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A
HISTORY OF NAVAL TACTICS
FROM 1530 TO 1930

The Evolution of
Tactical Maxims

A HISTORY OF NAVAL TACTICS FROM 1530 TO 1930

The Evolution of Tactical Maxims

By

REAR ADMIRAL S. S. ROBISON, U. S. Navy (Retired)
(Former Commander in Chief, U. S. Fleet)

and

MARY L. ROBISON



THE UNITED STATES NAVAL INSTITUTE
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THIS BOOK is dedicated to the late ADMIRAL CHARLES F. HUGHES, U. S. Navy, a great seaman, and to our comrades in the Navy in memory of many happy years.

M. L. R. - S. S. R.

. . . A captain of the line "must" at this day be a tactician. A captain of a cruising frigate "may make shift" without having ever heard of naval tactics.

PAUL JONES, 1783.

Evolutions and signals are the very sinews of marine duty and without proper knowledge and attention to them ships had better be kept at home.

TRUXTUN, 1797.

The best protection against the enemy's fire is a well-directed fire from your own guns.

FARRAGUT, 1862.

. . . In fleet fighting . . . each vessel is but part of a whole and cannot be considered whipped until the whole fleet is beaten. It becomes therefore the imperative duty of each captain in a fleet to fight his vessel while he has a gun to fire, a bow to ram with, or a deck to stand upon; for however crippled he may be, so long as he fights, he is rendering good service to his comrades by keeping an enemy from turning his guns on them.

FOXHALL PARKER, 1868.

FOREWORD

THIS BOOK was made possible only through the never failing courtesy of the former Librarian of the United States Naval Academy, Professor R. J. Duval; the Assistant Librarian, Mr. Louis H. Bolander; and the members of the library staff.

Acknowledgment is also due to Mrs. Constance Lathrop and the staff of the Navy Department Library for their kind responses to all requests; to Professor Allan Westcott, U.S.N.A., for correcting the manuscript and the proof; and to the staff of the Naval Institute for their friendly aid and assistance.

In treating of historical incidents from so many sources, errors cannot be avoided. Such as exist, we believe, do not vitiate the sense or meaning of the subject to which they relate.

Credit is given in the text to authors whose writings are referred to or quoted, and our thanks are tendered to the authors and publishers, who have graciously permitted us to use their illustrations.

M. L. R. - S. S. R.

September 8, 1933-December 19, 1940.

INTRODUCTION

IT HAS BEEN SAID that we are the sum of all who have gone before. The past carries through to the present. Unconsciously through association with seniors, and consciously by study, observation, and experience we assimilate, and are influenced by the tactics evolved and practiced in the navies of earlier days.

They form the background of naval knowledge, and are properly a strong, though not a governing factor, in directing the trend of naval tactical thought.

The written record of naval tactics is fairly complete from the time of the practical disappearance of the galley from naval warfare up to the present.

Sails for fighting ships date from many centuries B.C.; but fighting under sail was practically unknown until cannon were mounted where oars had been. With cannon came fighting at a distance as contrasted with fighting hand to hand. During the three centuries following the last great battle under oars, fighting under sail became almost as standardized as fighting under oars had been since the dawn of history.

Then, in the short space of twenty years sails gave place to steam, wood to metal, oak to armor, and smooth bores to rifled cannon.

The rostrum, or beaked prow, of the ancients was revived in the ram. The ram dominated naval construction, and to a large extent naval tactics, for forty years.

The battle between guns and armor began—and still continues. To the gun have been added new weapons—mines and torpedoes from beneath the waves; bombs from the air above.

Because the offensive and defensive qualities of men-of-war are relative and not absolute, tactical maxims which are valid at one period may have to be discarded at another; and always sound tactics must be based on the quality of the weapons employed and of the structures which carry them.

To bring together under one cover for convenient comparison and study the naval tactics of four centuries is the object of this work.

In its essential form it dates from September, 1933. As stated in the Supplementary Chapter (LIII), press of other matters prevented completion of the final draft until the end of 1940, by which time a second world war had been raging for more than a year.

The Supplementary Chapter is largely the contribution of Captain W. J. Ruble, U. S. Navy.

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A HISTORY OF NAVAL TACTICS FROM 1530 TO 1930

The Evolution of Tactical Maxims

CHAPTER I

EARLY ENGLISH NAVAL BATTLES

ABOUT THE MIDDLE of the 19th century, shortly after the value of steam propulsion for men-of-war had been demonstrated in Mexican waters and at the bombardment of Acre, and when the supremacy of sails was being questioned, Robert Allen, R.N., compiled his *Battles of the British Navy.*

His object, in his own words, was to place

within reach of his countrymen an impartial record of those great and glorious conflicts on the ocean by which England had gained her supremacy among nations.

Basing chronology on Allen and relying for the wider view on the *History of the Royal Navy* by W. Laird Clowes and his collaborators, if we follow England's naval history both before and after she became mistress of the seas, we shall by-pass few, if any, actions fought under sail which are important to the student of naval tactics.

The English as allies or opponents fought with or against every other naval power. Great sea battles were fought in which they were not participants, but no tactical maxims which were not known to the English can be traced to such battles.

Allen begins his chronicle with an account of the capture of a Turkish dromon off Beirut on the coast of Asia Minor, on June 7, 1191, by galleys from the fleet of Richard the Lion Hearted, King of England, and leader of the Third Crusade for the rescue of Jerusalem from the infidel.

A dromon, in its usual meaning, was a fast man-of-war galley of one or more banks of oars, using sail only when making a passage; but the vessel in this action was described as an immense, high-sided, three-masted sailing ship, carrying 1,500 men.

The Turks replied to the attack of the Crusaders

with showers of missiles, Greek fire, and other combustibles. To board so lofty a ship from galleys was no easy task; but being personally urged on by Richard, some of the galley men jumped overboard and diving under the vessel's bottom, attached ropes to her rudder, by which means they gained the power of steering her. Some of the most agile now ascended her sides but so numerous and brave were her defenders that the assailants were overpowered. As a last resort the galleys were ordered to try the effect of their beaks. They receded, and forming a line

to windward, the crews urged their galleys with all the power they could bring to bear, and with such velocity did they strike the object with their iron prows that the sides of the dromon were sufficiently pierced to admit the water. The Turkish ship sank, and out of 1,500 men said to have been on board, only 55 were spared.

The dreaded Greek fire, whose secret was so long and so jealously guarded by the Eastern nations, had become familiar to Westerners, and at this period was used by Crusaders as well as Saracens. It was a mixture of sulphur, crude oil (though any other oil would serve), and probably quick (unslaked) lime, which, when wetted, would generate enough heat to ignite the oil and sulphur. This substance was forced through tubes, called syphons, manned by regular crews whose skill was comparable to that of gunners of later days. (See *Naval Warfare Under Oars,* Rear Admiral W. L. Rodgers, U.S.N.)

Arrows—plain or flaming—were used during the approach; stone-throwers and Greek fire when close aboard. Then the ram was brought into play, to carry away the enemy oars, or pierce his side, preliminary to boarding, which was always the final step unless the enemy had been sunk by the ram. After boarding, swords, axes, and lances were wielded, and masts and rigging were cut away by men told off for that duty to prevent possible escape under sail. The Romans invented a yard, specially braced and prepared, for bringing down enemy masts in a surge past, before boarding.

In his *Greek and Roman Naval Warfare,* Admiral Rodgers concludes that neither large nor small galleys could *spurt* much over seven knots. What speed oars and sail combined could make is conjectural; but seven knots was sufficient to force an iron beak through a thick side.

The passive defense was thickness of side, covered decks, catheads extending well out-board to ward off attempts to sweep a side clear, and hand shields which were lined up as a bulwark against arrows during the approach and employed individually in the hand-to-hand combat after boarding.

The English, French, and Spanish learned much of Mediterranean ships during the Crusades. They imported Italian shipwrights and hired Genoese galleys and seamen to augment their fleets and fight in their battles, but only sails could cope with the strong currents and turbulent seas of northern waters, such as the Bay of Biscay, English Channel, North Sea, and the vast stretches of the Atlantic. Galleys there were the exception rather than the rule for fighting ships.

The small galleys in which, centuries earlier, Norsemen invaded the Mediterranean were manned by freemen—freebooters and pirates,

fighting men as well as oarsmen. Rowers in the Mediterranean were slaves or captives, sometimes chained to their thwarts.

The French—almost up to modern times—condemned criminals to the galleys, but these were almost solely employed in the Mediterranean. In later years, galleys were merely prison hulks. British galleys were not manned by slaves.

In 1293, a century after Coeur de Lion's exploit off Beirut, a staged sea fight, in which galleys undoubtedly bore a part, took place in the middle of the English Channel. In describing this action, Allen, in his dry and purely factual style, yields some interesting details

Mariners of the Cinque Ports, guardians of England's Chan ' coast, considered themselves lords of the sea. Some of their exploits approached piracy. There was no love lost between them and their fiery Norman neighbors across the Channel. Ravaging each other's coasts in undeclared war was a favorite pastime.

Allen says,

An En ish ship belonging to the Cinque Ports, having entered a port in Normandy, the cr r were attacked, while procuring fresh water, by some Norman fishermen, and o : man killed.

In onsequence of this fracas the Normans assembled all their forces expecting the English to take revenge and the latter to repel further insult. The Normans afterwards added to their former crime that of hanging the crews of two English vessels which they captured, and at the same time hanged an equal number of dogs, implying that they entertained no sort of difference between the two races.

The Cinque Port mariners immediately prepared to revenge this insulting cruelty, and after numerous acts of hostility committed on both sides, it was at length resolved that the matter should be settled in one grand fight.

A ship was stationed halfway between the coasts of England and Normandy and on the 14th of April (or 14th of May, according to another authority) the action took place.

Both parties had obtained assistance from their neighbors. The English from the Irish and Dutch, and the French from the Flemish and Genoese, and the assembled fleets amounted to a little short of 200 on each side.

Snow and hail preluded the encounter which is described as having been most terrific. Thousands fell, and a number of ships were destroyed when victory decided in favour of the English. The latter returned in triumph, attended by numerous prizes.

The French king [Philip IV, the Fair] demanded satisfaction for the loss sustained by his subjects and it was ultimately agreed to give him possession of Gascony for forty days. At the expiration of this period Philip refused to restore that possession and Edward [I] determined to regain it by force of arms.

This bizarre struggle and the equally amazing indemnity awarded the losers might readily be considered a figment, but historians vouch for both. Clowes names two leaders, Robert Tiptoft and Charles of Valois.

No names of other leaders on either side of this *grande mêlée* have come down to us. It may fairly be presumed that in such a joust every weapon and every tactical maneuver known would be skilfully employed. Quite possibly quick-lime was used, a missile of the period that was thrown in the eyes of the enemy when boarding from windward.

This battle was unique. Knights in former days met and fought by appointment. Armies have watched chosen champions battle between the lines. Single ships have challenged each other to combat, but there is no other record of either armies or fleets joining in battle at a previously agreed time and place. But from neither the victors nor the vanquished comes any account of the commanders, the crews, the ships, the weapons, the stratagems, or the tactics which contributed to the result.

Allen found no other sea battle worthy of note until nearly half a century after the sea-tourney of 1293. In this later period Edward III, King of England for fifty years from 1327, claimed the French throne in right of his mother, Isabella of France, and his attempts to make the claim good brought on the Hundred Years' War, dating from 1337.

Edward fought in person on both land and sea. He commanded the English fleet at the battle of Sluys, on June 24, 1340. In pursuance of his claim to the French crown he had assembled an army, and a fleet to transport it to Flanders, when he learned that the French King Philip VI was collecting a large fleet in the harbor, or roadstead, of Sluys, near the south side of the entrance to the Scheldt. It appears that the French planned to prevent the English from landing and possibly hoped to follow this up with an invasion of England. Philip's fleet of over 200 ships included a Genoese detachment, commanded by a celebrated Genoese admiral, Barbenoire.

Some of the largest ships in the French fleet had been previously captured from the English. Among them the "cog" (ship) *Christopher,* of which more later.

Against the advice of Barbenoire, who urged going to sea, King Philip's admirals, Hué Quieret and Nicholas Béhuchet, on hearing of the approach of the English, decided to accept battle at anchor, and according to Hannay they formed their ships in three or four lines, chained together, with a few of the largest stationed to seaward as outposts.

Edward arrived off the port on June 23 with about 250 sail, including transports. The royal banner was displayed on the cog *Thomas,* which appears to have been his favorite flagship. He anchored his fleet off shore and reconnoitered the French position.

The next forenoon he formed for the approach in two lines and stood on and off until afternoon in order to have the sun at his back when he attacked. This hauling off, one account states, caused the French to believe that Edward was retreating and they cast off their moorings and pursued. It is agreed that a hand-to-hand conflict followed which held through the afternoon and the short June night.

Some of the attendants of Edward's consort were on board the *Thomas,* or a transport, as it is recorded that one of Queen Philippa's ladies was killed in the battle.

Barbenoire, with his squadron, escaped to sea on the morning of the 25th with two English prizes. In all other respects the English were completely successful. The French fleet was destroyed, Quieret killed, and Béhuchet hanged. It is claimed that of the 35,000 men in the French fleet, 30,000 were lost.

Allen says that the *Christopher,* one of the French outpost ships, was full of Genoese archers:

> Flights of arrows darkened the sky; huge stones and missiles of every kind used in warfare fell in all directions, dealing death, contusions, and wounds, while hand-to-hand engaged the men-at-arms and brave mariners. Hatchets, lances, swords, and every available weapon found full employment.
>
> The ships clustered together . . . all that strength and valour could accomplish on either side was performed. In the end the French were completely defeated, with terrific slaughter.

Four days after the battle, King Edward sent off the first English naval despatch of record. It was written in French to his son Edward, the Black Prince, then a boy of ten, at Waltham Abbey. Edward had been designated as "Warden" of England during his father's absence.

The despatch, a somewhat lengthy one, begins "Most Dear Sir," and ends, "Most dear son may God be the keeper of you. Given under our secret seal in our ship, cog *Thomas,* Wednesday, the eve of St. Peter and St. Paul."

King Edward reported the enemy as having 190 ships, galleys, and barges, of which all but 24 were captured, and that their crews, "men-at-arms and other armed people amounted to 35,000," but he does not give his own force. Evidently with some pride, he wrote,

> . . . all our ships, that is to say the *Christopher* and others which were lost at Middleburg, are now re-taken, and there are taken in this fleet three or four as large as the *Christopher.*

Authorities do not agree as to the earliest date that guns were mounted on English men-of-war. They do agree that brass and iron balls were

made in Florence in 1326 and that guns were used on ships or galleys as early as 1350.

Cannon could have been no novelty to the Genoese Barbenoire, as Genoa and Venice were then century-old rivals for the mastery of the eastern Mediterranean and remained so until the final defeat of the Genoese at Chioggia in 1380, after which Venice reigned supreme for two more centuries.

W. Laird Clowes in his *History of the Royal Navy* states that three iron cannon with chambers, and a hand gun, figured among the stores of the ship *Christopher of the Tower* in June, 1338. The barge *Mary of the Tower* had an iron cannon with two chambers and a brass cannon with one chamber. *Bernard of the Tower* had two iron cannon. Again quoting from Clowes:

> In 1340, two notable ships of the King of England, whereof one was called the *Christopher* and the other the *Edward,* with some common ships, heavily laden, were captured at sea by the French, but not without much bloodshed, for upwards of 1,000 English were there slain and the battle lasted nearly a whole day.

Immediately on her re-capture at the Battle of Sluys the *Christopher* was used to attack the galleys of the French allies, the Genoese. No mention is made of her guns in this battle, nor is it known whether the French and Italians had guns mounted on their ships.

Dials and sailing needles are mentioned among ship stores as early as the date of the battle of Sluys and the clerk of the *George,* one of the ships participating in that battle, reports six shillings spent for twelve stones called adamants. But notices of the magnet are not numerous, even as late as 1440, although many reports of guns are found

According to Giovanni Villani, a noted Florentine citizen, traveler, and chronicler who died in 1348, the English had guns mounted on carriages at the battle of Crécy, in 1346, which threw little iron bullets *"avec des éclairs de feu."*

Meyer, the Prussian author of a history of firearms written in 1834, remarks that other descriptions of the battle of Crécy do not mention guns, but he states that the English had firearms at the siege of Calais in 1347, and that they had them still earlier on their ships.

Edward is said to have taken with him to Calais, "Ingyners lvii, artellers vi, gonners vi." These men were paid sixpence per day. Lieutenant Colonel Brackenbury, from whose treatise on ancient cannon in Europe this fact concerning the siege is quoted, also tells us that the word "gunnis" was employed for "gun," and considers that "gonne" was a corruption or abbreviation of "mangonel," one of the stone-

throwing engines in use before the days of gunpowder. Earlier than this, Edward is credited with having used cannon against the Scots in 1327, of shipping them to France in 1345, and of buying all available saltpeter and sulphur in 1346.

The early history of ordnance, ashore and afloat, is obscure, partly because printing was not invented until a century after the battle of Crécy, and almost another century elapsed before it was used to record the history of contemporary technical matters. All original records of the years of which we are writing exist only in manuscript.

No description, for instance, is extant of the manner in which the *Christopher's* guns were mounted; that is, whether in cradles or on trunnions.

In 1350, Edward III took command of another English fleet, on this occasion against the Spanish, who having captured some English ships and murdered their crews, had threatened to destroy all English shipping.

As in 1340, the royal standard was on the cog *Thomas*. The king's son the Black Prince was in command of another ship, and distributed through the fleet were many great personages, including about 400 knights.

Edward embarked at Winchelsea, August 28, and sighted the Spanish at 4 P.M. the following day,

> with forty large ships, denominated carracks [heavily built vessels, designed for either commerce or war]. So strong and handsome were they, that they were the theme of admiration to all beholders. Each mast was decorated with rich standards and banners and their tops filled with soldiers and missiles.

Edward led the attack. In laying the *Thomas* alongside a heavy carrack, his ship's mast went over the side, drowning the topmen. She also sprung a dangerous leak. The carrack got clear. He managed to board and capture another, and finding the *Thomas* sinking, abandoned her for the prize "and pushed into the thickest of the fight."

The Prince's ship was likewise sinking when his adversary was boarded and captured by the Earl of Lancaster and the Prince and his crew were taken into the prize just before their own ship foundered.

Edward captured in all 26 large Spanish ships and took them into Rye.

This battle gained for him the title of "King of the Sea"; but Allen says:

> The successes attending the arms of England while they, for a time, paralyzed the efforts of her enemies, had the effect of rendering the people supine and careless

of their best bulwarks, and numerous were the inroads made upon her shipping and seacoast.

What Colomb called "cross ravaging" and the transport of armies, rather than "the command of the sea" were the objectives of fleets of that era, except in the Levant, where control of trade and trade routes were the prizes at stake.

One of the oldest fleet orders which has come down to us verbatim dates from 1365.

In 1894, Rear Admiral S. B. Luce contributed to the U. S. Naval Institute *Proceedings* a translation by Medical Director Philip Lansdale, U.S.N., of:

ORDERS AND SIGNALS
OF THE VENETIAN FLEET COMMANDED BY
MR. JAMES DOLFIN, A.D. 1365

We owe this contribution to the history of naval tactics primarily to Rear Admiral Luigi Fincati of the Italian Navy, an able and prolific writer on the art, some of whose productions appear in other issues of the Institute PROCEEDINGS.

Admiral Luce in his preface, says:

. . . It will be seen with how few and very simple signals, sustained by intelligent preliminary arrangements, all the necessities of navigation and battle could be provided for.

The orders were issued:

Sept. 9, 1365.

In the name of God, of the Virgin Mary, and of Mr. St. Mark the Evangelist, our Chief, and all the Saints.

Orders,

given in the noble name of Mr. James Dolfin, Captain of the four galleys of the Station of Cyprus.

The substance of these orders and signals has appeared in all naval signal codes up to the present day. Some excerpts follow:

FORMATIONS

Item. Whenever the captain shall desire the fleet to draw up in line of battle abreast, he shall cause his cornet to be placed upon the beacon inclined towards the head of the "standard"; that is, towards the prow.

And when he wishes to form line ahead [in file, one behind another] he will cause the cornet to be raised, and this shall be observed under penalty of forty soldi [32 cents] for each time that it shall be transgressed.

MAKING SAIL AT NIGHT

Item. If the captain wishes to make sail at night with the mizzen he will show two lights amidships, one by the side of the other.

If he wishes to set the foresail he will show three lights amidships, one by the side of the other.

If he wishes to set the *papafiga* (mainsail), he will show in the same manner, four lights.

These signals indicate that the galleys in this fleet carried three masts.

ACTION SIGNALS

If it should happen that the captain desires to go into action, he will hoist the flag, with his arms, on the right side of the poop; each galley will then take her assigned position, and at the first sound of the trumpet each will get ready the proper arms. At the second call every one must be armed and ready. At the third, every one is to follow the captain and fight vigorously, or stand firm and ready to receive the enemy, as may be ordered; or maintain the conflict and fight vigorously until the battle is ended, and this shall be observed under forfeiture of the head of whoever may infringe it.

Another Venetian commander, Il Signore Piero Mocenigo, words his action instructions more forcibly.

. . . When they shall see hoisted amidships the square banner of our Lord Jesus Christ, they shall hasten every one ardently and in good order, without one galley fouling another, to assail the enemy and shall not withdraw from the fight until the last extremity. And if, peradventure, anyone shall attempt to assail before the signal or shall attempt to withdraw from the engagement he shall be punished as a traitor.

. . . if a ship fails to take part in the action, or having taken part, retires before the combat is finished, the commander, officers, sailors, and steersmen shall lose their heads, and if any of them cannot be found, they shall be forever banished from Venice and from all territory subject to the Duke and commands of Venice.

Those only excepted who *manifestly* were not culpable, and this cannot be revoked but by five Councillors, thirty of "the Forty," and two-thirds of the Great Council.

These orders predicate battle under oars.

WHEN LEAVING PORT AND WHEN SIGHTING AN ENEMY

Whenever the fleet shall prepare to leave port, the guardship shall not abandon her post until daylight, when she will precede the fleet at sea by one or two miles; and at sunrise she should hoist a flag and send a man aloft to scan the horizon. If she discover one or more armed vessels, she will hoist the flag of St. Mark and lower and run it up as many times as there may be ships in sight.

CHAPTER II

SHIPS, GUNS, AND GUNNERY OF 14TH AND 15TH CENTURIES

ALLEN FINDS but few sea battles of moment between Edward's victory of Winchelsea and the end of the 15th century. One of these in 1372 may be noted because it is definitely stated that the Spanish ships mounted *cannon,* and from the account of the battle it may be assumed that the English ships did not. The occasion was an attempt to relieve La Rochelle with a small fleet under the Earl of Pembroke. He was overcome by a larger Spanish fleet of heavier ships. The English fleet was practically destroyed and the Earl captured.

Allen says that pirates or private adventurers who differed little from pirates kept up the naval prowess of England until 1492, when the navy was revived under Henry VII, who came to the throne in 1485.

Clowes speaks of guns as being quite common in 1416. Allen says that about 1492, cannon—meaning great guns—were generally mounted in ships of all countries. These may have been distinguished from small guns mounted in the fore and stern castles of ships as a defense against boarders in the waist. Cannon had to be fired over the bulwarks until after 1500, from which year portholes are said to date.

Fletcher in *Warships and Their Story* says that Henry VII began to build the *Great Harry,* England's first two-decker, in 1488. He also built the first naval dry dock at Portsmouth.

The photograph in the upper half of Fig. 5, page 26, shows the *Henry Grace à Dieu,* built by Henry VIII and often called the *Great Harry.* Many prints of ships then and later are very inaccurate.

These ships are said to have been topheavy, unwieldy, and poor sailers, but they actually navigated waters where strong currents change direction every hour, and tides rise 20 to 30 feet.

No large ship except the galleass was built exclusively for fighting. Cogs, carracks, caravels, and galleons served a double purpose, to fight, or to carry cargo. They were sailing ships. The galleass, while usually a three-master, had also a complete complement of rowers and was intended to fight under oars.

An account of the development in ships during the 14th and 15th centuries will be simplified by a short excursion into the past.

The oared galley, with raised bow and stern (forecastle and poop) and single mast with square sail, long antedated the Christian era.

Galleys were given flush decks by covering the intervening space be-

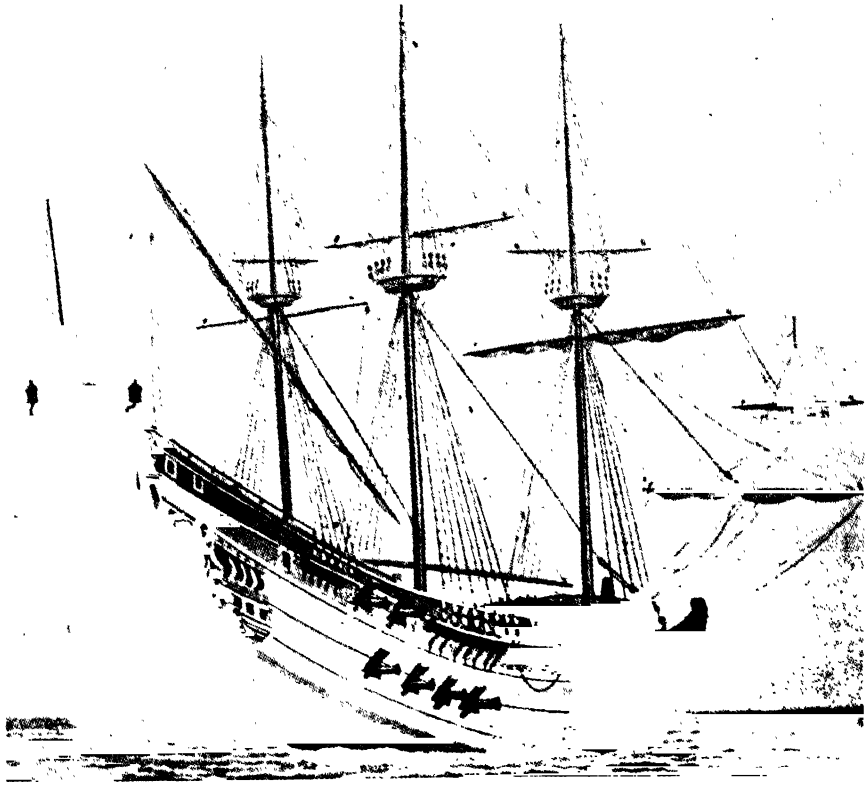


FIG. 1.—A Genoese Carrack. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

tween forecastle and poop to protect the rowers, and to enlarge the deck area for men-at-arms. As galleys increased in size, bows and sterns were again built up above the covered decks and thus became "castles" for defense against boarders.

In his *Greek and Roman Naval Warfare,* Admiral Rodgers reconstructs a Roman bireme of about 36 B.C., with a poop but no forecastle. He shows a tower near the stern and one forward of the poop for slingers and javelin throwers who cast over the heads of the men

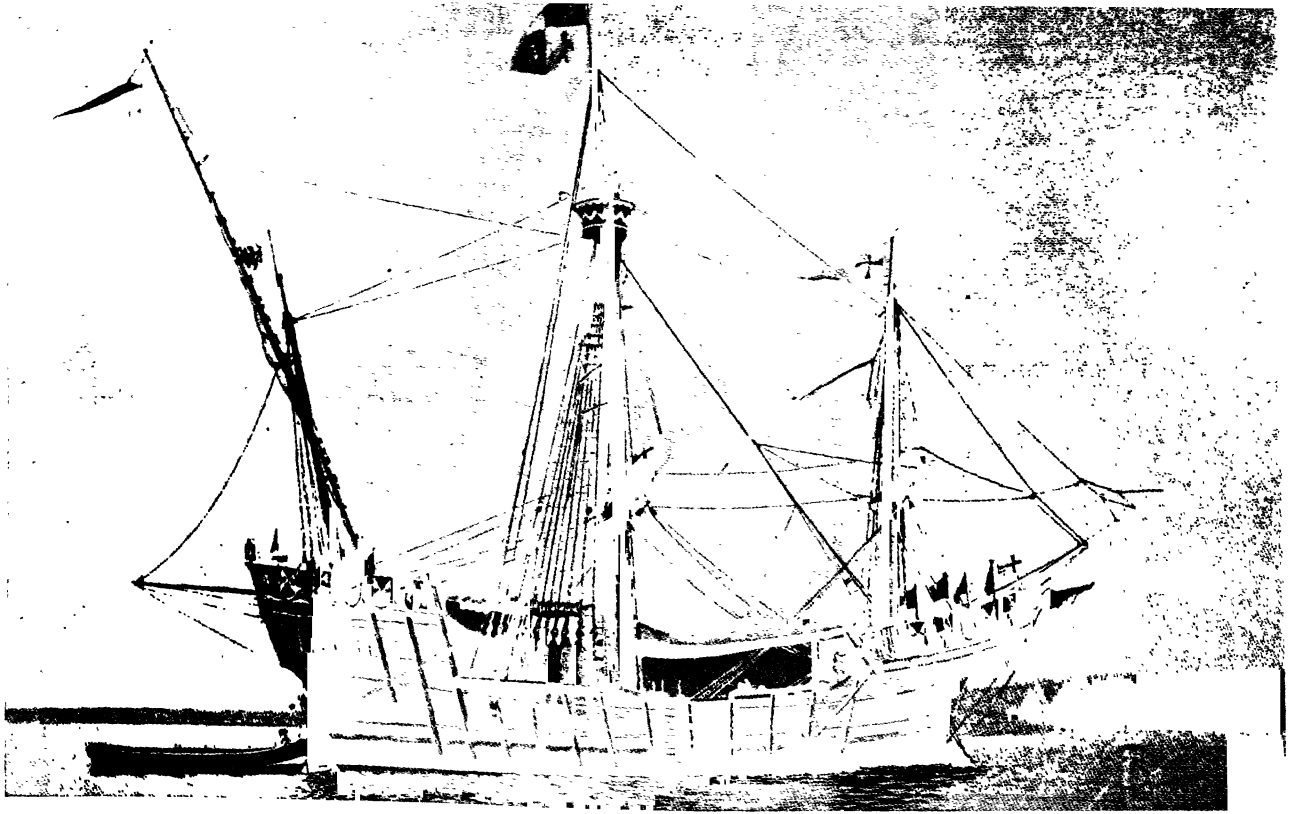


FIG. 2.—*Santa Maria.* Length of keel 60.68 ft.; length between p.p. 74.12 ft.; length, ship proper 93.00 ft.; length, overall 128.25 ft.; breadth, extreme, 25.71 ft. *(Courtesy Navy Department)*

on deck. In these, we see the genesis of the "fighting tops," first known as top-castles.

Admiral Rodgers also illustrates a "pentere" of Dionysius, in the 4th century B.C. which had a flush deck forward and a raised deck on two levels aft (half deck and poop). A stone-thrower (ballista) was mounted on each bow, and a steering oar, or paddle, on each quarter. Some galleys carried two steering paddles on each quarter and could also be turned by orders to the rowers.

F. L. Robertson, Engineer-Commander, R.N., in *The Evolution of Naval Armament,* says that by the end of the thirteenth century ships generally had two masts with a square sail on each; a central rudder appeared in place of the paddles fixed to the quarter and also a rudimentary bowsprit. He quotes Oppenheim on English ships, to the effect that, by the end of the fifteenth century, men-of-war were "three, or four masters, with topmast and topsails, bowsprit and sprit sail, conforming to the characteristics of the type which remained generally constant for more than two centuries" (Fig. 1).

Merchant cogs did not carry fighting tops nor the high fore and stern castles. These were added when they were "hired for war service."

As prints and models indicate, "war vessels at this time were lavishly decorated; the sails were silk, dyed red and embroidered with armorial designs; the tops and stages were aflame with banners and pennons; the masts and yards were gilt. Large sums of money were spent by the knights in beautifying their ships."

In 1340 King Edward's cog *Thomas* is said to have carried a crew of 85 men. Large cogs measured about 250 tons. Their length and beam were approximately as 3 to 1. Few, if any, actual dimensions have come down to us.

The *Great Harry,* nearly a century and a half later, may have displaced nearly 1,000 tons and carried a crew of over 500 men. As for contemporary smaller ships, we have replicas of Columbus' caravels built for the U. S. Columbian Exposition. As far as available knowledge allowed, the *Nina, Pinta,* and *Santa Maria* in dimensions and equipment were replicas of those of 1492 (Fig. 2).

Although the fleet orders quoted in Chapter I make no reference to guns, it is known that guns were mounted on ships in the Mediterranean prior to 1365 and were fired in battle from the bows of galleys, where they may have displaced the tubes for launching Greek fire. There were practical difficulties in the way of employing large calibered guns on ships, but these could be overcome on land.

Lieutenant Colonel Brackenbury, who seems to have taken great pains to consult copies of original documents, is definite in his statement that in 1377 a muzzle-loading cannon throwing a projectile (stone) weighing 450 pounds was cast for the Duke of Burgundy. He says,

> There seem to have been, in France at least, no slow intermediate steps between the small breech-loading and muzzle-loading cannon, projecting arrows and leaden bullets of less than two pounds, and the gigantic cannon, hurling its massive stones.

Such great guns were called bombards or wall-breakers for breaching the defenses of besieged towns.

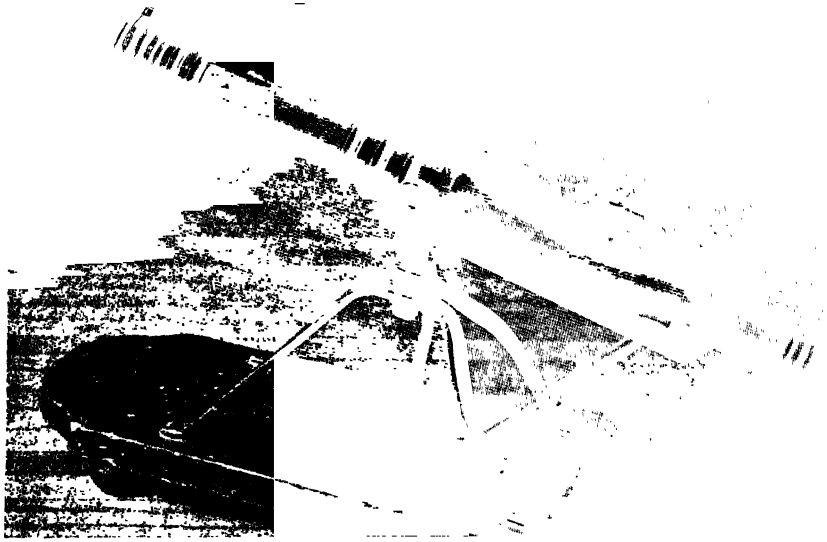


FIG. 3.—Ancient Chinese Gun. (*Courtesy U. S. Naval Academy Museum*)

The earliest guns were breech-loaders. The chamber was separate from the tube and some writers say that it was loaded with both charge and projectile before it was placed in position and wedged, or held, by a distance piece.

There are three ancient breech-loading guns, now at the U. S. Naval Academy, which were captured in Korea in 1871. They have been described in the Naval Institute *Proceedings*. Various dates of manufacture from 1313 onward have been assigned to them—on what authority is not known. They are said to be of Chinese origin and are made in three pieces. The breech-piece (1) is bolted or riveted to the tube (2) containing an opening in which the chamber (3) is placed with its

mouth against, or partly inside of, the rear end of the tube. Slotted openings in each side of the breech-piece provide for a wedge to hold the chamber in position. Each chamber has a touch-hole on its right side near the top about three inches from the rear end. Each has a projecting prong of iron rising from it at a right angle, about two inches, and then bent forward to form a handle. These guns have fixed front and trunnion sights which could readily have been added after the use of sights became known in China (Fig. 3).

Both in muzzle-loading and breech-loading guns, "chamber" came to signify the space in the breech end of the bore, designed to contain the powder charge. Generally speaking, a gun was called *chambered* if the breech end was made other than the full-sized cylindrical shape of the rest of the bore.

On the Continent, the movable chamber was called the "cannon." Gunners were called "cannoniers" before the end of the century, but in England, "gonne" or "gunne" was more frequently used than "cannon" and the name included the whole—chamber and tube.

Brackenbury quotes from Chaucer (1340-1400), who had himself had military experience at home and in Italy:

> As swifte as a pillet out of a gonne
> When fire is in the pouder ronne.

The small opening in the cannon through which fire was applied to the charge became known as the touch-hole or vent, and according to Brackenbury, contemporary records show that with cannon or bombards came iron pans for charcoal and bellows for blowing the charcoal, evidently to heat the irons used to fire the powder with which the touch-hole was filled.

The firing-iron preceded both torch and linstock, the latter being used at a later date to hold the slow-match. The slow-match, or, as it came to be known, the *match,* kept its place as the means of firing all guns on land and sea until the end of the 18th century when the flint-lock was invented. Long after the introduction of flint-locks, however, the match rope and match tub were brought to each gun at "cast loose and provide," as a final resort in case of trouble with the newer means of firing.

Again Brackenbury quotes from Reducius, what he believed to be the earliest description of loading and firing a bombard. It was written in 1376:

> The bombard is an iron instrument of great strength with a wide tube in front in which is a round stone of the size of the tube and it has a cannon joined to it

at its rear and twice as long as the tube but narrower in which a black powder made of saltpeter, sulphur and willow charcoal is inserted through the opening of the cannon towards its mouth. This opening is then closed with a wooden plug which is pressed in and when the round stone has been inserted and adjusted against the mouth of the cannon fire is applied through a smaller opening of the cannon and the stone is projected with great impetus by the force of the lighted powder, nor can any walls no matter how strong withstand it as was found out by experience in the following wars and when these bombards thus belched forth stones the people thought that God was thundering from above.

But what of the gun after the Duke of Burgundy's 450-pounder muzzle-loading bombard of 1377?

Siege guns continued to increase in all dimensions—length, weight, and caliber. Some of the largest still exist.

Of these, the oldest are two wrought-iron guns, abandoned by the English at Mont St. Michel in Normandy in 1424. These, or others like them, had been used at the siege of Le Mans. The calibers are 15″ and 19″, respectively; overall length 156 and 197 inches. When examined in 1863, each had a stone shot in the bore.

Next in age is the "Dulle Griete" bombard of Ghent, caliber 25″, cast sometime after 1430 and probably used by Mohammed II as a model for the great guns employed at the siege of Constantinople in 1453.

Mohammed's guns, used during that siege, are said to have been cast close to the sites where they were to be fired. The ingredients of the powder were likewise assembled and mixed near the place it was to be used.

Saltpeter was difficult to obtain and the sources of supply were carefully guarded, not only by Mohammed, but by other rulers. It was not pure, nor was the sulphur. Charcoal, likewise, varied in quality. No two batches of powder were exactly alike, which undoubtedly explains the statement that the Turks, during the siege which lasted 53 days, fired ranging shots from small pieces daily. "Les Turcs commencent toujours par tirer d'abord quelques coups avec les pièces de petit calibre et regler apres ce tir, celui des grandes bombardes."

Measurement of the chamber of one of the 20″ Turkish guns showed a capacity for 150 pounds of powder.

Guns of 25″ were used during the siege, and however slow the rate of fire the tonnage of powder and of stone shot expended was a large item. Two of these stone shot flank the approach to the Superintendent's office at the U. S. Naval Academy.

One of the 25″ guns, weighing 18¾ tons, was presented to the British

Government in 1868. At that time, 21 others, varying in caliber from 19½ to 29½ inches, were mounted in the forts guarding the entrance to the Dardanelles. As many as 63 of these were reported in 1829, at which time, carriages for them were being provided. They had been used with effect in 1807 against the British squadron under Sir John Duckworth.

These, like other large guns made on the Continent in the 15th century, were in two parts screwed together; one containing the chamber and the other the barrel, or tube. Each end of each part mounted a ring which contained holes for handspikes for screwing the parts together and for rolling them into place. They were fired resting on the ground, with the muzzle wedged up to the elevation desired.

One author (Fletcher) says that in sieges where bombards were employed, it was the custom to load them at night and fire them in the morning. After they had been fired, the siege proceeded in other forms during the day. Other accounts give the maximum rate of fire as from four to seven shots a day.

There are some records of Mohammed's guns at the siege of Scutari in Albania in 1478. This siege lasted 29 days. On the first day, the two guns in position fired seven shots.

The largest number of guns used was eleven. They varied in caliber from not less than 20″ to over 33″.

The maximum number of shots in any one day was 194; four days before the end of the siege. Assuming all guns firing, this indicates a rate of fire of 17 shots per gun per day.

The stone shot from the 33″ gun weighed 1640 pounds. About 250 tons of powder and not less than 1,000 tons of stone shot were expended during the siege.

Mohammed's ordnance officers were men of no mean ability. The year before his death, in 1481, sixteen great guns and some large mortars were cast for his long threatened, but unsuccessful siege of Rhodes. These guns were 18 feet long and their calibers ranged from 24 to 36 inches.

Rhodes is about 500 miles from Constantinople and the guns had to be transported by water, although there were nearby mainland harbors that could have served as bases of operations. This was Mohammed's greatest naval expedition.

He is credited with having brought about the invention of mortars for high angle fire at the siege of Constantinople.

During the siege it was found impracticable to fire at shipping because

of the intervening walls of Galata. The Sultan called his people together and demanded a plan that would make it possible to fire upon the vessels anchored in the entrance to the port in such a way as to sink the vessels.

Accounts state that, no plan being forthcoming, he proposed a new kind of gun which would be capable of throwing its shot to a great height so that in falling it might sink the ship on which it descended.

Guns were cast according to the outline given by the Sultan and the Turks were successful in sinking a Genoese ship just 18 days after the order had been given for the new gun.

A British writer hinted that physical chastisement of the Turkish admiral lent a terrible stimulus to the activity of all concerned in the execution of Mohammed's orders.

There are records of other great bombards, but of only one rival of Mohammed's: the Russian "Tsar Pooshka," cast in one piece in 1556 and known as the "Great Gun of Moscow." It measured 213″ over all, caliber 36″, and weighed 38½ tons.

One smaller piece must be mentioned. A 20″ wrought-iron gun; a younger sister of "Dulle Griete," and like her, forged in two pieces, supposedly in Flanders, before 1460—possibly before 1455—and brought to Scotland by James II.

This gun is now at Edinburgh and was formerly known as "that mickle-mouth murtherer, Mons Meg."

Her weights of charge and projectile have been indefinitely but picturesquely referred to as "a peck of powder and a stone nearly as large as a Galloway cow."

Her work as a siege gun ended in 1497, after which she was preserved as a relic to be fired only during celebrations.

There is a record that shows it was thought necessary to fire a shot with each charge of powder, since men were hired in July, 1558, to find the shot and bring it back from "Weirdie Muir to the Castell of Edinburgh [about two miles] xs. viii d."

Meg made a water trip to London in 1754, but after a sojourn of 75 years she was returned with honors to her ancient quarters in the Castle. On this occasion, probably, she was in care of sailors, since there is an account of her having been "ourelaid with reid leid" [red lead] and having her fittings slushed with "Orckney" butter.

Some kings, or feudal lords, owning these *"brise-murs,"* would, when themselves at peace, loan or hire their guns to neighbors at war. With the gun went the gun captain and crew—mercenaries—who in some

cases, after artillery on wheels was developed, owned the guns they operated.

Gunners were a special skilled class, ashore or afloat, carried separately on muster rolls from other fighting men, and so they remained, down through the ages—the gunner and his gang, obeying the rules of their art; taught, and teaching others, always to treat explosives with respect.

It was not until the first quarter of the eighteenth century that the gunners became part of the standing military forces in Europe.

We are told that a master gunner whose service and guns were hired was often as much interested in the safety of his pieces as in their successful employment in battle and that fusiliers came into existence both to furnish protection to the gunners against infantry and to keep them from decamping when it appeared that their guns were in danger of capture.

About a century after the battle of Crécy, what was known as "corned powder" generally replaced the dry mixture called "serpentine." It was found safer and better to mix, or grind, the sulphur, niter, and charcoal into a paste with water. When dried and broken up the resultant grains could be made fairly uniform in size and showed greatly improved ballistic qualities, both in uniformity and strength.

The ingredients of the dry mixture, being of different specific gravities, tended to separate during transportation and handling. In the paste mixture, they were not only more thoroughly and minutely incorporated, but in drying, enough moisture remained to hold the particles in contact and prevent separation.

The improved powder required an increased thickness in the walls of guns for the same charge and projectile. Or the weight of gun remaining the same, a reduced charge and reduced caliber resulted.

Again, the use of cast-iron instead of stone for shot tended to reduce calibers, as an iron shot for the same weight was much smaller. Cast-iron was also used for guns.

This change, first generally made on the Continent, spread to England, although the substitution of iron instead of bronze for guns was by no means as universal as the change from stone to iron for shot.

The Turks were the exception. They did not know how to work iron and for nearly 400 years after the siege of Constantinople their guns—ashore and afloat—were made of bronze, and their shot, except when purchased, of stone.

Bronze for guns returned to favor from time to time. Stone shot did

not entirely disappear until sometime in the 19th century. They were included in the list of U. S. Army ordnance stores until after the war of 1812.

It is not known who first produced corned powder.

The secret of Greek fire was kept from the western world for centuries and it was natural that the Christian nations would incline to keep improvements from the infidel whom they dreaded and against whom they were continually warring.

Authors in general would not be encouraged to disclose military secrets in those times any more than in the present. This attitude may account for the lack of definite information over more than a century and a half concerning improvements in small and great guns and in their mounts and carriages. This applies to hand-guns and to ammunition as well.

The conservatism—reasonable and unreasonable—of military men, (both soldiers and sailors) must also be taken into account.

Stone-throwing machines and arrows could not destroy their possessors—especially on ships—as could Greek fire or gunpowder. Also the latter—granted that it could be employed at greater distances—slowed the rate, and therefore the volume of fire, materially, compared with that of trained mangonel crews and skilled archers.

It is said that an English archer who could not loose twelve arrows a minute considered himself disgraced.

The time required for priming and applying the match made arquebuses and muskets seem to most military men of that period less effective than the tried bow and arrow. The same objection applied to cannon, large and small. Protection of the priming powder from wind and rain and keeping the linstock or match at hand, or lighted, were even greater problems than loading.

But guns made their way. Medium sized cannon, afloat, were placed in fixed cradles where recoil could be controlled. Small guns—as many as 100 per ship—had swivel mounts in castles, tops, and on the rail.

Muzzle-loading guns gradually replaced breech-loaders, although cannon with chambers were used afloat probably as late as the accession of Elizabeth in 1558.

Muskets firing arrows—one of the earliest military uses of gunpowder—became popular in England and were employed against the ships of the Armada. They were also among the stores taken by Sir Richard Hawkins in the *Dainty* when he started round the world in 1593.

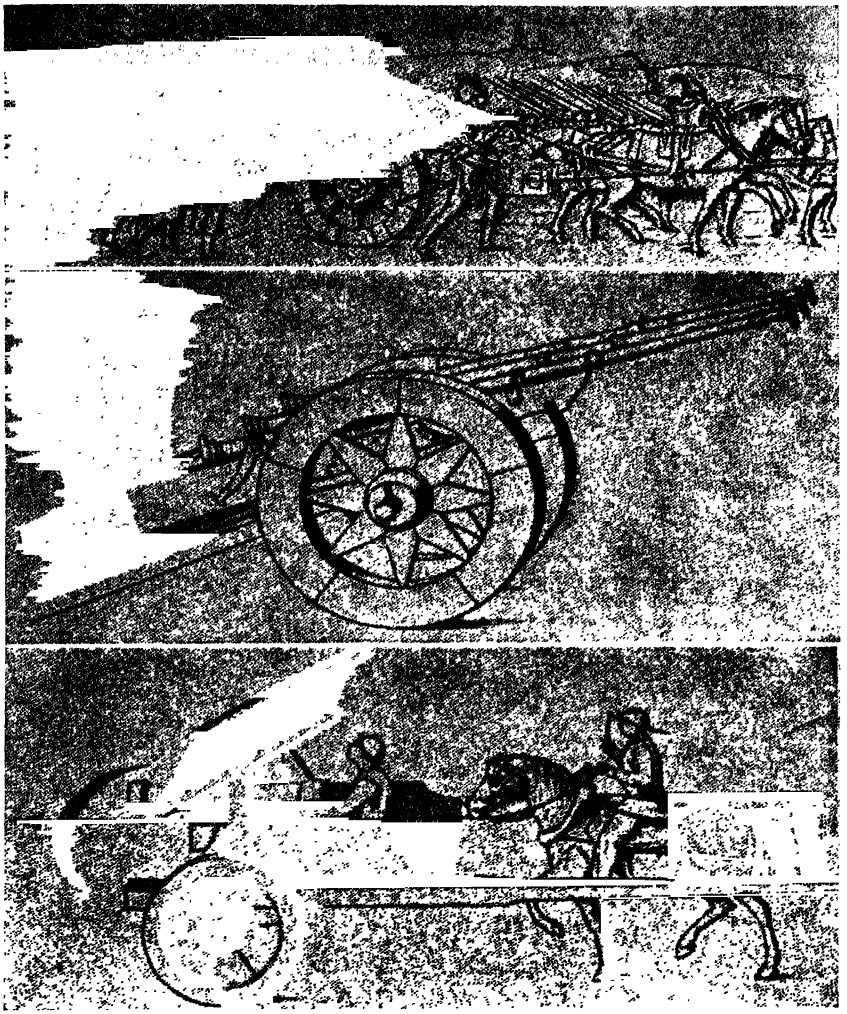


FIG. 4.—Fifteenth Century Field Artillery. (*Courtesy Encyclopaedia Britannica*)

Swivel mounts for small guns date from about 1450. The reconstructions of early field-pieces, shown here, are from the collection of Napoleon III, reproduced in the *Encyclopaedia Britannica*. Upper one, 15th century horse artillery, shows almost modern harness, armored lancers as gun-guards and crew, high-wheeled carriage with trail, muzzle-loading piece with tompion or muzzle-bag, and cascabel at breech.

Center, also 15th century, shows a triple-barreled breech-loader with

elevating rack. About this time, small guns mounted in carts were a feature in British civil wars.

Lower, from the same collection, is unique. It is labeled as an example of field artillery in 1525. The arrow and crescent might denote Turkish origin. The ring at the muzzle is similar to that on Turkish great guns of that period.

For ship guns, Robertson and other writers ascribe the invention of portholes to the French at Brest about 1500. Small holes were cut in the bulwarks of ships which would just permit the muzzles of the guns to protrude. These were soon followed by larger square ports, except for bow guns. For these, according to Charnock, small circular ports, permitting little if any train, were the common bow-ports in English ships and those of other nations until after the days of the Commonwealth. The amount of protection to sacrifice to secure greater train was a moot subject even to the 20th century.

Sailing ships, with their clear sides, were far better fitted for gun-ports than galleys and galleasses, where all openings were filled by oars, and guns were practically limited to the "coursier" for firing ahead.

It was inevitable that the sailing ship, thus armed, would drive the war galley from the seas.

CHAPTER III

EARLY 16TH CENTURY NAVAL WARFARE AND FIGHTING INSTRUCTIONS

THE SURVEY in Chapter II brings us to the time of the *Great Harry* and later; to Columbus and his caravels, the careful reproductions of which show us the model of the sailing ship of the period; and to the reigns of Henry VIII of England, Charles V of Spain, and Francis I of France. Each of these rulers, especially the first two, effected some degree of standardization of guns afloat and ashore. Some of these guns still exist.

The very great variety of kind and sizes of guns afloat, as shown by the inventory given below of the guns of the *Henry Grâce à Dieu,* indicates that some simplification was desirable in ship batteries.

Allen says the *Great Harry* was built in 1490. Clowes does not mention a *Great Harry* but does say that the *Sovereign* was built partly from the hull of an earlier *Grâce à Dieu* and probably launched in 1488, and that Henry VII built the *Regent,* an even larger ship, about the same time; that the *Regent* was lost at Brest in 1512 and the *Henry Grâce à Dieu* was built as a substitute. It matters little at this time which ship was the *Great Harry,* the one of 1490 or that of 1512.

The picture (Fig. 5) shown by Clowes in *The Royal Navy,* vol. I, p. 406, is reproduced as being more like a real ship than other drawings.

Christopher of the Tower and the cog *Thomas* did not compare in size with the *Great Harry,* estimated by some writers to have displaced 1,500 tons. Named after Henry VII, the first Tudor king, and either rebuilt or re-named *Henry Grâce à Dieu* in honor of his son, she is one of the notable ships of naval history.

Oppenheim in *The Administration of the Tudor Navy* gives an inventory of her battery in 1514. It comprised 122 iron serpentines, twelve "grete yron gonnes of oone makyng and bygnes." Twelve ditto "that came out of fflaunders"; all with separate chambers. Two "grete Spanish pieces of yron of oone sorte" with chambers. Eighteen "stone gonnes upon Trotill wheles" with chambers; "ffaucons of Brasse upon Totill wheles"; one "grete bumberde of Brasse upon iiij trotill wheles"; two "grete culverynes of Brasse upon unshodd wheles"; as well as a great "curtalle of Brasse upon iiij wheles"; also some brass serpentines on wheels. (Clowes credits the *Regent* with 229 serpentines.)

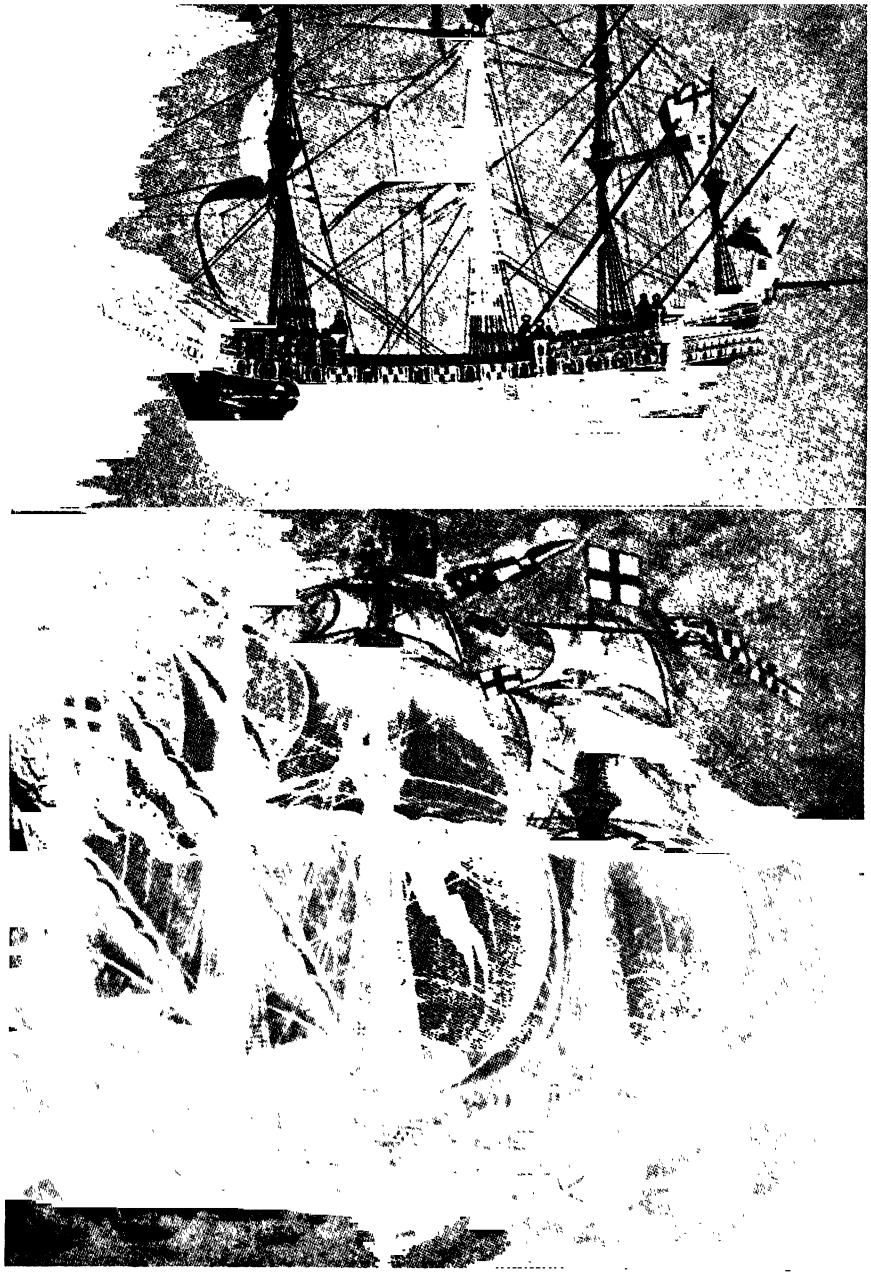


FIG. 5 (*top*).—Model of *Henry Grace à Dieu* or *Great Harry*. Launched 1514. (*From Chatterton's "Ship Models," published by Studio Publications, London*)

FIG. 5 (*bottom*).—The *Henry Grace à Dieu*. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Serpentines were portable guns, firing a ball about as large as a swan's egg from a barrel whose muzzle was wrought, or cast, in imitation of a snake or dragon's mouth—a gargoyle. Serpentines, as mounted on ships, were usually swivel guns, muzzle-loading.

Imagine serving the *Great Harry's* guns in action—loading each chamber with its proper charge of powder and wedging it in place against the shot in the barrel, or ramming home the charge and ball in the muzzle-loaders.

Some forty years later, in the reign of Queen Mary, the dangers of handling powder were guarded against by queenly order:

> Orders To Be Observed At The Seas In The Queen's Majesty's Ships:
> Before ye shall deal with your enemy that there may be straight charge given that the master-gunner do suffer no barrel, budge-barrel, or bags of powder to be carried about the ship, because there may be many fortunes of evil belonging to it; but if he shall need to lade his brass or cast pieces, to do it by cartridge which may be covered in mantells, or some other thing out of hazard of fire; and as for the lading of his chambers that it be done in the cook room, the fire being all quenched, and not upon the overlops, or decks, or any cabin.

At the time of the battle off Brest in 1512, Henry VIII was twenty-one years of age and had been three years on the throne.

War having been declared against France, Henry's fleet of 20 ships under Sir Edward Howard, Lord High Admiral, was sent to convoy an English army embarked in Spanish ships to the south of France, to co-operate with Henry's father-in-law, King Ferdinand.

On the return voyage, Admiral Howard landed his brother with a force at Le Conquet, near Brest, where they burnt towns and ravaged the country.

Learning that the French were fitting out a fleet in Brest, Henry collected an additional force of 25 large ships which he reviewed in person and sent to Admiral Howard's assistance. With his fleet of 45, the Admiral arrived off Brest on August 10, 1512.

According to accounts,

> When the Englishmen perceived the French Navy to be out of Brest advancing, then the Lord Admiral was very joyous and every man prepared according to his duty, the archers to shoot, the gunners to loose, the pages went to the topcastle with darts . . . [they were doubtless the midshipmen of that day]. The Englishmen approached towards the Frenchman which came fiercely forward . . . and when they were in sight they shot ordnance so terribly together that all the sea-coast sounded of it.

Allen says, "This is supposed to have been the first sea action in which great guns were extensively used."

The *Regent* and *Sovereign,* considered by Henry his two best ships, were part of Lord Howard's fleet. The *Sovereign* attacked the *Marie la Cordelière,* a French ship of great force which Anne, Queen of France, had built at her own cost. The *Sovereign's* captain was Sir Charles Brandon, later created Viscount Lisle.

Brandon got foul of the *Cordelière* in an unfavorable position, seeing which the captain of the *Regent* abandoned the ship he was chasing, came to the *Sovereign's* assistance and boarded the *Cordelière.* A French gunner, in desperation, is said to have fired the *Cordelière's* powder magazine which set fire to that ship and the *Regent.* Both ships were destroyed.

The remainder of the French fleet went back to Brest and adjacent ports.

Nine hundred men were lost in the *Cordelière.* The British lost 700 in the *Regent,* including her captain.

About 1530, Henry directed the drawing up and issue of "Orders to Be Used By The King's Majesty's Navy By The Sea." These orders are probably only repetitions or modifications of earlier ones, but they are the earliest that have been preserved—the first English tactical and fighting instructions of record.

The naval world is indebted to the British Navy Records Society for the collection and publication of "The Tactical and Fighting Instructions of the British Navy" from Henry's time to 1816. The Society selected the late Sir Julian Corbett (1854-1922), the distinguished naval historian and lecturer, to edit the available records. They were published in two volumes: *Fighting Instructions, (1530-1816)* in 1905; and *Signals and Instructions (1776-1794)* in 1908. They are volumes XXIX and XXXV, respectively, of the Society's publications. Volume XXXV contains important records of which the existence was not known to the Society until after 1905. The sources of the material in both volumes, subsequent to 1650, are tabulated in appendix F of Volume XXXV. These sources, up to 1796, are principally in manuscript.

Henry's orders of 1530 are in manuscript. Corbett gives extracts from them, having made minor corrections where necessary.

The paragraphs which relate directly to tactics and fighting are quoted in full below:

ORDERS TO BE USED BY THE KING'S MAJESTY'S NAVY BY THE SEA

If they meet the enemy the admiral must apply to get the wind of the enemy by all the means he can, for that is the advantage. No private captain should board the admiral enemy but the admiral of the English except he cannot come to

the enemy's as the matter may so fall out without they both the one seek the other. And if they chase the enemy let them that chase shoot no ordnance till he be ready to board him, for that will let his ship's way.

Let every ship match equally as nearly as they can, and leave some pinnaces at liberty to help the overmatched. And one small ship when they shall join battle [is] to be attending on the admiral to relieve him, for the overcoming of the admiral is a great discouragement of the rest of the other side.

In case you board your enemy enter not till you see the smoke gone and then shoot off all your pieces, your port-pieces, the pieces of hail-shot, (and) cross-bow shot to beat his cage deck, and if you see his deck well ridden then enter with your best men, but first win his tops in anywise if it be possible. In case you see there come rescue, bulge [scuttle] the enemy ship, [but] first take heed your own men be retired [and] take the captain with certain of the best with him, the rest [to be] committed to the sea, for else they will turn upon you to your confusion.

The admiral ought to have this order before he joins battle with the enemy, that all his ships shall bear a flag in their mizen-tops, and himself one in the foremast beside the mainmast, that everyone may know his own fleet by that token. If he see a hard match with the enemy and be to leeward, then to gather his fleet together and seem to flee, and flee indeed for this purpose till the enemy draw within gunshot. And when the enemy doth shoot then [he shall] shoot again, and make all the smoke he can to the intent the enemy shall not see the ships and [then] suddenly hale up his tackle aboard, and have the wind of the enemy. And by this policy it is possible to win the weather-gage of the enemy, and then he hath a great advantage, and this may well be done if it be well foreseen beforehand, and every captain and master made privy to it beforehand at whatsoever time such disadvantage shall happen.

In the first sentence of the first paragraph, Henry announces the prime tactical maxim for sailing men-of-war, "Get the wind of the enemy" (the weather guage); and in the last paragraph he proposes a stratagem for getting it, which includes laying a smoke screen. He claims this is a feasible maneuver if every captain and master is made privy to the plan beforehand.

Preparatory to boarding, which was the object of every attack, he directs a barrage from every available weapon to sweep the enemy's cage (upper) deck and clear his tops.

If, after taking a ship, it appears she will be re-taken by another enemy vessel, the instructions are to take off your own men and the enemy captain, "with certain of the best," then throw the rest overboard and scuttle her.

Henry prescribes no formation, but directs the admiral to hoist his distinctive flag forward, so that all ships can recognize him, and other ships a distinctive flag aft that they may be recognized by friends.

Once getting the wind, fleet movement ceases and each captain is free to choose any antagonist that he considers an equal match, keeping clear of the enemy admiral unless his own admiral cannot bring him to action.

To his own admiral, Henry assigns a tender, "a small ship"—evidently to take him off should the enemy flagship prove too strong.

He also directs "some pinnaces" to be held in reserve, and not to attack, except when a "private ship" is being worsted. An indefinite assignment. (It was long a custom in the English Navy to call vessels, other than flagships, "private ships.")

The maxim "choose every man his bird" was deeply embedded in English naval philosophy as long as sails ruled the waves, culminating in Nelson's memorandum, "No captain can do very wrong if he places his ship alongside that of an enemy."

Liberty to choose brought on the *mêlée*.

Henry's first queen, Catherine of Aragon, was daughter of Ferdinand and Isabella and the aunt of Charles V of Spain, who was born in 1500, came to the throne in 1515, and at this time, 1530, was the world's most powerful ruler, uniting Spain and the Holy Roman Empire under his sway.

Spain was conquering and colonizing the New World and being enriched by the gold of the Incas. Her navy was larger and stronger than any other.

Henry, though not at war when he issued his "fighting instructions" had twice been in arms against France; once in alliance with Charles.

All three rulers, Henry, Francis, and Charles, took the field in person and were intensely interested in the improvement of artillery.

Henry's biographers agree that he had the ability to shine in everything he undertook. He was devoted to the Navy. He determined to improve on the Spanish model for galleons and to increase the proportions of heavy guns on his ships.

Robertson quotes from an old chronicle,

> The King minding wars with France made great preparations and provision, as well of munitions and artillery as of brass ordnance, amongst which at that time, one Peter Bawd, a Frenchman born, a gun founder or maker of great ordnance and one other alien, called Peter Van Coller, a gunsmith—both the King's freedmen, conferred together, devised and caused to be made certain mortar pieces, being at the mouth 11 inches unto 19 inches wide; for the use whereof, the said Peter and Peter caused to be made certain hollow shot of cast yron, stuffed with fire works or wild fire; where of the bigger sort for the same had screws of yron to receive a match to carry fire kindled, that the fire work might be set on fire to break in small pieces the same hollow shot, whereof the smallest hitting any man would kill or spoil him.

This is a quaint description of the early quick-match, or fuse (time fuse) and its purpose. It may be that the claim for it as an English invention is not well founded, because it is established that the Turks—

inventors of mortars—fired explosive shot from them at the siege of Rhodes, in 1522, the period to which the chronicle refers.

Robertson also says that the King

> . . . in his efforts to possess fighting ships superior to those of Spain, France, and Scotland (under James V) raised not only artillery, but ships themselves to a different rôle. As he personally urged the manufacture of ordnance in this country by the subsidizing of foreign talent, so he sought to improve the design of his ships by inviting Italian shipwrights to come to England and apply their knowledge to the royal vessels. Dockyards were founded at Woolwich, Deptford, and Portsmouth. Large ships were laid down, and several were rebuilt with many improvements embodied in them, chief of these being a new artillery armament. The king had seized the advantages of the sailing ship with broadside fire.

"The development of broadside fire," says Sir Julian Corbett, "was

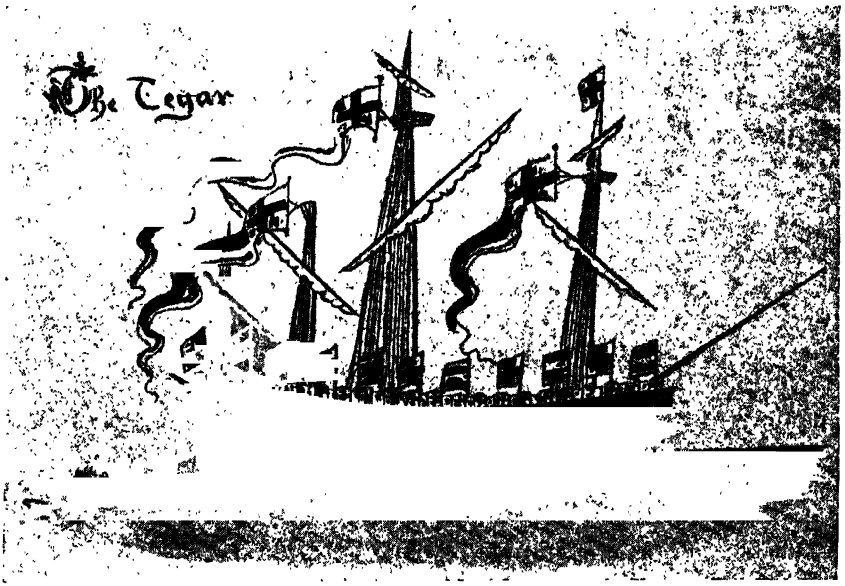


FIG. 6.—(*From Oppenheim's "A History of the Administration of the Royal Navy," published by John Lane, The Bodley Head Limited, London*)

a question of gunnery, of naval architecture, and of seamanship. With Henry's introduction of heavy guns on board his larger vessels, however, the true note had been struck, and by the end of his reign the first two arts had made great strides. Guns of all patterns and sizes were cast in England, both in bronze and iron, which were little inferior to those Nelson fought with." The result of the king's efforts was seen in the ships laid down in the last years of his reign.

The frontispiece of Mr. Oppenheim's *History of the Administration of the Royal Navy* is a picture of one of these, the *Tiger,* a four-masted flush-decked vessel, with no sheer, little top hamper, a long tier of ordnance on the gun deck, and with a beak-head ending in a spur: one of a class "which shows a very great advance on anything before afloat and indicates a steady progression towards the modern type" (Fig. 6).

Robertson continues,

> At the royal word French and Flemish gun founders were induced to come to England to teach the technique of their craft . . . and to this puissant prince, the Italian savant Tartaglia dedicated his classic treatise on *The Art of Shooting.* England now learned to found, not only bronze, but cast-iron cannon.

She soon became an exporter instead of an importer of guns, and it is interesting to note that a very modern cry was raised against the export of munitions. It was even claimed later (1588) that some of the guns of the invading Armada were made in England.

This aspect of Henry VIII as an upbuilder of his country's manufactures and trade and the naval service that protected them is a contrast to the idea the average reader of history forms of his character as a species of burly, boisterous Bluebeard without any mitigating qualities. He followed his royal father in laying secure foundations for England's rise to Mistress of the Seas.

Henry never visited Spain but the Emperor Charles visited England and there were continuously close relations between representatives of the two countries throughout Henry's entire reign.

Charles warred principally against Francis I and the Turks, carrying on the traditional war against the infidel dating from the battle of Tours in 732 and the expulsion of the Moors from Spain in 1492.

After experiments in 1521, Charles decided upon 18 calibers as the most advantageous length for guns. He is reputed to have cast twelve 18 caliber 40-pounders in 1535, which were called "The Twelve Apostles." He used them the same year in a successful expedition which he commanded in person for the re-capture of Tunis from the Turks under Khair-ed-Din (Barbarossa), the famous Turkish admiral and corsair.

The Spanish fleet and land forces were assisted by a Genoese contingent under the equally renowned Genoese admiral, Andrea Doria.

Doria commanded afloat. Charles landed with the troops. Though heavily fortified, Tunis fell after bombardment by sea and land, and most of Barbarossa's ships were destroyed.

It was Charles who established a relation between the thickness of metal and the caliber of guns. In the Twelve Apostles, the thickness over

the chamber was seven-eighths of a caliber, and around the bore three-eighths. In 1544, he approved seven models to which all artillery throughout his world-wide possessions were to conform, and it is said that before his abdication he had established gun foundries in Spain, Flanders, and Italy, ten in all.

Clowes says not many new types of ships' heavy guns were introduced during the 16th century. Robertson speaks of Henry as having discarded several classes of guns from the English Navy and setting a weight limit for the heaviest to be carried.

Clowes attempts a tabulation of weight, length, and caliber of heavy ship guns and weight of shot and charge about 1545, when Henry was next at war with Francis I.

He places them under five headings:

CANNON ROYAL

Caliber, 8.54 in.; length, 8 ft. 6 in.; weight, 8,000 lbs.; weight of shot, 74 lbs.; powder charge 30 lbs.

CANNON

Caliber, 8 in.; length not given; weight of gun, 6,000 lbs.; weight of shot, 60 lbs.; charge of powder 27 lbs.

DEMI-CANNON

Caliber, 6.4 in.; length, 11 ft.; weight, 4,000 lbs.; weight of shot, 32 lbs.; charge of powder, 18 lbs.

CULVERIN

Caliber, 5.2 in.; length 10 ft. 11 in.; weight, 4,840 lbs.; weight of shot, 18 lbs.; weight of powder charge, 12 lbs.

DEMI-CULVERIN

Caliber, 4 in.; length not given; weight, 3,400 lbs.; weight of shot, 8 lbs.; weight of powder charge, 6 lbs.

He gives seventeen calibers in all; from the smallest (robinet), 1 inch, to the largest (cannon royal), 8.54 inches.

Heavy ship's guns were, in general, and for obvious reasons—when muzzle-loading became the rule—shorter than land guns of the same caliber.

The French also took a hand in the standardization of artillery. In 1550, Henry II, son and successor of Francis I, reduced the number of calibers for French artillery to six.

That Charles did not limit himself exclusively to 18-caliber guns is shown by a gift he made to Henry on the occasion of their last war with France in 1545. This was a 58-caliber brass 12-pounder, and one of the world's famous guns. It became known as "Queen Elizabeth's Pocket Pistol" and may well be considered the forerunner of the "Big Berthas" of the World War. Tousard, writing in 1809, says that this piece, which

was mounted at Dover Castle and pointed at the French coast, carried the legend:

> Load me well and ram me down
> I'll send my ball to Calais Town.

Assuming the caliber of this gun to be about 4.5 inches, its length would be about 22 feet.

Corbett believes that Spanish naval thought influenced Henry and gave him the basis for his second set of Fighting Instructions. These were issued in 1545 during the French War. To substantiate his belief, Corbett quotes from the "Espejo de Navegantes" or "Seaman's Glass" by Alonso de Chaves, which was found among the manuscripts in the library of the Academy of History in Madrid and published in the *Revista de Navegacion y Comercio* in 1894-5, by the Spanish naval historian Captain Fernandez Duro.

De Chaves was a naval writer and lecturer on navigation at the Court of Charles V about 1530. He and others conducted examinations for shipmasters desiring to sail for the West Indies.

About the time De Chaves' manuscript was discovered, Colomb was writing that on every occasion when two fleets meet, there must be some formation for each that is better than any other. He was unconsciously repeating what De Chaves had written some three and a half centuries earlier in different words, when, as Corbett says, the old idea "still prevailed that only galleys and oared craft could be marshalled in regular order."

He quotes from De Chaves:

> Some may say that at sea it is not possible to order ships and tactics in this way, nor to arrange beforehand so nicely for coming to the attack, or bringing succour just when wanted, and that therefore there is no need to labour an order of battle, since order cannot be kept. To such I answer that the same objection binds the enemy, and that with equal arms, he who has taken up the best formation and order will be the victor . . . and if they say that the enemy will take the same thought and care as I, I answer that when both be equal in numbers and arms, then in such case, he who shall be more dextrous and have more spirit and fortitude, he will conquer, the which he will not do although he have more and better arms, and as much spirit as he will, if he be wanting in good order and counsel. . . .

De Chaves separates his proposed battle formations from his fighting instructions. He begins with a general statement:

> When the time for battle is at hand, the captain-general should order the whole fleet to come together that he may set them in order . . . the captain-general ought to order the largest and strongest ships to form in one quarter, to attack, grapple, board and break up the enemy, and the lesser and weaker ships to form in another

quarter apart with their artillery and munitions, to harass, pursue and give chase to the enemy if he flies, and to come to the rescue wherever there is most need.

He recommends that this body of small ships should be one quarter of the whole fleet, to be kept separate from the main body; one half on each flank.

The captain-general should then marshal the other three-quarters of the fleet that remain, in the following manner. . . . He should consider the order in which the enemy is formed, whether they come in a close body or in line ahead, and whether the great ships are in the center, or on the flanks, and in what station is the flagship. . . .

By all means he should do his best that his fleet shall have the weather gage . . . if the enemy have made squadrons of their fleet, we should act in the same manner in ours, placing all the greater ships in one body as a vanguard, to grapple first and receive the first shock, and the captain-general should be stationed in the center squadron so that he may see those which go before and those which follow.

Each of the squadrons ought to sail in line abreast so that all can see the enemy and use their guns without getting in each other's way and they must not sail in file one behind the other, because thence would come great trouble as only the leading ships could fight.

He calls his supports (the one quarter specified) the rear-guard, but repeats his instruction that their station is on the flank, nearest the flag, or on both flanks, if in sufficient numbers—favoring the windward side.

If the enemy approaches in one line, the Spaniards should do the same; always with the largest ship in the center. If his approach is in the form of a lance head, the Spaniards should advance both wings to envelop him.

If the enemy approached in two lines, the Spaniards were to do the same,

placing always the greatest ships over against the greatest of the enemy, and being always on the lookout to take the enemy between them, and on no account, must ours penetrate into the midst of the enemy's formation (batalla) because arms and smoke will envelope them on every side, and there will be no way of relieving them. . . . Everything being ready for battle, all shall bear in mind the signals he shall have appointed with flag or shot or topsail, that all may know at what time to attack or board or come to the rescue, or give chase . . . and likewise the armed boats shall take the same care and remember what they ought to do, and do their duty.

De Chaves falls into the same error as many subsequent authors, by writing as if a fleet could remain at a fixed place where it could be formed and re-formed at will.

Of course an oared fleet could advance and withdraw and change to any course, but to a sailing fleet between fourteen and fifteen of the thirty-two points of the compass are dead, and sailing ships must at

least have steerage way until they board. They can only go ahead; never astern.

Writers forget that both fleets are moving; that their relative positions change continuously, and that therefore course, speed, and wind become vital governing factors as soon as enemies sight each other at sea.

Having arranged the fleet, De Chaves continues:

> Then the flagship shall bid a trumpet sound and at that signal all shall move in their aforesaid order, and as they come into range they shall continue to play their most powerful artillery, taking care that their first shots do not miss, for . . . when the first shots hit, inasmuch as they are the largest, they strike great dread and terror into the enemy . . . and after having come to closer quarters they ought to play the lighter artillery, and so soon as they come to board all the other kinds of arms shall be used . . . first, missiles, such as harpoons and stones, hand-guns and cross bows, and then the fire-balls . . . as well from the tops as from the castles, and at the same time, the calthrops, linstocks, stink-balls, grenades, and the scorpions for the sails and rigging. . . .

This to be followed by the actual boarding "with a lusty cheer."

> The captain-general should never be of the first who are to grapple, nor should he enter to the press, so that he may watch the fighting, and bring succour where it is most needed.
>
> The ships of support, in like manner, should have care to keep somewhat apart and not grapple till they see where they should bring succour. The more they keep clear, the more they will have opportunity of either standing off and using their guns, or of coming to close range with their other fire-arms. Moreover . . . they will be able to watch and give succour wherever the captain-general signals.

Spanish formation for battle was to depend somewhat on the formation of the enemy, if such there were. The captain-general was to do his best to gain the weather-gauge, the smoke advantage being emphasized. The importance of using his heavy guns to gain "initial superiority" was clearly recognized.

He was to command *after* as well as *during* the approach, directing the movements of the support, and using his own guns, but was cautioned not to grapple, if it could be avoided.

Under Henry's orders, the admiral commanded during the approach only. He then, accompanied by his tender, sought the enemy admiral, while each of his ships matched "equally as near as they can." The support acted at discretion. Obeying such orders would break up any formation, if any existed.

Corbett believed that Henry's keen interest in all that pertained to the navy brought him to study, or to keep in touch with, the best Spanish tactical thought of the time, and that this was shown in his "Fighting

Instructions" of 1545, issued by his admiral, Lord Lisle, in anticipation of a battle with the fleet of Francis I under Admiral d'Annebaut.

These instructions not only directed a fleet formation much like that of De Chaves, but referring, as it did, to an actual fleet, we learn the names of the powerful ships and other details of interest.

However, the English orders of 1545, like those of 1530, gave the admiral command during the approach only. After close contact he was to seek out the enemy admiral, and his vice-admiral, the enemy vice-admiral; the captains, as in 1530, "every man choosing his mate as they may."

But instructions for the approach were definite; first the formation was specified, viz., a vanguard of three ranks, eight ships in the first rank. These were the largest and were evidently hired from the Hanseatic League, two from Lubeck, three from Danzig, one from Hamburg, and two others from ports not given.

The second rank had 12 ships, led by the *Henry Grâce à Dieu,* and the third rank, 19.

In addition there were two oared wings. The right wing of galleasses and galleys had 12 ships led by the *Great Mistress of England;* the left wing had 11 ships led by the *Anne Gallant.*

Corbett says that Henry, learning that Francis had obtained a squadron of galleys from the Mediterranean, fitted out some of his best ships with oars to re-enforce his pinnaces and the galleys—very fast—of his fleet.

The war had begun in 1544. Henry, landing a large force at Calais, had attacked and captured Boulogne; and Francis, who had recruited his army and naval force to recover it, while mustering troops, decided to use his fleet to capture Portsmouth and the Isle of Wight and to ravage the English coast.

Both monarchs determined on a test of naval strength. Henry proceeded in person to Portsmouth to superintend the despatch of every available ship to join Lord Lisle.

Francis went to Havre to watch his ships put to sea. One of the largest, the *Caraquon,* on which he was about to give a banquet, took fire while the other vessels were leaving port and Francis and his suite barely escaped with their lives.

The French fleet, under the Admiral of France, Claude d'Annebaut comprised more than 200 ships, large and small, including 25 galleys. To these, the English Lord High Admiral Lisle could oppose only 63.

The English fleet was anchored off Portsmouth on July 18, when the French were sighted.

While getting underway, the *Mary Rose* of 60 guns, said to have been the fourth ship in size, capsized in a squall, with the loss of her captain and nearly the entire crew.

D'Annebaut did not push his attack home, but endeavored to draw the English into the Channel, while Lord Lisle tried to draw the French into shallow water and under the guns of the shore batteries. There was little real fighting save between the oared wings of the two fleets, and except for the *Mary Rose,* not much loss on either side.

The French were formed in three squadrons. The Admiral was in the center with a squadron of 30 ships, and two other squadrons of 35 each were to starboard and port, respectively.

Henry's formation, in what Corbett called a sort of blunt wedge, has been referred to. His oared wings were to be used as a reserve, as well as to keep the French galleys in check.

Failing to draw the English away from the coast, the French pursued other objectives. They raided the Isle of Wight and British ports further up the Channel and then crossed to Boulogne and landed troops to assist in its recapture.

In the meantime Henry had received a re-enforcement of 50 West Country ships, and about the middle of August, learning that d'Annebaut was at sea, he despatched his fleet to bring him to battle.

In addition to the formation prescribed for his 63 ships, Henry issued two other orders, the last on August 10. All three orders included some fighting instructions.

With his enlarged fleet he changed his order from a vanguard of three ranks to a van of 24 ships (number of ranks not specified) and a main body (battalla or battail) which could act in two divisions; he still required, however, that admiral should engage admiral.

Nevertheless, ships were not free during the approach and could only match after contact. In fact, he provided that the first rank should "charge through" and then "go about" before boarding. His orders read:

> It is to be considered that the ranks must keep such order in sailing that none impeach another. Wherefore it is requisite that every of the said ranks keep right way with another, and take such regard to the observing of the same that no ship pass his fellows forward nor backward nor slack anything, but (keep) as they were in one line, and that there may be half a cable length between every of the ships.
>
> The first rank shall make sail straight to the front of the battle and shall pass through them, and so shall make a short return to the midwards as they may,

and they (are) to have a special regard to the course of the second rank; which two ranks is appointed to lay aboard the principal ships of the enemy, every man choosing his mate as they may, reserving the admiral for my lord admiral.

Another set read:

Every ship shall retain its place in the Van, Battle, and Wing, and every captain take his orders from the Commander of his own division.

In action the Van shall attack the French Van, Admiral engage Admiral, and every captain a Frenchman of equal size.

The *Wing* shall always be to windward so that it may the better beate off the gallies from the great ships.

A paragraph of his last order, August 10, read:

Every Captain of the said wards or wing shall be in everything ordered by the Admiral of the same.

After contact, the admiral occupied himself exclusively with the enemy admiral. His juniors could give orders, and it was evidently expected that the commanders of the oared wings should continue their duties of warding off galleys and sending succor to overborne friends.

Lord Lisle found the French to leeward and attempted to bring them to battle, but after a day's maneuvering, lost the weather gauge.

After getting the advantage, the French attacked, but only with their galleys, and eventually the English returned to Portsmouth and the French to Havre.

We do not know whether Henry's plan would, or could, have been carried out, had both admirals determined to fight.

Peace was concluded in 1546, and in 1547 D'Annebaut came with a large suite and an escort of 12 galleys to pay a state visit to England. He proceeded to Hampton Court and in Henry's presence solemnly swore, in the name of his sovereign, Francis I, to "perform" the Articles of Peace.

The record of both sovereigns was notoriously bad in this respect, but as both died in that same year the pact was not broken by them. Their successors, however, did not feel bound by the agreement.

The French claimed that the *Mary Rose* was sunk by gun-fire. The English ascribe her loss to the fact that her lower gun port sills were only 16 inches above water, and that with her "loure tiere" run out, she heeled so deeply to the breeze off the Isle of Wight that she foundered before coming into action.

Some of her guns were recovered in 1836 and photographs of two of them are shown here, one from Clowes' *History of the Royal Navy* and the other from Fletcher's *Warships and Their Story*.

The gun shown by Clowes is a muzzle-loading brass cannon, made

in 1535 by Robart and John Owyn. The center of its trunnions is well below the axis of the bore. The gun body tapers uniformly from breech

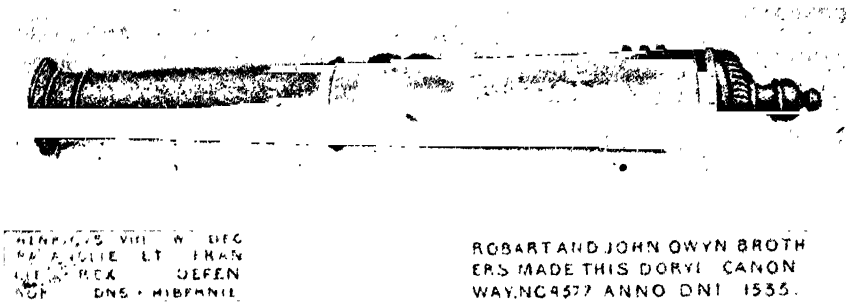


FIG. 7a.—Brass Gun from the *Mary Rose*. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

to muzzle. Clowes shows another photograph of a culverin-bastard of the sixteenth century which has the same general shape and same position of the trunnions as the gun from the *Mary Rose*. The culverin is mounted on a four-wheeled wooden carriage, secured to the gun-port by rope breechings. It is probable that the recovered gun had a similar mount on the *Mary Rose*.

The gun shown by Fletcher is an iron breech-loader without trunnions. It lies in a wooden cradle, similar to those in which large fieldpieces and other great guns of that and earlier periods were mounted.

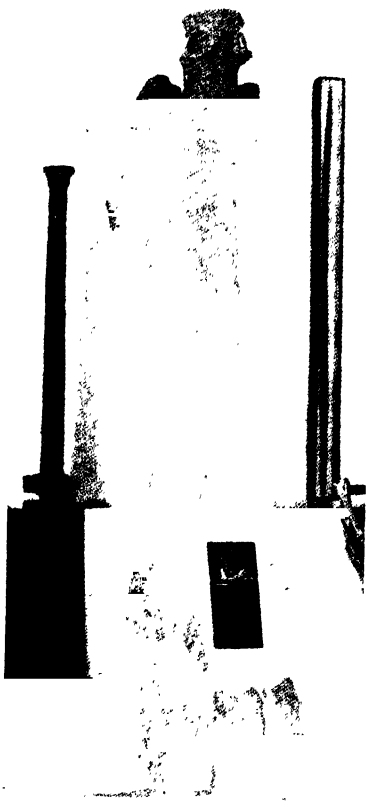


FIG. 7b.—Breech-loading gun recovered from the wreck of the *Mary Rose*. A spare chamber is shown in the front. (Museum of the Royal United Service Institution, London.) (*From "Warships and Their Story," R. A. Fletcher, Cassell and Co., Ltd., London*)

This gun and its fellows were said to be intended for mounting in a restricted position, where loading from the muzzle would have been difficult.

Clowes says that both "serpentyn" (dry mixed) and "corned" (wet mixed) powder were used in the battle off the Isle of Wight. The powder was made up in canvas-covered cartridges for the heavy guns, and in paper covers for the medium and lighter guns.

The weight of charge, except in the largest ship guns, was about half the weight of shot; in small guns, more than half. He ascribes this to excessive windage, as well as to weakness of powder. He considers that the windage of the cannon-royal was from one half to three quarters of an inch. Robertson says it was one quarter of an inch, regardless of caliber.

A German authority of the period gives the weight of the powder as about half the weight of the shot for shore artillery, though it sometimes varied with the material of the shot—stone, iron, or lead, being least for stone and greatest for lead. This writer reports the death of many people in gun explosions. He recommends, as a proper relation between weight of gun and weight of shot, 225 pounds of metal for each pound of iron shot.

Giving rules for night firing during sieges, Meyer forecasts tracers and star shell, which waited for full development about three and a half centuries. "Pour découvrir pendant la nuit le point ou l'on veut tirer, on commence par tirer avec de petits boulets, mis au calibre par une enveloppe de composition de balles à éclairer."

Henry VIII's interest in gunnery was known on the Continent, for in 1537 Tartaglia, an Italian mathematician, published his *Della Nuova Scienza,* which he dedicated to the English monarch. Tartaglia propounded some theories on trajectories and on the angle of elevation which would give the greatest range.

He was also the inventor of the gunner's quadrant which consisted of a metal plate graduated 90 degrees or more, with an arm to be placed in the bore of the gun parallel to the 90 degree mark of the quadrant. A plummet, hung from the center of the circle of origin, would then show the elevation of the gun in degrees, or its depression if the plate was marked beyond zero. Some means of retaining the gun in position after the correct elevation was determined by the quadrant must have existed, if the quadrant was not to be used after each discharge.

The quadrant was long used as a means of establishing gun levels on board ship, but not for elevating them.

Tartaglia was the first to develop the theory of the hot gun. According to Rieffel, he said:

> Le deuxième coup porte toujours plus loin que le premier à charge égale, parce que l'arme est alors échauffée.

The value of this theory is considerably lessened by his further statement that in addition to the heating of the gun, the increased range of the second shot over the first, was, above all, due to the first shot having to push the air in front of it, and he advances this as a reason why it made more noise. He went on to say that succeeding shots carried less distance than the second one, because in the measure that the piece became heated, it drew the vapor from the saltpeter and diminished its impulsive force.

Concerning the rate of fire of ships' great guns in Henry's time (the s.p.g.p.m.) we have little information, except that it was slow.

A French account states that not less than 300 shots were fired from heavy guns during the first battle between Lord Lisle and D'Annebaut, but we know this was only a partial engagement, principally between the galleys and pinnaces, though the galleasses of Henry's "oared wings" were no doubt engaged.

From other sources we learn that, early in the century, 30 shots a day from a siege gun was consisted good, and later, 1588, cannon and culverins could average eight shots per hour. With powder in cartridges, and a culverin—like that from the *Mary Rose,* on a wheeled carriage, there seems to be no reason why this rate of fire could not be easily exceeded.

Much has been written about the *Mary Rose.* A new *Mary Rose* was built and figured later in naval history.

Before closing the history of tactics and gunnery in Henry's reign, it is proper to note a proposal of De Chaves which, as far as known, was never adopted by the English or French, but may have been a tenet of galley tactics against sailing men-of-war in the Mediterranean.

His battle instructions directed the use of armed boats, after boarding, to disable the enemy's rudder and do other damage, both in single ship and fleet actions:

> The boats in like manner should not close in till they see the ship grappled, and then they should come up on the opposite side, in the manner stated above and carry out their special duties as occasion arises, either with their bases (boat guns) of which each shall carry its own, and with their harquebuses (muskets), or else by getting close in and wedging up their rudders, or cutting them and their gear away, or by leaping in upon the enemy if they can climb in without being seen, or from outside by setting fire to them or scuttling them with augurs.

This implies arming and equipping the boats, and getting them in the water and in tow when out of gun range—in those days, "point blank"—not always practicable.

Attacking the enemy's rudder is reminiscent of the fight between the galleys of Richard Coeur de Lion and the Turkish dromon, with which Allen opens his *Battles of the British Navy.*

In 1547 Henry was succeeded by his son Edward VI, and Francis I by his son Henry II. In their reigns, there was war between the two countries, but no important naval actions between them, either then or in succeeding reigns, for more than a century.

The powder regulations of Mary Tudor, who succeeded her half brother Edward in 1553, have been quoted. These regulations were for the conduct of a fleet assembled in 1558 under Admiral William Wynter and Vice Admiral Richard Brook. They provided for fog signals, and for shielding lights at night "so that the enemy might not discover you by the same, whereby oftimes the service is greatly hindered."

This is still a most pertinent regulation.

It was further provided that when underway, every captain should speak the Admiral twice a day.

Only two articles of Mary's Instructions can be construed as "Fighting Instructions." These read:

(I) That the captain ought to comfort his men at the time of boarding and put his things in order for the same.

Before you deal with your enemies, ye shall call before you the officers and company of your ship, not only to encourage them in words of comfort, but likewise to know and also to feel it yourself, the state and readiness of your things, which may serve for the annoying of the enemy and defending of yourself, which being cared for in time, do make the victory, by God's help, the more certain.

It is interesting to note that the words "company of your ship," meaning "ship's company," connoting companionship, have come down to the present day.

(II) An order for boarding the enemy that every man may choose his match.

If it chance to meet with any ships of war enemies having an admiral and vice-admiral, and so fortune to join with them, then no man shall offer to board the admiral and vice-admiral of the said enemies before Wm. Wynter and Richard Brook, Admiral and Vice-Admiral of our Fleet; but to give place if they should be able to fetch them. And when not, every man to choose his match as nigh as he can, and to have a good regard one to another that succours may be given as occasion serves.

Mary Tudor, sometimes known as "Bloody Mary," married Philip of Spain, son of the Emperor Charles V, in 1554. She died without issue in 1558.

In 1556, Charles V abdicated of his own free will in favor of his son, Philip II (1527-1598), who reigned forty-two years.

Philip was a bigoted religionist who warred for the Holy Roman Catholic church against the infidel Turk, against the Protestant English queen, Elizabeth, and against all other heretics with equal fervor.

Elizabeth Tudor succeeded her half-sister, Mary (Philip's second wife, and like him a devout Catholic). Elizabeth reigned forty-five years, outliving Philip and dying in 1603.

During a large part of her reign, Spanish ships—merchant and others—and Spanish possessions were considered fair game for Englishmen. Although the Spaniards richly deserved what the cruelties of the Inquisition had brought upon them, their resentment at the piratical methods the English employed for obtaining redress was not unnatural.

Corbett says, "No fighting instructions known to have been issued in the reign of Elizabeth have been found, nor is there any indication that a regular order of battle was ever laid down by the seamen-admirals of her time."

This may be accounted for by the fact that except for the national determination to repel the "Great Armada," nearly all of Elizabeth's armed expeditions—and there were many—were semi-national only, or purely private for reprisals and booty.

Philip II planned the two great naval battles of the 16th century, both included among the decisive battles of the world: Lepanto, October 7, 1571, against the Turks, and The Invincible Armada, July 21-29, 1588, against the English.

CHAPTER IV

THE BATTLE OF LEPANTO

HISTORY HAS preserved for us more particulars of the Battle of Lepanto than of the destruction of the Great Armada. The victor at Lepanto was Spanish, but his ships were nearly all Italian and all under oars. The vanquished in the Channel was Spanish, his ships were almost all Spanish and fought under sail. Oars were used infrequently.

Fighting in the Channel was disorderly and partial, continuing over several days. At Lepanto, galley tactics, which had long been standardized, both as between single ships and between fleets, were employed by masters of the art, with well trained crews, both Infidel and Christian. The order of battle was prescribed. The conflict lasted but a few hours.

In the Channel there was no regular formation on either side. English crews were trained seamen—if not trained gunners. Spanish crews were neither one nor the other. The battle was between Catholic and Protestant, both Christians. At Lepanto it was waged with greater fury, between Christian and Mohammedan, Latin and Turk. Less than seventeen years intervened between the two great conflicts. Some Spaniards fought in both.

Mohammed II, the "Conqueror" (1430-1481), victor at the siege of Constantinople in 1453 two years after his accession as ruler of the Moslems, is credited with creating the Turkish navy.

The Turks gained their first great naval victory over the Venetians, off Lepanto in 1499, during the reign of Mohammed's son Bajazet II, (1447-1512). Under Mohammed's grandson, Solyman the Magnificent, Turkey became a first rate sea power. During his reign of 46 years, ending in 1566, the Ottoman Empire reached the zenith of its temporal power.

In 1537, Solyman made Barbarossa (Khair-ed-Din) the famous Algerian corsair, admiral of the Turkish fleet. The following year, off Prevesa, on the coast of southern Albania, Barbarossa defeated the combined Venetian and Spanish fleets, under the celebrated Genoese admiral Andrea Doria (1468-1560). In 1541, Barbarossa drove off the Spanish besiegers of Algiers, commanded by Charles V in person, and in 1543, with the aid of the French, he captured Nice.

After these successes, Turkish and Barbary corsairs continued to ravage the coasts of Spain and Italy and their Mediterranean possessions, while Turkish armies warred against the Christians on land.

In that era, the warships in the Mediterranean navigated usually under sail, but fought under oars. The man-power of Turkish galleys was largely made up of Christian slaves and Christians were also held in slavery in the cities on the North African coast. Many had been liberated by Charles, when he captured Tunis in 1535.

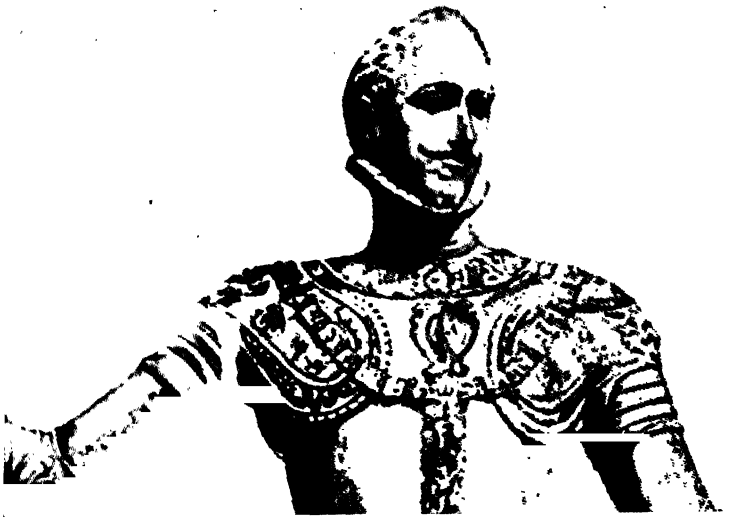


FIG. 8.—Don John of Austria. From his statue at Messina, by Calamech. From Library of Congress. (*From Rodgers' "Naval Warfare Under Oars," U. S. Naval Institute*)

The crusading spirit was at times dormant, but not dead. It awoke again in 1570 when the Turks, under Solyman's son, Selim II, sultan from 1566 to 1574, made an unprovoked attack by sea and land to wrest Cyprus from Venice. The attack on Cyprus stirred Pope Pius V to renew the Holy League against the Turks. He succeeded in arousing the determination of Philip II of Spain and of the Venetians to destroy Turkish sea power.

Spain, Venice, the Pope in his temporal capacity, other Italian States and the Knights of St. John at Malta, united to gather an overwhelming fleet at Messina, under the command of Don John of Austria (1547-

1578), Philip's half brother, and already a noted man-at-arms, though but 24 years of age.

Sicily proper, and southern Italy were then Spanish possessions. Galleys and smaller craft began to appear at the rendezvous in June, 1571. By August 23, when the Commander-in-Chief arrived, after a leisurely progress from Barcelona via Genoa, Rome and Naples, he found in port more than 200 galleys, six galleasses, numerous small craft, and some large sailing transports. Pope Pius, having no galleys of his own, had borrowed a dozen from one of his princely adherents, Cosmo de Medici, paying only for their manning and upkeep. Don John had received the Holy League standard from the hands of the Pope, in person, to be displayed during the battle.

It is worthy of note, as evidence of the crusading spirit, that five galleys were contributed and manned entirely by volunteers. These carried many adventurers of rank . . . "des princes, des ducs, ou des marquis . . ." writes the French author, Admiral Julien de la Gravière, upon whose history of the second, and last "Battle of Lepanto" this account is based.

History has preserved for us both the names of ships and of their captains. By far the largest single contribution was made by Venice. La Gravière lists the League fleet as comprising 207 galleys, 6 galleasses, and unnumbered galiots, frigates and brigantines, together with sailing transports carrying siege material, stores, and horses. These, however, did not keep with the fleet.

In the order of numbers, the galleys were: 109 Venetian; 28 Neapolitan; 19 Genoese; 13 Papal (Florentine); 12 Spanish; 10 Sicilian; 4 Negrone; 3 Savoy; 3 Lomellino; 2 Grimaldi; 1 David Imperate.

The fighting crews were composed of Italian, Spanish, and some German men-at-arms, supplemented by ships' officers, gunners, and sailors. Men-at-oars were largely criminals and Turkish slaves.

Our author quotes Don John as estimating that he sailed from Messina with 25,000 soldiers in his fleet and, presumably, two or three thousand gentlemen volunteers. These included representatives of every noble Italian family and many from Spain.

The flagship carried 500 men-at-arms out of a total crew of 800. During the 25 days between his arrival and sailing, Don John was busily and effectively employed in organizing his fleet, and in quelling—or stifling at least for the time—rivalries, disorders, and actual quarrels between Spanish and German men-at-arms and the crews of Italian galleys on which they were berthed. He is credited with razing the prows

of all galleys where they were higher than the deck level, in order to give the bow guns direct fire ahead.

The thoroughness of Don John's fleet organization for cruising and for battle and the fact that his battle formation and that of the Turkish admiral Ali Pasha were alike when the fleets met, show that galley fighting in the Mediterranean was well standardized.



FIG. 9.—Sebastiano Veniero, Doge of Venice, Victor at Lepanto in 1571. (*From Rodgers' "Naval Warfare Under Oars," U. S. Naval Institute*)

The Christian fleet comprised:

(a) An advance guard (scouts and lookouts) of seven galleys under the command of Don Juan de Cordona.

(b) A right wing of 50 galleys and two galleasses under Giovanni Andrea Doria, son of the Great Admiral. In battle formation—single line—Doria was right guide. The galleasses were to be about one mile ahead of the line, spaced as in Chart I.

(c) A center (corps de bataille) of 62 galleys and two galleasses. This was under the command of Don John in person, stationed in the center of his line, with a flagship on each quarter and two on each beam. On the starboard quarter was the second in command of the Spanish galleys; on the starboard beam, the flagship of Marc Antonio Colonna, the papal commander-in-chief and the flagship of Mgr. De Ligny, senior officer of the Savoy galleys. On the port quarter there was a spare flagship for Don John, and on the port beam, the Venetian commander-in-chief Sebastiano Veniero (Fig. 9) and the Genoese admiral Ettore Spinola. These formed a compact group of six flagships, not counting the spare for Don John.

(d) A left wing of 53 galleys and two galleasses under the Venetian admiral Agostino Barbarigo, whose flagship was the left guide of his wing.

(e) A rear-guard of 30 galleys, commanded by Don Alvaro de Bazan, Marquis of Santa Cruz.

The stations of the commanders of the advance and rear guards were in the centers of their commands. Each wing had a flagship at the extremity nearest the "corps de bataille."

Each grand division of the fleet was composed, as nearly as might be, of galleys from every League power. This was believed to be the surest way to prevent desertions or mutinies and to promote rivalry in action. Division distinguishing flags were assigned to be flown by every ship of a division. Flagships, in addition to the distinguishing flag, carried poop lanterns (fanals).

Before sailing, each captain received a memorandum, giving in detail his cruising and battle stations, day and night. By September 17, after some delays caused by bad weather, the organization was complete and the League armada ready to sail.

It was an anxious period for Don John and his admirals. The season was advancing, the whereabouts and strength of the Turkish fleet were uncertain, but the orders from Philip II and the Pope to seek and engage were definite. Counsels were divided.

What were the Turks doing?

Ali Pasha, the Turkish commander-in-chief, had sailed from Cyprus about the end of May for Euboea (Negropont), in company with troop transports under their commander Pertev Pasha. He proceeded thence via Milo to Candia, where he hoped to surprise and capture part of the Venetian fleet.

The Venetian admiral, Marc Quirini, having been forewarned

anchored his 60 galleys under the guns of Canée, a port on the north side of the island, near its western end.

Failing to gain his first objective, Ali landed troops to ravage the island. He lost 3,000 men in various skirmishes, but collected booty with which he embarked and retired to the bay of Navarino on the west coast of the Morea. He landed troops and looted the island of Cerigo en route.

After recuperating at Navarino, Ali continued north, landing troops, burning towns, and carrying off men to man his fleet to the number of 7,000 from Zante and Cephalonia.

From Cephalonia, he made the harbor of Butrinto, then Turkish territory. Butrinto is on the mainland at the northern end of the channel between Corfu and the coast. The island of Corfu was then Venetian territory, and the city, about 15 miles to the southward, was fortified. But at Butrinto the Turks could lie safely, recuperate, and obtain supplies and recruits.

Sebastian Veniero, with half of the Venetian fleet, had remained at Corfu until after the middle of July. He had learned of the arrival of the Turks at Navarino and of their departure. He believed that they were bound for the Adriatic and feared that he might be blockaded in Corfu, but he hesitated to abandon his position and expose the Venetian coast, and perhaps Venice itself, to infidel attack. He was urged, however, by Marc Antonio Colonna (the papal admiral) to join up at Messina, and after consulting his captains he agreed to do so.

He dispatched a galley to Marc Quirini, at Canée, with directions to join him at Messina. With his own fleet he crossed the strait to Otranto on the Italian coast, about 75 miles north-west of Butrinto. From Otranto he could coast safely to the rendezvous. La Gravière says that he was just in time, for, as he cleared Corfu, he learned from fishermen and from his lookouts on the high land of Corfu, that the advance guard of the Ottoman fleet was in sight. Veniero escaped with the loss of only two galleys.

From Butrinto Ali sent word to the local authorities, in the name of the Sultan, to furnish him with soldiers (spahis, timariots, and milices), which they were obliged to do. He sent 40 galleys to ports along the coast of Epirus to embark recruits and then sailed north about 200 miles, harassing the enemy coast en route, and laid siege by land and sea to Cattaro. He despatched a part of his force—62 galleys, under Uluch Ali, his second-in-command—to attack points further north.

Uluch Ali, who was a capable successor to Barbarossa, and a name to terrify the inhabitants of that coast, chased two Venetian galleys

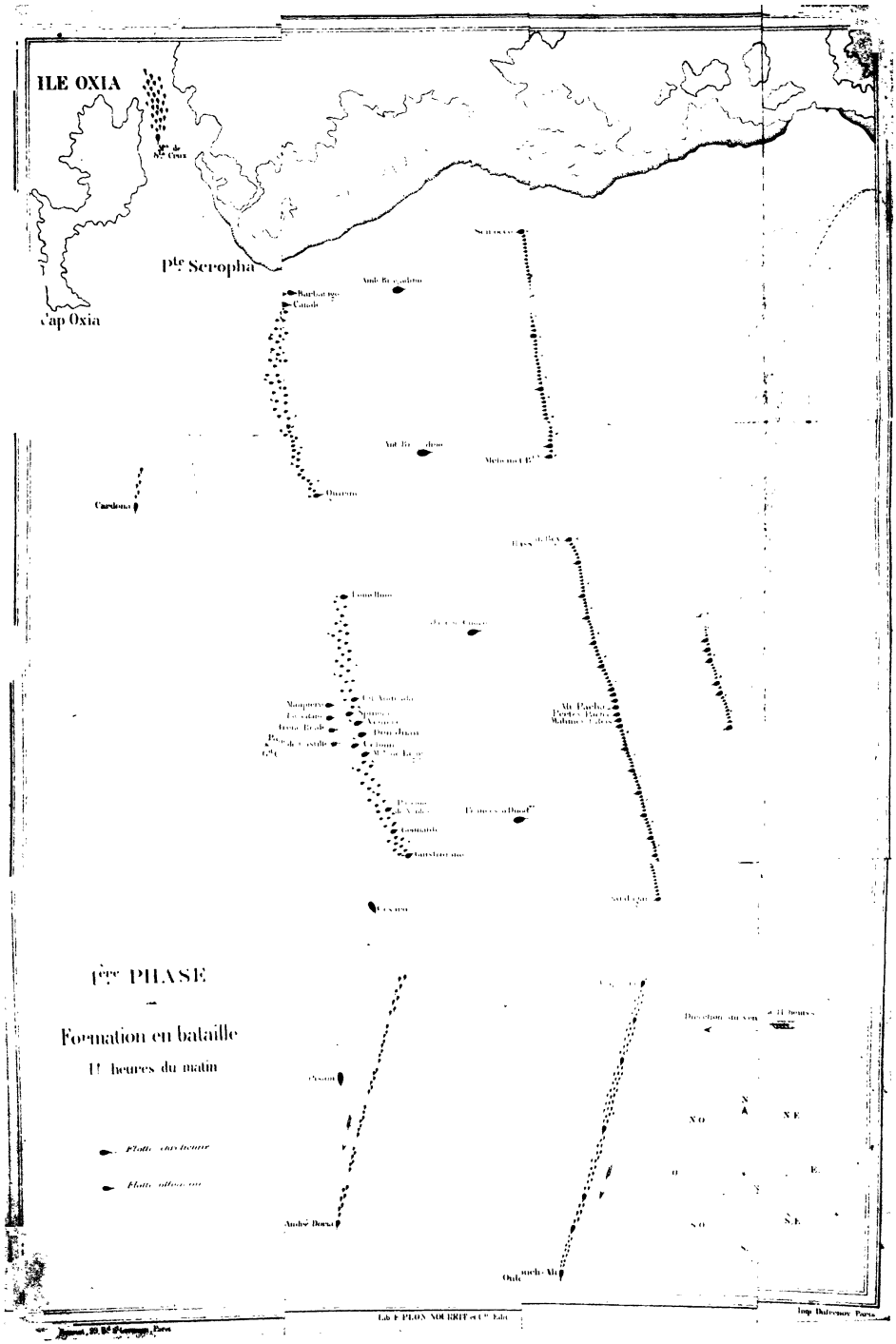

ILE OXIA
Pte Scropha
cap Oxia
Cardinaux
Quarante
Canaille
Barbarigue
Marguerite
Pierres Plates
Malmuse
Ouessant
Andre Doucet
Oule
1ère PHASE
Formation en bataille
11 heures du matin
Direction du vent
11 heures
N
NE
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CHART I

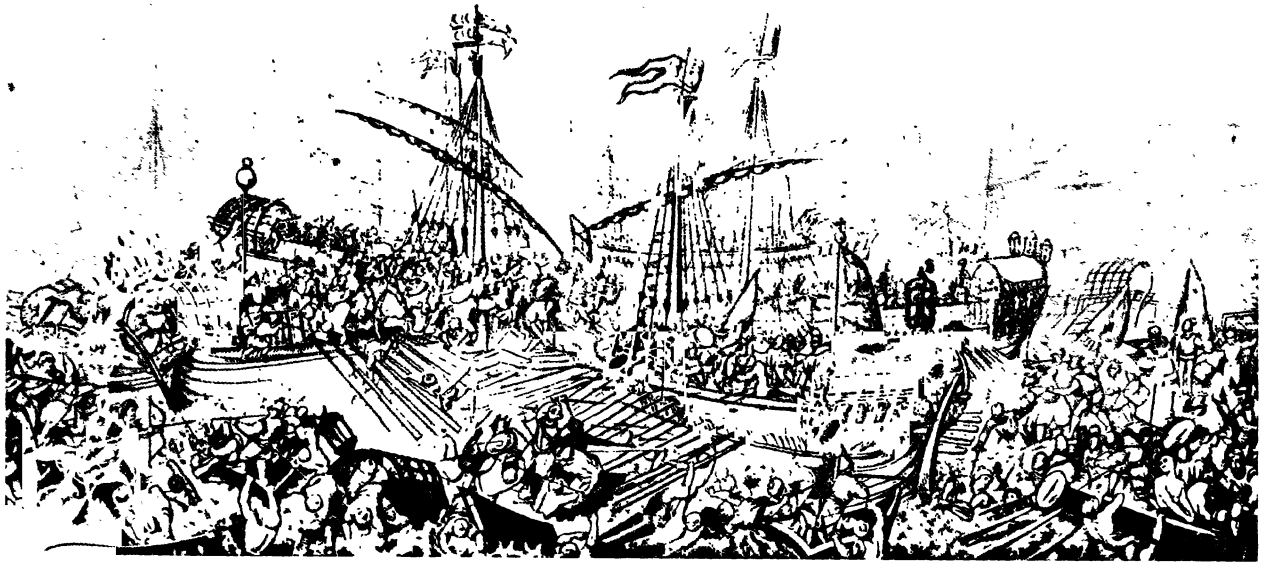


FIG. 10.—The Battle of Lepanto 1571: the picture is from pl 175 Zanotto's Palazzo Ducale; it is marked in Zanotto, "Victory at Curzolari (a near-by island where the Christian fleet anchored the night after the battle) won by the Christians against the Turks in year 1571; painted by Andrea Vicentino": in Zanotto the picture is larger than here. The rowing is scaloccio. Zanotto gives names of ships and captains: in the picture the Christians are to the right and Turks to the left. There can be no doubt this represents the ships as they looked and the manner of the fighting. The ship in the right-center is that of Veniero, commander of those of Venice; her upper deck is given up to fighting men; she has sails furled and the yard hoisted half-way: crow's-nest but unoccupied at the mast-head; the Christians have firearms and Veniero's ship has just fired a large-bore gun on port quarter. (*From Meigs' "The Story of the Seaman," J. B. Lippincott Company, Philadelphia*)

into Ragusa, but hesitated to violate the neutrality of the port, as it had often been a place of refuge for the Turks. He continued up the coast to lay siege to Zara in Dalmatia, but found it too strong. Zara is about 200 miles from Cattaro and 150 from Venice.

The news soon reached Venice where great exictement ensued, for an enemy was at their doors. Veneiro was absent, his whereabouts unknown. All possible measures for defense were taken. Uluch Ali, however, had his orders to return after a stated number of days. At Ragusa he learned some details of the League fleet and hastened to report them to the Capitan-Pasha Ali, who had been losing time and men before Cattaro, without any hope of immediate success.

Ali's fleet was in no condition to fight a battle. His ships needed cleaning outside and overhauling within. His stores were low and he was still short of both rowers and soldiers.

On August 15, one week before Don John's arrival at Messina, Ali raised the siege of Cattaro and sailed for Butrinto, detaching eight galleys to scout towards Messina and five others, with some galiots, to reconnoiter the coast of Calabria.

From Butrinto, the main Turkish fleet proceeded to Corfu, anchored out of reach of its main batteries, landed troops, and began to burn the outskirts of the city and the neighboring villages. A sortie from the city captured some of the Turkish troops and among them a renegade Corfiote from whom the Governor hoped to obtain information as to the force and plans of the Turks.

Ali sent despatches to the Sultan and sailed for the Turkish port of Pargo about 30 miles south of Corfu to await orders. Orders were already coming from the Sultan to attack the Christian fleet as soon as it could be found.

Ali and Pertev agreed that their base should be at Lepanto, a safe harbor on the north side of the Little Dardanelles, joining the gulfs of Patras and Corinth and about 120 miles from their anchorage at Pargo.

Mehemet Bey with 60 galleys was sent to Euboea, of which he was governor, for stores, ammunition, and troops. The last named were to comprise 10,000 Janissaries, 2,000 spahis, and 2,000 volunteers. Whether these numbers were obtained is not stated.

Ali, keen to fight the infidels, and with the Sultan's express command to back his desire, overcame the advice of some of his most experienced commanders, who counseled awaiting the enemy at Lepanto. He was determined to seek the enemy and bring him to action, and took every means to prepare his own fleet for battle.

His scouts, sent out to discover the strength and movements of the Christians, reported, in each instance, a total strength less than his own. On the other side, Don John's scouts reported less than the actual Turkish strength for the same reason—absence of some galleys from both fleets when estimates were made. The result was to foster the belief of each commander-in-chief that his fleet was superior in numbers.

Though Ali Pasha had no galleasses and no more galleys than Don John, he had more galiots and smaller fighting craft. When ready to sail from Lepanto, the Ottoman fleet counted 208 galleys and 66 smaller oared fighting ships, galiots, and fustes. Ali included galiots in his battle line, interspersed between the galleys.

The galiots of both fleets are described by Admiral de la Gravière as having a single mast and sail, mounting only small guns, and having from 16 to 25 banks of oars with three men at each oar. Brigantines and fustes were smaller.

We have the names of Turkish captains, but not the names of their ships. We have the names of both in the Christian fleet, in which religious names for the galleys prevailed. No less than 17 were named *Christ* or *Christ Arisen*. Whether this was a usual custom, or in the present case emphasized the crusading spirit, is not known.

But one galley, number six of the reserve, carried the appropriate name of Santa Barbara, the patron saint of gunnery.

The six galleasses seem to have mounted 30 guns each, though they may also have carried many small pieces. ("Quel terrible effet auront leurs cent-quatre-vingt bouches à feu, sur le front de bataille des Turcs.")

Don John would not sail without them, though they frequently had to be towed to keep company with the galleys. Their captains were Francisco Duodo, senior in command, Andrea de Cisero, Pietro Pisani, Jacopo Guoro, and Antonio and Ambrogio Bragadino. It was Marc Antonio Bragadino, the Venetian admiral captured in Cyprus, whose skin, stuffed with straw, was sent by Ali Pasha to Constantinople, as a present for the Sultan.

On September 15, Don John towed his five sailing transports to sea, giving them a rendezvous in the Gulf of Taranto, about 200 miles from Messina. (See chart 1.) They were not seen again until after the campaign.

Admiral Rodgers has estimated that galleys could reach seven knots for short spurts. They could make four or five knots for two or three

hours with the full complement of rowers. In three watches, with clean bottoms, they could average about three knots on an all day voyage. When the wind was fair they sailed.

On the morning of the 16th, the galleasses were towed out in the wake of the flagship. Then Don John took station in a brigantine off the harbor entrance, and with extended arm blessed each ship as it passed ("Il s'approche, et la main droite étendue, bénit solenellement la flotte qui va combattre pour la cause de Christ.")

In the evening the fleet anchored in pre-arranged order to port and starboard of the flagship, coming to on the east side of the strait, well to the southward.

From this anchorage, Don John wrote, "I start to-night for Corfu. From Corfu I will go where I can learn where to find the Turks."

Getting underway at sunrise on the morning of the 17th, the fleet after an easy run anchored by grand divisions under Cape Spartivento, making good about 30 miles.

Here they were weatherbound for 30 hours. They got underway an hour after midnight and by sunset on the 19th, reached Cape Colonna, where they took shelter from a strong nor'easter, having run about 77 miles.

A false alarm of "enemy in sight" during the night caused Don John to get underway with 35 galleys, only to find that the 20 strange galleys were his own, convoying and towing the galleasses.

While at this anchorage he received 500 militia which he distributed in the fleet and sent galleys to ports in the Gulf of Taranto to obtain replacements for the sick and disabled left at Messina.

While at Cape Colonna, he received word from a brigantine that Ali Pasha had taken his fleet into Prevesa to await orders from the Sultan. This news created great excitement in the Christian fleet. Sebastian Veniero cried, "Heaven has delivered them into our hands! It is not to Corfu but to Prevesa that we should go!"

However, it was pointed out that 6,000 soldiers awaited the fleet at Corfu, and in any case, the first task was to get the galleasses to the probable scene of action.

Four fast galleys under Captain Gil d'Andrade were detached to make contact with the Turks, in order to verify their strength and position.

Getting under way by night on the 22nd, the fleet made Cape Santa Maria, at the heel of the Italian boot, by the evening of the 23rd, a run of about 75 miles. Again underway, in a heavy thunder-storm, on the



CHART I-A

From "Cambridge Modern History" Atlas, Map No. 3. (*Courtesy Cambridge University Press, London, and The Macmillan Co., New York.*)

morning of the 24th, by noon Don John had crossed the Strait of Otranto, the entrance to the Adriatic, and reached an anchorage under the islands northwest of Corfu.

Here a southeast wind held them until early morning of the 26th, on which day they made the southern entrance to the channel between Corfu and the mainland and were joined by Captain Andrade with the discouraging news that ships from Zante had sighted the Turks bound eastward, evidently for Lepanto on the Gulf of Corinth, where they would be safer from attack. Don John continued to Corfu and anchored off the town, ten days out of Messina.

This somewhat detailed account of his movements has been given to bring out the delays and difficulties which were experienced in moving such a fleet when command of the sea was in the balance, surprise must be prevented, and readiness for battle maintained.

Corfu, re-acting from the ravages of the Turks, fired every gun in welcome. Don John returned the salute with three guns from his flagship.

He had been disappointed in the number of soldiers obtained from the towns in the Gulf of Taranto, and found in Corfu only 4,000 of the 6,000 he had hoped to obtain. Also the transports were missing. They had not arrived in the Gulf of Taranto while the fleet was there and no other rendezvous had been given.

Andrade was once more sent to locate the Turks, and at all risks, to determine their strength.

In the meantime, Don John borrowed siege equipment from Corfu to use against Prevesa and Saint Maure, with the hope of restoring them to Venice, if unhappily the Turkish fleet could not be brought to battle. It required two days to load the additional men and material.

It was estimated that on September 28, when Don John left Corfu, his total armed force, though not all with the flag, numbered 30,000 Italians, 1,000 Spaniards and Germans, and 2,000 volunteers, exclusive of ships' companies and rowers.

He merely shifted to a new anchorage in the Strait of Corfu and while waiting for Andrade's return, ordered all ships to clear for action and inspected their preparations for battle.

Three inspecting parties were detailed; one under Don John in person; the others under the Marquis of Santa Cruz and Giovanni Andrea Doria.

The Venetians, assigned to Doria, a Genoese, were much offended and some captains refused to permit him to come on board. Inspections

by Spaniards and Genoese were not relished by the Venetians, whose contributions to the League fleet outnumbered all others combined.

On the 30th, Don John got underway and stood south along a hostile coast for the bay of Gomenezza, 30 miles from Corfu, where he put troops ashore to protect his sailors, who landed for wood and water.

Andrade returned October 1, still without having actually seen the Turks, or having learned their total strength, but it was certain that they were based at Lepanto, were landing the sick, and taking on stores and re-enforcements of soldiers.

On the morning of October 3, Don John cleared Gomenezza and steered to the westward of Saint Maure, bound for the channel between Ithaca and Cephalonia, a run of about 70 miles. On the morning of the 4th he anchored in the Cephalonian port of Phiscardo to rest his crews. While there, the captain of a Greek galiot, on a raiding cruise, told him he had left Lepanto—about 75 miles distant—the preceding evening; that the Turks were in no condition to fight and that the African galleys were already underway for the Barbary coast.

Some of Don John's officers wished to lay siege to Turkish strongholds in the vicinity, but he decided to base on the port of Petala, on the main land, north of the entrance to the Gulf of Patras, where he could get wood and water and observe the Turks at Lepanto, about 60 miles distant. He resolved to attack if Ali came out, bound for the Bosphorus or elsewhere.

Having reached this decision, he got underway during the night of the 4th, but with the greatest effort, was not able to clear the strait on the 5th against a south wind. After an exhausting day, he anchored on the eastern Cephalonian coast, north of the Bay of Samos.

An east wind kept him at this anchorage until the afternoon of the next day, October 6. While there, the fleet was observed by two Turkish scouts, who at once returned to Lepanto where their commander Kara Khodja reported that the Christians were not to be feared, although he had not been able to make an exact count.

Accepting this report, Ali took his fleet through the Little Dardanelles and anchored it in the Bay of Calydon on the north side of the Gulf of Patras and about 14 miles east of its entrance. From this anchorage, he got underway on the morning of October 7 and steered west, expecting to find the Christians in, or near, the Bay of Samos. But the weather having improved somewhat, Don John—against the advice of his pilots—determined to make a try for Petala. Starting in the afternoon of the sixth, by sunset he had cleared the channel south of Ithaca.

He then put his fleet under short sail for the night and laid a course for the north end of the Curzolaris, small rocky islands about 20 miles from Petala. He used oars only to keep the course.

At dawn, the sharp peaks of the Northern Curzolaris were made out, and the course was gradually changed to east and, when the islands were rounded, to south, to make the port of Petala, as planned.

Still anxious for news, Don John despatched some frigates with observers to the mainland with instructions to climb the hills which afforded a view over the low lands at the mouth of the Aspro Potamo and into the Gulf of Patras. At the same time he sent Don Juan de Cordona ahead with the advance guard and ordered Giovanni Andrea Doria, with the right wing, to take station at the head of the fleet.

About the time the sun cleared the mountain tops to the east the fleet was off Port Petala which is about seven miles north of Cape Scropha in Latitude 38° 15′ north, at the entrance to the Gulf of Patras. The fleet extended over a length of at least four miles (Chart I).

Before course was changed to make the port, the lookout on Doria's flagship reported two ships to the southward, but so far away that he could not tell whether they were men-of-war or fishing boats. Their sails only could be seen. Ere long they were recognized as two galleys. Masts and yards were loaded with volunteer lookouts. Then a cloud of sails were made out—without doubt the enemy.

Doria stopped. The men on shore were recalled. The fleet hove to, to await orders.

The Turks, under sail, with an easterly breeze, were about ten miles to the southward. The time was between seven and eight in the morning.

Don John fired a small saker and hoisted a white flag. This was the signal prescribed at Messina to form the order of battle; in this case, to deploy, which could not be done until the fleet cleared the passage between the island of Oxia and Cape Scropha.

The Turks, being in the open sea, were not thus hampered.

The Turkish scout, Kara Khodja, could not see the entire Christian fleet and his report again cheered Ali Pasha.

On the other side, Don John sent a fast frigate to count the Turks. Cecca Pisano, the frigate captain, according to account, climbed a rock and counted 260 large ships. Returning to the flagship, he reported the enemy as inferior, but whispered to Admiral Colonna "Sortez vos griffes, seigneur; vous en aurez besoin; le combat sera rude."

Thus each commander-in-chief was encouraged to believe that victory was within his grasp.

Uluch Ali suggested to Ali Pasha that the Turks go about, and entice Don John to follow them under the guns of the forts, but Ali refused to take on even the appearance of flight.

Don John's staff suggested that he call his council together, but he refused saying "the time to counsel is past; prepare to fight." He called his despatch frigate alongside and went on board with his secretary, at the same time directing Don Luis de Requesens to embark in another.

With crucifix in hand, Don John rowed under the stern of each galley of the center and right wing, recalling the plenary indulgence granted by the Pope and promising victory. Don Luis performed a similar service for the left wing.

The irons were taken off Christian slaves and they were given arms. The men (chiourmes) kept at oars were given wine and the best food the hold contained. On most galleys the thwarts nearest amidships were taken out to make more room for men-at-arms.

On his return to the flagship Don John fired one gun towards the enemy, hoisted a square flag at the mast-head, a pennant at the peak, and on the poop the Grand Standard of the League which he had been directed by the Pope not to fly until the day of battle. Painted on the flag was a large picture of Christ on the cross.

The two fleets must have been nearing each other, for Ali Pasha announced his defiance by a return shot and by hoisting the standard of the Prophet.

This flag, generally stored at Mecca, is said by Prescott, the historian, to have been the Sultan's own flag "passed from father to son since the foundation of the imperial dynasty and was never seen on the field unless the Grand Seigneur, or his lieutenant, was there in person."

This great Ottoman standard carried on a white ground, on both sides, texts from the Koran, laid on in gold letters, and—says Prescott —with these, the names of Allah appeared no less than 28,900 times. In those days visible symbols were believed to be of vital importance.

For nearly a month, prayers for victory had gone up daily from the Pope and from all the convents and monasteries in Italy.

Admiral de la Gravière speaks of this battle as being one between gentlemen. All the formalities of a joust between knights were observed.

The Turks were fresh, after a night's rest. The Christians were not, having been underway, with some rowing, all night. They could not form their battle line until clear of the passage between Oxia and Cape Scropha and then were obliged to partially change front in order to parallel the Turks.

It appears that at this juncture Ali Pasha could have gained an advantage by pressing on to the attack, while part of the Christian fleet was in the passage, but he did not make the attempt. He kept the wind, and remained under sail until about eleven o'clock, when sail was taken in and oars manned by signal, so quickly and uniformly as to arouse the admiration of the foe.

On the Turkish galleys, men danced and sang with joy, to the sound of cymbals, tambourines, and flutes.

Despite all efforts, Don John had not been able to complete the formation of his battle line. All of the galleasses had not reached their stations. The reserves were not up. Many of the galleys were not in line.

It was important that every ship should be in position before the advance, but the formation shown in Chart I was scarcely approximately attained, before the oncoming Turks precipitated the action.

Giovanni Andrea, leading the right wing, had to take enough sea-room to permit the center and left to form. Barbarigo, left guide of the opposite wing, had instructions to keep as close to the coast as the depth of water would permit in order to prevent the Turks from passing in shore and attacking his rear.

Each captain in the line of battle was to have maneuvering space, but intervals were not to be so great as to permit an enemy to pass through. With 200 galleys on a front of at least 8,000 yards, wings and center forming up more or less independently, the "seaman's eye" had to be wisely employed if large intervals or undue crowding were to be avoided.

It was nearly noon before Don John felt justified in sounding the charge. It is unlikely that the two fleets closely paralleled each other. In fact, the inshore wings met before the centers. General orders were to "protect the flag"; otherwise, each captain was "to select an opponent, ram, and board."

The galleasses were the first to fire when the Turks came within range.

The first shot, from Francesco Duodo, carried away the signal lantern (fanal) on the Turkish flagship. The second and third damaged adjacent Turkish galleys. Many of these began to back water, but Ali set an example by urging his rowers to their utmost speed and the others followed, changing course to clear the galleasses, and closing in after passing them.

The galleasses, except the two covering the left wing, were now out of the battle and the Turks were encouraged by getting clear with the



FIG. 11.—Philip II of Spain. (*From Gayarrés' "Philip II of Spain," W. J. Widdleton, New York.*)

loss of only two galleys and damage to a few others. They came on, says the chronicler, with wild cries, and at such speed that the water foamed under their bows.

The in-shore wings met first, and a mêlée between them quickly ensued. Soon the same condition prevailed between the centers, while Doria and Uluch Ali kept moving to southward and eastward, without fighting, each apparently trying to outflank the other until there was much open water between them and the centers.

Along the shore, the light galleys of Mehemet Scirocco managed to pass between Barbarigo and the land, and attacked from the rear.

Barbarigo, having lifted his visor to encourage his men, received an

arrow in the left eye, which proved to be mortal. He died on the following day. The Turks boarded, and reached the main-mast of his flagship. Shot, arrows and fire-pots rained on her. Her captain was fatally wounded, but other galleys came to her rescue and drove off the Turks.

The Venetians attacked Scirocco's flagship with equal fury. Scirocco was found covered with wounds on the bridge of his ship and was thrown overboard.

After many losses on both sides, the tide turned in favor of the Christians. Of what remained of the Turkish right wing, those who could get clear ran their ships on shore and fled inland.

Early in the fight between Barbarigo and Scirocco, the centers had fiercely engaged. Don John and Ali Pasha steered directly for each other, with all the speed their rowers could make, both reserving their gun-fire until close aboard—accounts say, half a length. The fire of each swept the deck of the other, and in the smoke the two flagships crashed bows on.

Ali's flagship had the higher bows, and her stem, or spur, appears to have been the sharper, for it pierced the Christian ship from her bow to the fourth thwart. The bow of the Turk hung well over her waist.

Both ships seemed to recoil, but their bows were grappled and quickly lashed together for a hand-to-hand fight. The mêlée was general along the whole center.

Despite entreaties to go aft, Don John chose to stand and fight in person on the bow of his ship.

Ali's flagship carried both Janissaries and archers; Don John's, Sardinian arquebusiers. Numbers were nearly equal. The Christians boarded the Turkish flagship twice, but were driven off. Ali's own men were supported by others from his attendant galleys.

The Turks, in their turn, streamed aboard the Christian flagship, in numbers and determination that would have turned the tide in their favor, had not two Christian galleys come to the rescue, rammed Ali's flagship in the stern and immediately boarded, shooting down Turks and taking the boarders between two fires.

The painter, Fig. 10, has endeavored to illustrate this indescribable mêlée. It was probably duplicated in many instances along the battle front that day. It was paralleled in modern warfare—but not intentionally—during the night destroyer action after the battle of Jutland.

Don John was armed with the sword only. Ali stood on his own deck, plying bow and arrow. De la Gravière says that Veniero, then 76 years

old, did execution against his opponents throughout the battle with a blunderbuss (tromblon) loaded for him by an attendant.

One account relates that Ali's body was found under a heap of slain near the stern of his flagship and was thrown overboard. Another, that having been discovered badly wounded, his head was cut off and brought to his conqueror on a pike. Don John indignantly refused to receive it and it was cast into the sea.

Accounts agree that men-at-arms and rowers on the Christian galleys were better protected by bulkheads and barricades from fire ahead than were the Turks. Christian knights wore armor above the waist and carried shields and the soldiers wore head-pieces and hauberks. Turkish soldiers wore no armor and a large portion of them were archers, while among the Christians fire-arms largely predominated. On the whole, the arquebus was more deadly than the arrow.

Christian cannon were used more freely and effectively during the approach, set for point-blank. The Turks, in general, fired too high.

It was claimed that in only 40 of the Turkish galleys did the men-at-arms equal the average of their opponents. Others had no more than 30 or 40 soldiers. The 40 more fully manned galleys were those with crescents in their flags and signal lanterns aft (flagships).

As soon as Ali's flagship was captured, the League colors were hoisted, replacing the standard of the Prophet. The Turks were discouraged. At the end of an hour and a half, the battle between the centers ended with a complete victory for the Christians.

Pertev Pasha, commander of the troops, was in one of the galleys which attacked Veniero. Finding the day lost and with a disabled ship, he, though burned by a fire-pot, managed to board a small frigate which he had in tow and fled northward. He finally reached Prevesa, and later Lepanto.

To the eastward, Uluch Ali and Doria, without attacking, had each endeavored to out-maneuver the other. Doria's galleasses were out of the running and few of the Christian galleys could keep pace with the fast moving Genoese admiral, as he steered east to flank the Turks.

Uluch Ali's galleys and galiots outnumbered Doria's by 30. Suddenly, going about, Uluch steered to attack the Christian laggards and to gain Don John's rear through the wide interval. He overbore, captured, and sank some of the lagging vessels, but was met by the reserves under Santa Cruz and by Don John himself with other ships from the center, which cutting adrift their captured enemies, came to the rescue.

Among the galleys captured by Uluch, and the crews massacred, was the flagship of the Knights of St. John (Malta). Outnumbered by the approaching Christians, this wily corsair—a native of Calabria and once a Christian slave—gathered 13 of his galleys and fled northward under oars and sail with such speed that he could not be overtaken, notwithstanding all the efforts of Doria and Don John.

Of the corsairs, it may be said, as it was of the American Indian, that "they fought without fear and fled without shame."

Some 30 other galleys and some smaller craft made off in the direction of Lepanto. All others were sunk, wrecked, or captured.

The battle was over before sunset. Seven thousand Christians were killed; twenty-five thousand Turks were captured or killed. Twelve thousand Christian galley slaves were freed; five thousand Turks fettered.

Pope Pius called Don John "a man sent by God."

A freshening wind caused the Christians to abandon the scene of battle, towing many of their own disabled and some of the captured Turkish galleys, to ride out a short gale in the near-by port of Petala.

The next morning, the wind having gone down, Don John, with his principal admirals, returned to the battle area.

His only comment on the tactics of Doria was to invite the admirals to breakfast on the Genoese flagship as the only one in condition to serve a meal appropriate for such illustrious guests.

With his fleet and prizes in tow or in company, Don John reached the port of St. Maure on October 10. There he wished to attack a fort through whose possession the Turks controlled the island but was dissuaded by the considerations that it might require a lengthy siege, winter was coming on, food was scarce and already the fleet was subsisting on stores captured from the Turks.

Fortunately three Venetian galleasses, out of 13 which the Republic had manned to re-enforce Don John, arrived with stores on October 20. As this supply would last only a short time, however, the almost unanimous vote of the council was for home.

On October 22 they sailed for Corfu, reaching it the next day. Four days were spent in making preparations for the voyage across the straits to Messina. Halfway across, a heavy wind and rain storm which came on at night threatened to wreck those galleys which had others in tow, but all came safely through. Nearing Messina, a few were thrown on Charybdis by the current and their prizes were wrecked.

Don John, with twelve galleys, was the first to arrive on the morning of November first. He at once landed to give thanks for victory. The remainder of the fleet made port during the day.

The following morning the fleet went outside and made a formal re-entrance in double column with flags and banners flying, led by Don John and Colonna. Don John towed the Turkish flagships. Other galleys towed their captures by the stern, with yards cock-billed and flags trailing in the water. They were greeted with salvoes of artillery from the forts of Messina. A sea triumph!

Afterwards came the distribution of the booty and old jealousies and dissensions already rife were intensified. Don John claimed for himself one-tenth of the whole. This, after some protest, was approved. Other principal awards were: to Philip II, 82 galleys; Venice 54; the Pope, 19, and a proportion of slaves and cannon. Don John's tenth gave him 16 galleys.

These were not the amounts agreed upon while lying at St. Maure, but were those awarded by the Pope to settle disputes.

From the St. Maure agreement we learn that the distribution of slaves was to have been: to the Pope, Venice, Savoy and Malta, 1,801; to Philip, 1,685; to Don John, 720. Some 400 others were awarded in lots of 2 to 30 each, among princes and lesser nobles, according to their rank and nationality. Each galley captain was to have one. A total of about 5,000 no doubt found their way to chains and oars, even as they had chained Christians.

The immediate result of the battle was complete freedom from raids on Italian and Spanish towns and coasts by Turkish and Barbary corsairs and a cessation of assistance to the Moors in Spain. These raids were never renewed to their former extent, although corsairs roamed the Mediterranean and later the sea coast of Spain, the English Channel, and even the Irish Seas, for about 250 years.

Without a common peril the ties that bound the League were weak. Its moving spirit Pope Pius V died within a year, and the next year, in March, 1573, Venice made a separate peace with the Turks.

Admiral de la Gravière gives us some particulars concerning the arms of the soldiers at Lepanto, but no details about the guns, either number or caliber, and no mention is made of any damage from guns, magazines, or other powder explosions. It seems improbable that there were not some of these.

It appears that the ancient custom of equipping galleys with tiers of oars had gradually fallen into disuse, and at the time of this, the last

great battle under oars, galleys had one row of thwarts only; that these were at right angles to the keel, and that oars were double, triple and sometimes quadruple or quintuple manned, according to the size of the ship.

Admiral Rodgers gives oar lengths of 42 feet in the middle of the 16th century, not far removed from the time of the battle of Lepanto. He further states that in the 17th century, great oars or sweeps for galleasses were from 53 to 58 feet long, spaced nearly six feet apart, and each manned by nine or ten men, part facing aft and part forward (pushing and pulling). Such sweeps for working ship in calms were furnished British battleships as late as 1816.

In ordinary galleys, thwarts were spaced about three feet.



FIG. 11a.—Queen Elizabeth. (*From Chamberlin's "Elizabeth and Leycester," Dodd, Mead & Company, Inc., New York*)

CHAPTER V

THE ENGLISH NAVY UNDER QUEEN ELIZABETH

ELIZABETH TUDOR, daughter of Henry VIII, became Queen of England at the age of 25 as the successor of her half-sister Mary who died in 1558. Mary, an ardent Catholic, was the cousin and second wife of Philip II of Spain, the bigoted son of Charles V of Spain, who abdicated in Philip's favor in 1556.

The persecution, tortures, beheadings and burnings of Protestants in England which darkened Mary's reign ceased when Elizabeth came to the throne.

Reaction was against the Spaniards. Throughout Elizabeth's reign, sea-war, private and public, was waged against the Spaniard. It was inspired by Catholic cruelties under Mary; the excesses of the Spanish Inquisition, fostered by Philip; and the lure of Spanish gold, coming from the New World.

Allen finds no sea-action worthy of any except minor notice between 1545 and 1588, 17 years after the Battle of Lepanto.

English depredations ashore and afloat and the fall of Catholicism into disrepute in the island kingdom rankled in the Spanish mind and especially in the mind of the Spanish king, to whom all Protestants were heretics.

The dispatch of a fleet and an army against England had been in contemplation by Philip for at least five years before the project was carried out. By 1587, his preparations were well known in England. A squadron under Sir Francis Drake, consisting of 40 ships, was sent to harry the Spanish coast. Drake entered the harbor of Cadiz and destroyed about 100 ships, chiefly loaded with stores and ammunition. He ravaged the coast westward from Cadiz to Cape St. Vincent, challenged the Marquis of Santa Cruz to come out and engage him, destroyed about 100 more ships, and again harried the coast. Before returning to Plymouth he sailed to the Azores, where he captured a large Spanish galleon, the *San Felipe*.

These depredations so embarrassed Philip that the sailing of the Armada, which was to have taken place in 1587, was delayed for a year.

Philip's illustrious half-brother, Don John of Austria, died in 1578

and the death of the Spanish admiral Santa Cruz, who originally proposed the attack on England, occurred in 1588, just before the Armada was ready for sailing. Philip selected the Duke of Medina Sidonia for the chief command. The Duke protested his complete ignorance of war, both on land and sea, but was induced to accept.

He received orders to

> put to sea with the whole Armada and proceed direct for the English Channel up which you will sail as far as the Point of Margate, there opening communication with the Duke of Parma and assuring him passage across.

The army under the Duke of Parma was to be composed of nearly 100,000 men. The Armada was to consist of 150 warships and about 400 other vessels, transports, storeships, etc.

Philip felt his force was so overwhelming that although Medina Sidonia was not to *seek* battle until after he had landed the army, he was not to *avoid* it, regardless of where, or in what numbers, the enemy should be found. He was warned, however, that the English because of their superiority in artillery, would seek to fight at long range and that he should endeavor to get to close quarters.

After landing the army in England, the Armada was to be stationed near the mouth of the Thames, to keep open communication with Flanders and to co-operate with the army. This was considered a good anchorage, but if circumstances prevented the troops crossing from Flanders and landing in England, the Duke should try to make himself master of the Isle of Wight which would afford a secure harbor.

He was directed not to return until the objects of the expedition had been achieved. One of the announced purposes was to "lead back to the bosom of the Church, souls subjected to the enemies of the Holy Catholic Faith." The Armada sailed from Lisbon on May 20, 1588, entered Corunna June 9, and sailed again July 12.

After leaving Corunna, the fleet, exclusive of transports, consisted of about 120 ships of which about 60 were galleons, 4 galleasses and 4 galleys, mounting a total of approximately 2,000 guns. The majority of these were small, not exceeding 9-pounders. The ammunition allowed averaged about 50 rounds per gun.

Although warned by Philip that the British would prevent boarding, his officers expected to win by that means and by their overwhelming numbers.

Clowes says it is probable that ". . . the 34 largest ships of the English Royal Navy which were engaged had a slight superiority of armament over any 34 vessels belonging to the Armada." He thinks that the

Spanish gunnery was inferior and that the Spanish practice of making port-holes so small interfered with the service of the guns and prevented them from being effectively used. The largest Spanish ships, if stripped of their topcastles, would have been shown to be of little, if any, greater tonnage than the largest English ships, although the high sides of the Spaniards—as has been elsewhere remarked—made them not only less weatherly but generally unhandy, and they presented larger targets than the British ships.

It was a time of great uneasiness in England. Drake, on hearing of the prospective sailing of the Armada, wished to carry the war to the enemy by taking the English fleet to give battle on the coast of Spain, but he was overruled. Elizabeth appointed Charles Howard, Earl of Effingham, as Lord High Admiral and he selected Sir Francis Drake to be his vice admiral, with Sir John Hawkins and Sir Martin Frobisher as rear admirals. Howard's flagship was the *Ark Royal,* Drake's the *Revenge,* Hawkins' the *Victory,* and Forbisher's the *Triumph* (Fig. 12).

The Royal Navy was small and about half of its ships, assisted by a Dutch squadron, were watching the Flemish ports where the Duke of Parma was awaiting to embark his troops.

Some ships were hired. The cities of London, Bristol, Barnstable, and Exeter furnished others, as did many private owners. Volunteers of all ranks assisted in manning them.

By the time it was learned that the northeast gale which had forced the Armada into Corunna had not changed Philip's plans, Howard had about 100 armed vessels, large and small, being fitted out at Plymouth and other Channel ports.

The Armada was sighted off the Lizard, July 20. Howard at once sailed from Plymouth with all available ships to harass the Spaniards and delay their passage, while augmenting his own fleet. By the next day, he and his three admirals had 100 ships of all classes out in rear of the Armada, which had passed Plymouth and was sailing up the Channel with a fair wind.

According to Allen,

> The Lord High Admiral ordered a pinnace, called the *Defiance*, commanded by Mr. William Cope, to proceed to the attack and to denounce war against the enemy, while he in the *Ark Royal* overtook and attacked a ship which he mistook for the Spanish Admiral's, but other ships coming to her assistance, he was obliged to withdraw. His Admirals and other English ships attacked when they could and threw the Spanish convoy formation into some disorder.

The Spanish fleet was organized in three squadrons: van, center, and



FIG. 12.—(*top left*) Sir Martin Frobisher, Kt. (From the "Heroologia."); (*top, right*) Charles Howard. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

FIG. 12.—(*bottom, left*) Sir John Hawkins; (*bottom, right*) Sir Francis Drake. (*From Gosse's "Sir John Hawkins," published by John Lane, The Bodley Head Limited, London*)

rear, with Medina Sidonia in command of the center. As formed in the Channel, it was crescent-shaped—van and rear on the wings, with the transports between and to leeward.

Drake and Howard with the *White Bear, Mary Rose,* and some other ships followed the Armada during the night. The wind had increased and there were some collisions between the wallowing galleons. One of these—a flagship, *Nuestra Senora del Rosaria*—lost her foremast and bowsprit and fell a prize to Drake.

By the morning of the 23rd, Tuesday, the wind had shifted to the northeast and the Spaniards, being to windward, decided to attack. Meantime, more ships had joined Howard.

Tuesday's battle was indecisive. Both fleets were running short of powder. The Spaniards counted, according to their reports, 120 English sail on Tuesday, and noted that the English, who had previously fought individually, were divided into four squadrons. The rate of sailing was slow, the action of the 23rd starting off Portsmouth. Clowes says that neither side lost a ship. The Spanish, having the wind, were apparently betrayed into contravening their instructions not to seek action.

On Wednesday, the 24th, the British were the attackers. Both sides had sent for additional ammunition. Admiral Howard, knowing that it —with other assistance—awaited him at Dover, did not begin his attack until the Armada was off that port.

The Spaniards, on their part, felt that capturing the British by boarding was their only hope. They noted, for the first time, that the British admiral fired his large, lower deck guns, which makes it probable that Howard had hitherto been unable, owing to the weather, to use his "loure tiere."

In the third action (Wednesday) the British apparently inflicted more damage than they received. Medina Sidonia's only reliance for additional ammunition was on Parma, while Howard's supply was nearer at hand. The Spaniards hoped to join Parma off Dunkirk and steered for Calais.

On Friday evening, the 26th, the fleets were mutually in sight, for at least part of the day, but were unable to approach each other for lack of wind. On Saturday, the 27th, the Spaniards anchored near Calais, and the British came to, "within culverin shot of the enemy."

About midnight on Sunday, the 28th, the English sent eight fireships among the Spaniards, which forced many of them to slip, or cut their cables and make sail.

The British fleet had increased in numbers until its total was about 140 ships, barks and pinnaces.

On Sunday night, a Spanish galleass, the *San Lorenzo,* grounded near Calais and was plundered by the English.

On Monday, the 29th, Drake, with his squadron, attacked the Spanish off Gravelines. The Spanish fleet was underway, but not in good order. Drake's squadron was followed by that of Sir John Hawkins, and the latter by that of Admiral Howard. The new *Mary Rose,* built to replace the one sunk in 1545, figured prominently in this day's action.

Medina Sidonia was now near a lee shore, with a northwest wind, and felt himself forced to get into the North Sea to prevent being driven ashore.

Admiral Howard wrote, "Their force (the Spanish) is wonderfully great and strong and yet we pluck their feathers, little by little."

The Duke of Parma was found to be at Bruges, but neither the army nor its stores were embarked for the voyage of invasion. Medina Sidonia called a council of war, which decided that the Armada should return to Spain around the north of Scotland.

Clowes says that

> Neither Drake nor Howard could have known that many ships of the Armada had no cannon shot left and both, no doubt, overrated the amount of fight left in the Spaniards. That Gravelines had destroyed the morale of the enemy did not become apparent for several days afterwards, when making no attempt to return for Parma, and so abandoning its main object, the Armada was on its hazardous course *"sauve qui peut"* around Scotland.

Admiral Howard pursued with the main body of his fleet, determined to chase as far north as the latitude of the Firth of Forth, but abandoned his plan when he became convinced that the Spaniards had no designs other than to make the best of their way home.

On August 11, the unfortunate Duke sent Philip a despatch, in which he wrote:

> God has seen good to direct matters otherwise than we expected.

After escaping from the English, the Armada fell foul of the god of storms, losing about two score of its ships by weather and shipwreck while sailing around the coasts of Ireland and Scotland.

It is probable that Admiral Howard, when he engaged what he thought was the Spanish flagship, on the 21st, intended to grapple and board in the traditional way, but as Philip had been forewarned, this was contrary to the general tactics of the English throughout the battle. These were to "fire and fall off" to prevent the Spanish from boarding, and not to attempt it on their own account, though this did not preclude taking possession of ships that struck or were disabled.

Off-fighting was the rule, and it appears that after the four admirals were given separate commands, the approaches (firing and falling off) —especially at Gravelines—were conducted with some regularity.

Sending fireships among the fleet at anchor off Calais is the first instance of their use by the English and may have been suggested by the Dutch, who had some years previously used them against enemies in the Scheldt.

The success of fireships at Calais made them, thereafter, a regular or improvised part of fleets and their tactics were prescribed in fighting instructions.

In the ships of the Armada, the traditional formula—soldiers for fighting; sailors for trimming sails and steering—was the rule.

Admiral Howard's fleet was manned entirely by sailors, approximately 17,000, as opposed to 21,000 soldiers and about 8,000 sailors of the Armada, exclusive of the "men-at-oars" (more than 2,000 galley slaves).

Admiral Howard considered the 9-pounder as his most effective gun, while Robertson says the haughty Spaniard still looked upon artillery as an "ignoble arm."

The Spanish thirst for boarding and hand-to-hand fighting with their enemies was, no doubt, engendered by their centuries of conflict with the Moors and the fear inspired by their terrible infantry in the Low Countries under the Duke of Alva.

Two distinguished Frenchmen, about a century later, were to voice their belief that boarding tactics, as opposed to great gun duels, were best suited to the French temperament.

It is to be observed that as recently as 1898, the Spanish still clung to this view when they intimated that the Americans at the battle of Manila showed cowardice, because instead of closing for individual combat, they used "instruments of precision" from a distance.

Admiral Hawkins was a ship builder and contractor, as well as a great seaman. He was Treasurer of the Admiralty and was responsible for fitting out the fleet at Plymouth. He had many enemies, but one of them, Sir William Wynter, who had been Queen Mary's Lord High Admiral, and was then an Admiralty Commissioner, wrote a year before the invasion of the Armada, "We are thorolye persuaded in our conscience that he hath for the time since he took that bargaine, expended a farre greater somme in carpentrie uppon her Majesties shippes then he hath had eny wage allowance for."

When the Armada was daily expected, Admiral Hawkins' brother, William, wrote him (in present day spelling):

We trim one side of every ship by night and the other side by day, so that we end the three great ships in three days this spring(tide). The ships set aground so strongly, and are so staunch as if they were made of a whole tree. The doing of it is very chargeable, for that it is done by torch lights and cressets, and in an extreme gale of wind which consumes pitch, tallow, and firs abundantly. [To clean, calk, and paint between tides on these same shores was the routine of the sub-chaser squadron in 1918.]

Admiral Howard wrote:

For Mr. Hawkins' bargain, this much I will say. I have been aboard of every ship that goeth out with me, and in every place where any may creep, and there is never a one of them that knows what a leak means. I do thank God that they be in the estate they be in.

These were the ships, supplemented by armed merchantmen, requisitioned and volunteered, that sailed around, harassed, stung and put to rout the Great Armada.

Writing after the battle of Gravelines, Howard said,

All the world never saw such a force as theirs was; and some Spaniards that we have taken that were in the fight at Lepanto, do say that the worst of our four fights that we have had with them did exceed far the fight they had there; and they say that at some of our fights we had 20 times as much great shot plied as they had there.

Corbett remarks:

The attack at Gravelines in 1588 with four mutually supporting squadrons in échelon bears strong elementary resemblance to that of Trafalgar in 1805. It was in dexterity and precision of detail far more than in principle that the difference lay. The first and last great victory of the British Navy had far more in common with each other than either had with Malaga or the First of June.

. . . We cannot fail to notice the striking resemblance between his (Nelson's) method of attack by separate divisions on a disordered enemy, and that made by the Elizabethan admirals at Gravelines upon the Armada, after it had been broken up by the fireships.

It appears that these comparisons, though apt, are a little overdrawn.

The researches of Oppenheim give us particulars concerning the ships of the four squadrons which routed the Armada—the ships in which sailors of that day had fought, lived, and frequently died, from causes other than battle.

Of the four flagships, Frobisher's *Triumph* was the oldest and largest, having been built in 1561. Frobisher himself is better known to us as an explorer and seeker for a northwest passage, but he was at sea in the Queen's service, and distinguished himself both before and after the defeat of the Armada. The Lord High Admiral, in recommending him to Elizabeth, considered him to be one of the "men of the greatest experience that the realm hath."

We can visualize naval life of the 16th century more clearly by learning somewhat about how the ships were built and rigged; what stores were carried; and what the men ate, drank and wore. The *Triumph* was among the largest ships of the century, measuring about 1,100 tons, a match for the *Henry*. Tonnage was based on cubic measurement —not on displacement, as now, nor on cargo capacity. The unit "ton" was the space taken up by a tun of wine (about 60 cubic feet). The *Triumph* was not liked. She was too big, too expensive, or too unhandy to be commissioned "unless fleets of great strength were required."

Her early complement was 450 seamen, 40 gunners, and 200 soldiers, which she was expected to carry on a keel length of 100 feet; over all 143 feet; beam, 40 feet; depth of hold 19 feet. Her height above water in the waist was about 20 feet. We do not have any figures on her fore and stern castles. She had the greatest beam and depth of hold of any ship in the Navy and was exceeded in keel length by only three, the *White Bear, Merhonour* and *Vanguard*. With the possible exception of height of superstructures, she was equal to any ship of the Armada.

Included in her ordnance equipment were 250 arquebuses, 50 bows, 100 sheaves of arrows, 200 pikes, 200 bills, 100 corselets, and 200 morions (headpieces). In 1585, her battery was 9 demi-cannon, 4 cannon-periers, 14 culverins, 7 demi-culverins, 6 sakers, and 28 smaller pieces (minions, portpieces, fowlers and bases). Her magazines carried 750 pounds of corned powder and 4,247 pounds of serpentine. Whether in barrels or cartridges is not stated.

She was re-built in 1595. In 1602, her complement had been decreased to 340 mariners, 40 gunners, and 120 soldiers. Her battery was also changed. Its weight—68 tons—was greater than that of any other ship.

Experience, during and after '88, had made the quick handling culverins and demi-culverins the favorite ship guns. The actual—as well as relative—increase of both, in ships' batteries is shown by the changes in the *Triumph*. Five of her demi-cannon were taken off and five culverins, nine demi-culverins, and seven sakers, added. There was a marked decrease in the small pieces—from twenty-eight to four—but this may have been only temporary, as their number in small ships was not greatly reduced.

Culverins and demi-culverins (18- and 9-pdrs.) were proportionately longer, and used a heavier powder charge per pound of shot than other guns. Their extreme range was given as 2,500 paces.

It is noteworthy that nearly all guns on the royal ships in 1603 were

brass, although it was nearly four times as costly as iron and Elizabeth was not open-handed. Also the English prided themselves on their iron foundries. We read, however, that in Germany there were many deaths from the bursting of iron guns. Oppenheim says that there was good profit in selling iron guns to Spain and that despite stringent decrees and bonding of foundry men, a lucrative trade was carried on.

The disproportion of corned and serpentine powder in the *Triumph* is not explained. England made her own powder, but had to import the saltpeter, which in some countries was a government monopoly.

Heavy ships' guns were mounted on four-wheeled, wooden carriages of which Oppenheim records the invoice prices. He thinks they may have had elevating screws, but this is improbable. They do not appear in the English Navy—except for carronades, in 1775—until the 19th century.

Hammocks for the men were introduced in 1597. A warrant, in that year, authorized payment for 300 bolts of canvas "to make hanging cabones or beddes for the better preservation of their healths." Up to 1629, however, they were furnished for over-sea service only, and then in the proportion of one for every two men—a strictly watch-and-watch arrangement.

Previously, sailors' bedding, when they had any, was laid on deck. How it was stowed during the day and in action is conjectural. In 1513, a captain reported, ". . . because I had no rails upon my deck I coiled a cable about the deck breast-high, and likewise in the waist and so hanged upon the cable, mattresses, bed and table covers, and such bedding as I had within board."

"Hanging beddes" were the custom until well into the 20th century, when—in our own navy—they were gradually replaced by standing, or folding metal bunks.

No especial provision was made on board men-of-war for the sick or wounded sailor; if the ship went into action he was placed in the cable tier or laid upon the ballast as the safest places.

Men generally bought their own clothes. There seems to have been no uniform, except that the ships' supplies being furnished by contract or by the Admiralty were doubtless all of one pattern. Oppenheim quotes prices at various periods in shillings and pence, but except relatively to each other and to wages, they are of no value and need not be stated. He lists canvas jackets and drawers, cotton waistcoasts and drawers—at a much higher price—shirts, shoes, linen and cotton stockings. Outside of morions for the soldiers, head covering is mentioned

but once. "Monmouth caps" (small tam o'shanters) were among the stores carried by Drake and Hawkins on their last voyage in 1595. These stores included "calico for 200 suits of apparel, 400 shirts, woolen and worsted hose, linen breeches and Monmouth caps. Such a cap, a ruff at the neck, a close fitting vest and bell-mouthed trousers, are shown as worn by an officer of that period. "Canvas for breeches and doublettes" was shipped to Ireland for men on that station.

Lack of sufficient clothing was a constant complaint in the century and a half covered by Oppenheim's researches. Of the still more important question of food and its preparation, his observations are of interest. At that time, all ships carried gravel ballast.

> It was seldom changed and becoming soaked with bilge water, drawings from beer casks and the general waste of a ship, was a source of injury to the vessel and of danger to the health of the men. The "cook-room," a solid stone structure of bricks and mortar, was built in the hold on this ballast, and in that position, besides making the ship hot and spoiling the stores, was a frequent cause of fire. . . .
>
> Moving the galley to the forecastle was advocated in 1578, but the change came about very slowly, and as late as 1700 the galley was in the hold in some ships.

The wise and forehanded Hawkins, before one of his West Indian voyages, in 1590, shifted the galley of the *Mary Rose* to the forecastle,

> as well for the better stowing of her victualles, as also for better preserving her whole companie in health during that voyage, beinge bound to southwardes.

Rations were ample, if there was a full issue of good quality; frequently not the case.

For about one hundred years from 1545, the issues per man were: "Sundays, Mondays, Tuesdays and Thursdays, 1 lb. of biscuit, 1 gallon of beer, and 2 lbs. of salt beef; on the other days, besides the biscuit and beer, a quarter of a stock (dried) fish, one eighth of a pound of butter, and one quarter of a pound of cheese." In 1636, rice, sugar and oatmeal were among the medical stores. Water was used for other purposes, but not for drinking and probably wisely.

Ships were ordered to carry two months' provisions, but except for trans-Atlantic voyages, cruises were short and ships were laid up during the winter months. There were epidemics, however, other than scurvy, to weaken the crews, even in the narrow seas.

Space for the storage of provisions was allotted to beer, one half; wood and water, one quarter; and solid food, one quarter. Complaints on the quality of beer, whether well or ill founded, pervade the Admiralty correspondence.

Howard could not rest on his laurels after routing the Armada. Within a week his men began to fall ill. On August 10, he wrote to Burghley:

> Sicknes and mortallitie begin wonderfullie to grow amongste us . . . the "Elizabeth" which hath don as well as eaver anie ship did in anie service, hath had a great infectione in her from the beginning soe as of the 500 men which she carried out, by the time she had bin in Plymouth three weeks or a month there were ded of them 200 and above, soe as I was driven to set all the rest of her men ashore, to take out the ballast and to make fires in her of wet broom 3 or 4 daies together, and so hoped therebie to have cleansed her of her infectione, and thereuppon got newe men, verie tall and hable as eaver I saw and put them into her; nowe the infectione is broken out in greatest extremitie than eaver it did before, and they die and sicken faster than ever they did, soe as I am driven of forse to send her to Chatham. . . .

He writes to the Queen on August 22 that the infection is still bad, but adds, "I doubt not that with good care and God's goodnes which doth ever bles your Majestie it wyll quenche againe."

At about the same time, he sends a complaint to Walsingham that "although the beer in the fleet has been condemned as unfit for use, it is still served out to the men, and 'nothing doth displease the seamen more than sour beer!' " (Oppenheim)

Colomb says that English men-of-war were not officially divided into rates until the time of the Dutch wars, but Elizabeth made seven rates for pay purposes and it is in these base pay tables that the titles of the personnel above "the common man" (seaman) are found. They are arranged here in the order of amounts of base pay in 1582.

1582

ELIZABETH

1. Captain
2. Master
3. Master's Mate
4. Boatswain
5. Pilot
6. Quartermaster
7. Purser
8. Master Carpenter
9. Surgeon
10. Trumpeter
11. Quartermaster's Mate
12. Carpenter's Mate
13. Cook
14. Yeomen of the tacks and jeers
15. Cockswain
16. Steward
17. Master Gunner
18. Gunner's Mates

1631

CHARLES I

1. Captain
2. Lieutenant
3. Master
4. Pilot
5. Master's Mate

6. Surgeon
7. Master Trumpeter
8. Boatswain
9. Purser
10. Gunner
11. Other Trumpeters
12. Carpenter
13. Yeomen (jeers, sheets, tacks, halliards)
14. Armourer
15. Gunmaker
16. Surgeon's Mate
17. Quartermaster
18. Drummer
19. Fifer
20. Cook
21. Carpenter's Mate
22. Corporal
23. Gunner's Mate
24. Quartermaster's Mate
25. Seaman
26. Gromet (O.S. or Lds.)
27. Boy

1649

THE COMMONWEALTH

1. Captain
2. Master
3. Lieutenant
4. Boatswain
5. Carpenter
6. Gunner
7. Purser
8. Master's Mate or Pilot
9. Surgeon
10. Midshipman
11. Carpenter's Mate
12. Boatswain's Mate
13. Quartermaster
14. Corporal
15. Gunner's Mate
16. Quartermaster's Mate
17. Master Trumpeter
18. Cook

From the tables, the titles that existed in earlier days, their relative importance, and those that have survived or disappeared can be readily determined. They are arranged in the order of base pay, but differences in allowances for rations, "dead shares," and other causes may have altered relative totals received. Surgeons usually received the same pay regardless of the rate of the ship on which they served. Pay of others decreased with size of ship.

That important person, the master gunner, in pay, at least, ranked lower in Elizabeth's time than before or after.

Lieutenants do not appear until the time of Charles I, and no regularly appointed midshipmen until the Commonwealth, but Oppenheim says some ships carried lieutenants in 1588.

A curious order in 1602 was that sixth-rates could have either a surgeon or a trumpeter, but not both.

Oppenheim has a facsimile of a drawing representing the *Tiger,* one of Henry VIII's ships. It shows four masts; square sails on two; a lateen sail on each of the two mizzens; no fore and aft sail; a bowsprit, but

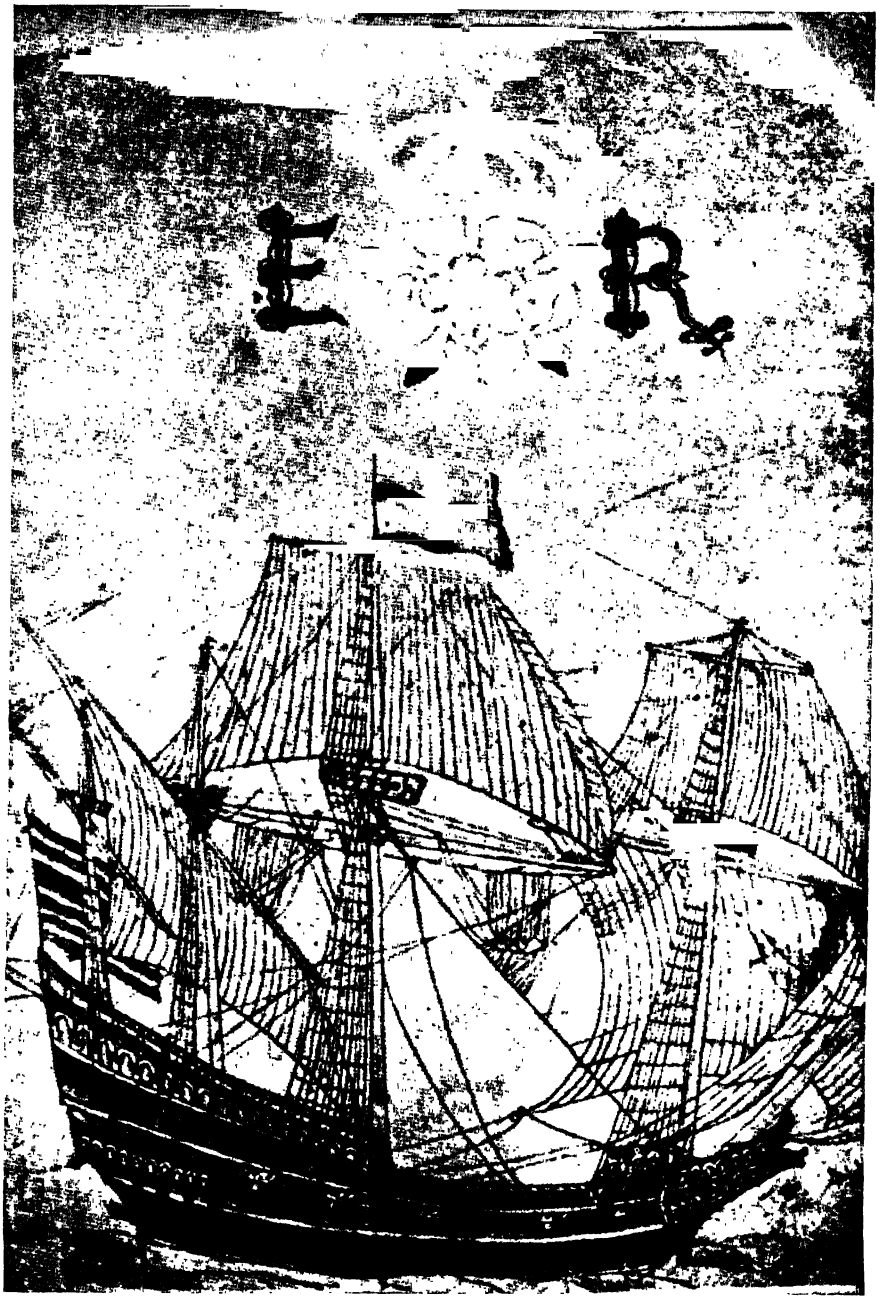


FIG. 13.—Elizabethan "Man-of-War." (*From Oppenheim's "A History of the Administration of the Royal Navy," published by John Lane, The Bodley Head, Limited, London*)

no sprit sail. There are practically no deck structures, either forward or aft. Guns are on one covered deck. The long boat rides astern (Fig. 6).

Openheim's other illustration, Fig. 13, is from a contemporary drawing of an Elizabethan ship, rigged like the *Tiger,* but with a two-decked poop.

However, there was a tendency to rig ships with three masts only, omitting the "bonaventure mizzen." Sprit sails were long retained. There seems to have been no provision for reefing topsails or topgallant sails. For courses, one, and sometimes two, bonnets were developed; the second, called a "drabler," could be laced to the foot of a course.

Royal ships flew banners and long pennants profusely and a tendency to over-ornamentation around bows and sterns was noticeable in different eras.

There remain to be considered ships' boats, which De Chaves believed should be armed and manned before battle. Three boats for each ship, large or small, as in the *Grâce à Dieu,* continued to be the rule for 150 years, with some changes in size, and change in names to "long-boat, pinnace, and skiff." Some long boats, during the Commonwealth, measured 35 feet. There seems to have been no provision for hoisting long boats and when taken on a voyage they were towed.

Oppenheim is authority for the statement that every long boat with the Cadiz Expedition of 1625 was lost in the Bay of Biscay. He quotes from a book of 1625 (*Nomenclator Navalis*), speaking of "boat tackles w'ch stand one on the main mast shrouds, the other on the fore mast shrouds to 'hoise the boat' as in 1514." This is most likely the familiar "yard and stay" which lasted as long as sailing ships for getting boats in and out. The stay tackle served to lift out of and lower into cradles; the yard tackle, to hoist from and lower to water. The two kept control of the boat while rigging in and out.

We read that before the use of the bowline to haul forward and taut the weather-leeches of topsails and topgallant sails, on a wind, these ships could not lay closer than eight points. That is, they could not beat to windward. This is surely an over-statement, not applying to light or moderate winds. If it were true, the fighting instructions, to first get the weather gage, would be futile, and to make Henry's instructions of 1545 for "a charge through" feasible, squadrons would have to be on exactly opposite courses when the approach began.

Despite his criticisms of the ships of the 16th and early 17th centuries, Oppenheim closes his account of naval administration under Elizabeth with a favorable appraisal of results.

It speaks sufficiently for the courage of the Elizabethan sailor that during the whole of the reign only two English men-of-war were captured by Spain and then only after desperate fighting against overwhelming superiority of force. It speaks equally well for his seamanship afloat and the skill and good workmanship of shipwrights ashore that, with the exception of the small *Lion's Whelp,* no dockyard built ship was lost by stress of weather, by fire, or by running aground. During the same years, and sometimes during the same gales, that the English ships weathered successfully, whole Spanish fleets foundered at sea.

Three flagships of Howard's fleet, the *Ark Royal, Victory,* and *Triumph,* were first-rates—about equal to what in the 18th century would have been rated 50-gun ships. The *Revenge* was considerably smaller. All four ships and their admirals, the saviours of England, deserve further notice here.

The *Triumph*—not popular, for she was a poor sailer—must have been a stout old ship. Rebuilt, in 1595, after 34 years in the water, she was still afloat in 1618, when she was sold out of the service. She long outlived Frobisher, who was knighted for his service in her. Later, in 1590 and 1592, he commanded small fleets which harried the Spanish coast. In 1594, while in command of a squadron attacking Brest, he received a wound which resulted in his death, at the age of 59.

Hawkins, Treasurer and Controller of the Navy, as will be recalled, fitted out the fleet in which he served against the Armada. Like the *Triumph,* his flagship the *Victory* long outlived her commander. She was bought in 1560, and it appears that her name as a merchant ship was the *Great Christopher.* Smaller than the *Triumph,* she was still considered too big and unhandy to be employed except in emergencies, and was sometimes rented out by that shrewd business head, Elizabeth, for merchant voyages. She evidently was not like other royal ships, until 1582, when she was "altered into the forme of a galleon." In 1608, she was broken up, and her useful parts were incorporated in the *Prince Royal,* England's first three-decker and the largest ship of her time. For this purpose, her value was credited at 200 pounds, but a Royal Commission, appointed to investigate corruption in ship yards, reported:

Though we set her at the rate of 200 li. yet it had been better absolutely for the King to have given her away to the poor than to have bin put to the charge of bringing her from Chattam to Wollich noe other use having been made of her than to furnish Phinees Pette (that was the only author of her preservation) with fewell for the dyette of those carpenters which he victualled.

James I had a new *Victory* built in 1620, which though larger than the earlier one was classed as a second-rate. Thus the name was continued in English naval annals, culminating in the last *Victory,* Nel-

son's flagship, built in 1765, now restored and enshrined in her dock at Plymouth, a national monument.

Sir John Hawkins, born at Plymouth, and bred to the sea by his father, was a noted merchant captain, privateer, adventurer, ship builder and naval officer before his Admiralty appointments. He, also, was knighted for his services against the Armada. Twice later he abandoned the cares of office for adventure at sea. First, in 1590, in partnership with Elizabeth, he sought the Spanish treasure fleet off Portugal without success. The second time, in 1595, in partnership with his friend and protegé, Drake, he went to the West Indies to seek treasure and harry the Spanish ports. He died on the voyage, just as he and Drake were about to attack San Juan, Porto Rico.

Drake's flagship, the *Revenge*, dated from 1577. Her history is brief, but glorious. Drake had been knighted for earlier services, and was Vice Admiral and second in command under Howard. With the *Revenge*, he made prize of a large galleon, whose captain—such was Drake's fame—is reputed to have struck as soon as he learned his adversary's name.

Three years later, 1591, the *Revenge* under the command of Sir Richard Grenville was one of a squadron of seven ships which anchored for six months off Flores Island in the Azores, waiting the arrival of the Spanish treasure fleet.

The Spanish convoy commander attacked the English squadron, dispersed it, and captured the *Revenge*. Though assaulted on every quarter, Grenville and his crew repulsed every effort at boarding and maintained the fight from three in the afternoon until daylight the following morning, and then struck, only after being promised their liberty.

Grenville was wounded about midnight, and again, while below having his wound dressed, his surgeon was killed by his side. He died two days later, on the flagship of Admiral Bassano, the convoy commander.

The *Revenge*, practically a wreck when surrendered, foundered a few days later, carrying down the Spanish prize crew of 200 officers and men.

Even before the days of the Armada, Drake was the most renowned of English seamen, with exploits and achievements too numerous to be more than referred to here. He was a kinsman of Hawkins, who paid for his education. In company with Hawkins, he fought in the Gulf of Mexico when yet a young man, traded on the coast of Guinea, crossed the Isthmus and destroyed shipping in the Bay of Panama, circumnavigated the globe, and explored the west coast of North America. He

rescued the first English colony from Roanoke Island, destroyed Philip's first Armada in the making, and would very probably have wrecked the second in the same way, had the Queen followed his recommendations.

When he returned to Deptford in the *Golden Hind,* in September, 1580, after a voyage of nearly three years, rounding the world and harrying the Spanish, Elizabeth came on board his ship, knighted him for his achievements and directed that the *Golden Hind* be preserved as "a monument of his own and his country's glory." She was so preserved, in an earth dock, for a century.

Drake commanded a fleet, in 1589, on an expedition to Portugal and was joint admiral with Hawkins in the ill-fated West Indian expedition of 1595. This fleet of 26 ships carried land forces under Colonel-General Sir Thomas Baskerville, and was at least semi-national, if not national, although the capture of treasure was the main object.

Hawkins died at sea November 12. Drake and Baskerville attacked San Juan, Porto Rico, but were repulsed with the loss of the second in command of the troops.

Drake then sailed for Nombre de Dios, which he captured as he had done in 1572 with a much smaller force. This was his only victory. An unsuccessful attempt on Panama followed.

Partly, it is said, from the shock of Hawkins' death and chagrin over his ill-success, Drake died at sea off Nombre de Dios, January 28, 1596 at the age of about 51.

Authority for the unfortunate expedition of 1595 was given by the Queen on the express recommendation of those two adventurous admirals, Drake and Hawkins. The original intent had been to land the troops at Nombre de Dios, capture the city of Panama, and intercept Spanish treasure from Peru. These orders were changed to the extent that the fleet was directed to proceed first to Porto Rico, in order to capture a treasure ship, dismasted there.

En route, an attempt was made against the Canary Islands. This was on Baskerville's advice, and was unsuccessful. They put in at Dominica and from there made San Juan, Puerto Rico.

The Spaniards had been forewarned and were ready to receive them. With more than their usual energy, they had blocked the mouth of the port by sinking a ship across the center of the channel and fixing booms between the ship and the forts. This repulse, the death of Hawkins, and the failure to capture Panama, as already mentioned, may have had their share in causing the death of Drake. The attack on Porto

Bello which had been planned was given up and the fleet sailed for home under the command of Baskerville.

Off the Isle of Pines, on the south side of Cuba, he encountered a Spanish fleet of 20 sail. An action ensued which lasted about two hours. The Spaniards were severely cut up and lost one ship. Baskerville did not follow up his success, but continued on his course, reaching England in May, 1596.

Before his brush with the Spaniards, Baskerville had formed his fleet—either for the attack, or as a cruising formation—in what Corbett calls "two divisions abreast, each in line ahead" (double column).

An English author of the time wrote, "Our General was the foremost, and so held his place until by order of fight other ships were to have their turns according to his former direction, who wisely and politically had so ordered his vanguard and rearward, and as the manner of it was altogether strange to the Spaniard so they might have been without hope of a victory if their general had been a man of judgment in sea-fights."

Corbett thought this formation did not originate with General Baskerville, but was proposed and agreed upon in the Council of War.

He wrote that "at any rate we may assert that the idea of ships attacking in succession so as to support one another, without masking each other's broadside fire . . . was in the air."

Howard, the Lord High Admiral, was the only one of these great commanders—Howard, Hawkins, Drake, Frobisher—to die comfortably in his bed, which he did in 1624 at the ripe old age of 88. The other three died in harness. They carved their own careers. Unlike them, Howard was born in the purple, a scion of the great Howard family. His father before him was Lord High Admiral of England.

Oppenheim says he is

> the link between the mediaeval and modern navy. Born in 1536 and dying in 1624, his era connects the cogs, and crayers, carracks and balingers of the Plantagenets—then hardly out of use—with the established Royal Navy of James I, a fleet divided into rates, controlled on present principles, and differing little in essentials from that existing up to the introduction of armor and machine guns.

However, we shall see that the Royal Navy was not quite as well established, nor on as sound principles, as Oppenheim believed.

Howard's flagship in 1588, the *Ark Royal,* was a new ship, having been built the preceding year. She was a little larger than the *Victory* and a little smaller than the *Triumph.* Like them, she outlived her admiral, and Oppenheim last records her as the *Anne Royal,* flagship of

Lord Wimbledon in 1625. She had been rebuilt in 1608 with a change of name, to honor Anne of Denmark, the wife of James I.

Howard's public service began during the reign of Queen Mary, under his father the Lord High Admiral. In 1570, in command of a squadron of 10 ships, he forced a Spanish fleet to lower their topsails in salute to Elizabeth, as Sovereign of the Narrow Seas. As the Spanish fleet was convoying Anne, daughter of Empress Maximilian, from Flanders to Spain, for her marriage to Philip II—his fourth wife—Howard's exaction was particularly galling.

Howard was a cousin of Queen Elizabeth and one of her most trusted adherents. He was one of the High Commissioners for the trial of Mary Queen of Scots, in October, 1586. He was thoroughly convinced that Elizabeth's safety depended on Mary's execution and even afterwards he was deeply concerned for her security.

Late in 1587, after joining the *Ark Royal* to make preparations to meet the Armada, he did not hesitate to write plainly to the Queen:

> For the love of Jesus Christ, Madam, awake thoroughly and see the villainous treasons round about you against your majesty and your realm, and draw your forces round about, like a mighty prince to defend you. Truly, Madam, if you do so, there is no cause for fear.

Howard was again in the *Ark Royal* in 1596. Philip had planned another invasion of England. Elizabeth, probably recalling Drake's advice, thought that the invasion might best be prevented by the capture or destruction "of some good number of the King of Spain's ships in his ports." Howard's expedition, which sailed from Plymouth in May or June, 1596, a few days after Baskerville's return from the West Indies, was in contrast completely successful.

Howard's orders were to

> discover the strength, whereabout, and design of the Spanish Navy . . . to destroy any vessels intended for Ireland, the Narrow Seas or Calais . . . to take undefended towns, especially if they should be understood to contain treasure; not to injure non-combatants and to preserve all booty for her Majesty's disposition.

The first part of Howard's orders are not unlike those cabled to Admiral Dewey some 300 years later "to seek the enemy and destroy him."

Although Lord High Admiral, Howard was in *joint*—not full command. At 60, he was joint admiral and joint general with Robert Devereux, Earl of Essex, only 30, *but* a queen's favorite.

According to Allen's account, 14 ships of the Royal Navy were in Howard's fleet, plus hired ships and a Dutch contingent, to a total of

126 sail. The Queen's ships were *Ark Royal, Repulse, Mere Honour, Warspite, Lion, Rainbow, Nonpareil, Vanguard, Mary Rose, Dreadnaught, Swiftsure, Acquittance, Crane,* and *Tramontane.* A goodly number of these names have been continued in the British Navy.

Howard said of the flagship, she was "the odd ship of the world for all conditions," Oppenheim said

She was handy enough for Elizabethan seamen who built her and knew how to work a ship at sea, but she did not win favour in the eyes of Cecil, Lord Wimbledon, and in his officers, who complained that they could not make her lie to, and that she rolled too much for their dainty stomachs. [This was in 1625.]

The Dutch joined the expedition with 24 ships, commanded by the Admiral of Holland, Van Duijvenvoorde, who served under Howard, and not in a joint capacity. Howard and Essex were assisted by a Council composed of the English Vice Admiral, Lord Thomas Howard (the Admiral's son), the English Rear Admiral (Sir Walter Raleigh), and three English captains of ships.



FIG. 14.—Jan Van Duijvenvoorde, Admiral of Holland. (From the engraving by H. Goltzius, 1579.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

The English rule of dividing power and responsibility by assigning joint command at sea and in combined expeditions to two, or more, admirals and generals did not have many exceptions during the 17th century. On the whole, its bad points outweighed its advantages and it was eventually discontinued. The officer in chief command always has access to counsel, when needed.

The English and Dutch ships, together with many armed merchantmen, victuallers, and transports, brought the total number of vessels up to 150 or more.

Twenty-nine articles of instructions for the conduct of this large fleet were issued by Howard and Essex. Each captain was ordered to read them to his ship's company twice a week, "at service time." They were "to be observed by every captain and chief officer of the Navy." These twenty-nine articles were not fighting instructions, but orders

for the conduct of the fleet and of ships under way and at anchor.

It is evident from the orders that the squadrons sailed in company, but not in formation. Each ship towards evening was to seek to speak with the admiral of the squadron to which it belonged, to learn the course for the night. The Admiral was to speak with the Generals, if possible. The rest of the squadrons were to keep their course and distance while the Admirals were communicating, and if the Admiral were unable "to recover the head of his fleet before night the rest shall then follow the light of the Vice Admiral of the said squadron."

Squadrons were directed to keep "a good breadth" from each other and the ships in each squadron a "reasonable" breadth. Large ships were to take special care not to becalm smaller ones. There was an obscure provision that "either the Admiral or the Rear Admiral of his squadron be always in the rearward of his fleet."

Internal regulations for ships provided that the watch should be "set every night by eight of the clock, either by trumpet or drum and singing the Lord's Prayer, some of the Psalms of David, or clearing the glass."

Special care was to be taken on night watches. One third of the soldiers were to be on watch every night, in port and at sea, with men specially appointed to keep diligent watch on the forecastle or beakhead, to prevent cutting cables. When becalmed in a fog, ships were to make a noise "by drum, trumpet, by shooting off a musket or calliver now and then, or by some other like means."

The joint command decided to make Cadiz the main object of the expedition.

Three look-out ships, *True Love, Lion's Whelp,* and *Witness,* kept well ahead of the fleet, to capture all vessels encountered that might carry information to Spain. After a voyage lasting 30 days, the fleet arrived off a tranquil and unsuspecting city, early on the morning of June 20.

The order of attack was arranged. It was decided to begin operations by boldly entering the harbor and seizing the shipping. At dawn of June 21, the attack took place, the leading vessels being those of the Vice and Rear Admirals and those captained by members of the Council.

Howard, unwilling to risk the *Ark Royal* in the narrow waters of the harbor, entered in a pinnace. The Earl of Essex took a personal part in the attack.

Hot fighting continued from dawn until noon, by which time many

of the Spanish ships had been destroyed by the English or sunk by their own crews. The Spanish flagship *San Felipe,* a very large ship for those days (1,500 tons), blew up. Two large galleons were captured and taken into the British navy. A few vessels escaped from the harbor and through a canal to the southward. The Dutch did their part by the capture of Puntal.

Troops were landed and Cadiz, attacked by sea and land, surrendered the following day. Spain lost 13 men-of-war, 11 ships bound for the Indies, and 13 others.

Essex wanted to hold the city and offered to garrison it with 400 men, but it was given over to pillage, its fortifications were razed and the principal buildings, except churches, were burned. The Council overbore the Earl and the fleet sailed for home, after inspecting Corunna and Ferrol without finding any Spanish ships.

Clowes gives, on the whole, the most credit to Essex and the Dutch admiral for desiring to remain longer on the Spanish coast and to inflict more damage. Essex, on his return, fell into disrepute with the Queen, who claimed that he kept back booty to which she was entitled.

The opinion of Colomb is that Spanish sea commerce, at this time, was greater than England's and that Philip had a stronger navy—if efficiently fought—than Elizabeth. This being true, he could have protected his merchant and treasure fleets by seeking out and attacking the English royal ships in the West Indies and the Narrow Seas. But his strategy was poor. He *did convoy,* but instead of seeking command of the sea, he sought revenge by cross ravaging and threats of invasion. He felt sure of support in Ireland if he could obtain a base of operations there, or in some near-by English port.

Drake and others saw clearly, what Elizabeth saw dimly, and what was put into words of the time by Admiral Sir William Monson.

> . . . when the Spaniards were employed at home by our yearly fleets, they never had opportunity nor leisure to make an attempt upon us . . . by which means we were secured from any attempt of theirs . . . we may be confident that whilst we busy the Spaniards at home, they dare not think of invading England or Ireland.

Colomb, in one of his essays, expresses the same thought in different words. "In war, make the enemy's coast your frontier."

Seeking revenge for injuries inflicted by Howard and Essex, Philip spent nearly a year preparing another armada. He collected ships from all parts of his dominions, seized suitable foreign ships which were lying in Spanish ports, or had entered them, and in the spring of 1597 embarked his troops and Irish fugitives and sailed from Ferrol to seize

Falmouth, or some other western English port as a base of operations.

As in 1587, the new armada was dispersed by a gale. Several months passed before it was again ready for sea.

In the meantime, the English, aiming to repeat the lesson of the previous year, had assembled a large fleet under the Earl of Essex, with Lord Thomas Howard and Sir Walter Raleigh as Vice and Rear Admirals, respectively. Sir William Monson was a flag officer in this expedition. The Dutch joined again with a squadron of 10 ships under their Grand Admiral. The fleet and train, with transports for about 1,000 troops, numbered about 120 sail.

Essex took no steps to prevent knowledge of his movements reaching Spain. The fleet was slow in assembling, did not finally set sail until after the middle of August, and a course was laid so close to the Spanish coast that the ships were sighted.

Essex' orders were to surprise, and possibly capture, Philip's ships at Ferrol and the near-by port of Corunna. Finding the enemy prepared he steered for the Azores to lie in wait for the plate fleet. By mismanagement, he missed his object, and had to return with only a few prizes. His fleet was scattered by a storm but reached port October 9.

In the meantime, Philip's fleet, learning of Essex' departure for the Azores, sailed at once to seize Falmouth as a base of operations against Ireland and to intercept Essex on his return.

It is said that the gale which broke up the English fleet struck the Spaniards off Scilly and obliged them to return to Ferrol. Colomb says,

> Had their seamanship been equal to their strategy, they might have done great things and perhaps turned the tables on this occasion.

The English always re-act promptly to a threat of invasion. The next year, 1598, the Lord High Admiral Howard was put in chief command and ordered to take measures for the defense of the kingdom. Philip's plans, however, were defeated by private raids. After his death in 1599, Elizabeth, learning of Spanish mobilization at Corunna, put Howard in command of land as well as sea forces, and so energetically did the English work under his direction that a fleet of 19 ships was rigged, victualled, and manned in 12 days.

Monson said that Spanish plans that year were foiled by the Dutch, who

> tooke the offensive alone with a fleet of 73 ships. This fleet of Hollanders . . . were the first ships that ever displayed their colors in warlike sort against the Spaniards in any action of their own. . . .

Their raids had little success, but England benefited by the diversion. Again quoting Monson:

Another benefit that we received by this preparation was that our men were now taught suddenly to arm, every man knowing his command, and how to be commanded, which before they were ignorant of . . . the expedition which was then used in drawing together so great an army by land and rigging so great and royal a navy to sea in so little space of time . . . was so admirable . . . many that came from beyond the sea said the Queen was never so dreaded abroad for anything else she ever did.

Frenchmen that came aboard our ships did wonder (as at a thing incredible) that Her Majesty had rigged, victualled and furnished her royal ships to sea in twelve days time. . . .

Clowes compares favorably the English mobilization of 1599, by land and sea with that three centuries later in 1896, about the time his *History of the Royal Navy* was written.

Philip's policies were followed by his son and successor, Philip III. His fleet of 48 ships actually landed 4,000 troops at Kinsale in 1601, Elizabeth having then only a small squadron in commission, but the Spaniards were unable to hold the port and withdrew.

The next year, for treasure, for revenge, and to keep the Spaniards at home, Elizabeth sent a fleet under Admirals Leveson and Monson to harry the Spanish coast and shipping. To surprise the Dons, this fleet sailed in March, too early for the Dutch to join, though they were expected to participate later on.

The English fleet returned in June, having captured the *St. Valentine,* a large carrack richly laden, in the port of Cezimbra, and burned two galleys.

Monson sailed again soon with a small squadron and remained on the Spanish coast until the end of October, evading all attempts to bring him to action.

Colomb wrote,

Monson did not quit the Spanish waters until the 21st of October; a feat proving not only the capacity of the man, but his growing knowledge of the art of naval war and the capabilities of the instruments for waging it. His attacks were wholly confined to shipping and were very successful. The Spanish fleet, however, was much superior to his own. It was at sea, but never succeeded in making contact with this consummate seaman, who could think and act. The next year, 1603, Howard prepared to send Leveson to the Spanish Coast as early as February, but the Queen's illness and death March 24 delayed Leveson, and James I, her successor, the canny Scot, always unpopular with his subjects, forbade any offensive.

CHAPTER VI

SHIPS AND TACTICS: EARLY 17TH CENTURY

CLOWES NOTES that, from the moment of Queen Elizabeth's death, except for a small squadron which cruised on the coast of France and Flanders, the Royal Navy had scant opportunity for active service until James' death in 1625. James' policy was never aggressive.

In 1604 Howard was sent to negotiate peace with Spain. His reputation, tact, and ability enabled him to succeed.

With the possible exception of Monson or Howard himself, either from experience or ability no one was better qualified to write on naval matters than the famous Sir Walter Raleigh. His sea experience dated from before the days of the Armada. He had been a rear admiral twice under Howard, a vice admiral under Essex, and in chief command of smaller forces.



FIG. 15.—Sir Walter Raleigh. (*From Allen's "Battles of the British Navy," George Bell & Sons, London*)

Some light is thrown on the methods of attack at sea at that time by his instructions to a fleet which he raised and commanded on a voyage to the coast of Guiana in 1617.

The circumstances surrounding this voyage will bear relating here. A few months after James' accession in 1603, Raleigh was imprisoned in the Tower of London for conspiring to place Lady Arabella Stuart on the English throne. He was tried and sentenced to death but the sentence was not carried out. He remained a prisoner, however, until March, 1616.

In 1595, he had made a voyage of exploration on the coast of South America, an account of which he published under the title of *The Discoverie of Guiana*. The principal object of this voyage, like that of so many others, was to discover gold.

After 13 years in prison, learning that the king was in need of money, he promised if he were released he would undertake to find a gold mine

in Guiana without trenching on any Spanish possessions. The king accepted the offer on the condition that if, during the voyage, Raleigh were guilty of piracy, he should be executed on his return.

It was for the guidance of the fleet organized for this expedition that Raleigh issued his fighting instructions, the first of record—according to Corbett—since the time of Henry VIII.

He sailed from England in March, 1617. The instructions comprised 45 articles, the majority of which dealt with other subjects than the disposal of forces in battle. Corbett remarks that they were more in the nature of articles of war and of sailing, rather than fighting instructions.

But his orders show what a well qualified officer thought essential for the guidance of a fleet on an extended voyage where battles might be fought, and where there was no outside source of supply, of men, ships, stores, weapons, or ammunition.

They were entitled,

Orders to be observed by the Commanders of the Fleet and Land Companies under the Charge and Conduct of Sir Walter Raleigh, Knight, Bound for the South Parts of America or Elsewhere, given at Plymouth in Devon the third of May, 1617.

He commanded divine service daily, forbade swearing, directed that soldiers as well as sailors should do duty, each to be instructed in the duties of the other; designated rendezvous, and provided methods of signalling information by raising or lowering, filling or loosing various sails.

Article 13 read,

For a general rule let none presume to shoot off a piece of ordnance but in a discovery of a ship or fleet by night, or by being in danger of an enemy, or in danger of fire, or in danger of sinking, that it may be to us all a most certain intelligence of some matter of importance.

Ships were directed to cruise astern of the General's (Admiral's) ship at night, follow his light, and be prepared to receive instructions in the morning what course to steer. In bad weather, ships were forbidden to run so far ahead by day that they could not fall astern of the Admiral by night.

Some directions for clearing ship for action were given, ship control parties designated, stations for riflemen indicated, and what is of considerable importance (Article 26), "The gunners shall not shoot any great ordnance at other distance than point blank, . . ." and the musketeers (Article 30), "shall not deliver their shot but at such distance as their commander shall direct them."

Raleigh knew how important it was (and is) to conserve his ammunition and to make every shot count.

Article 29 shows that boarding was still a principal, but not the sole object of battle:

> No man shall board his enemy's ship without order, because the loss of a ship to us is of more importance than the loss of ten ships to the enemy, as also by one man's boarding all our fleet may be engaged, it being too great a dishonour to lose the least of our fleet. But every ship, if we be to the lee of the enemy, shall labor to recover the wind if the Admiral endeavors it, but if we find them to be to leewards of us the whole fleet shall follow the Admiral, Vice Admiral, or other leading ship within musket shot of the enemy, giving so much liberty to the leading ship, as after her broadside delivered, she may stay [go about] and trim her sails, then is the second ship to tack as the first ship and give the other side, keeping the enemy under a perpetual shot. This you must do upon the windermost ship or ships of any enemy which you shall either batter in pieces or force him or them to bear up and so entangle them and drive them foul one of another to their utter confusion.

The voyage which these instructions were to govern was ill-starred. Raleigh's alleged source of gold was up the Orinoco. When he reached the Gulf of Para he was too ill to go further. He sent five small ships under command of his most trusted captain up the river.

Raleigh's son accompanied the expedition. He was killed in a fight with the garrison of a Spanish settlement, below the site of the supposed mine.

The squadron was forced to retreat. Its commander, feeling disgraced, committed suicide. Mutiny ensued. Raleigh had no recourse but to return to England. He was arrested on his arrival and James, true to his promise, ordered his execution, which took place Oct. 29, 1618. Raleigh brought tobacco from America to England, and is said to have smoked a pipe of it, with real satisfaction, just before going to the scaffold.

James' death, early in 1625, ended a period of inactivity at sea, but ushered in a somewhat inglorious succession of futile naval expeditions, inspired and directed by the notorious Duke of Buckingham, a favorite of James and of his son Charles I.

Howard resigned his office of Lord High Admiral in 1618 and was succeeded by Buckingham, then a privy councilor and already high in the king's favor. Buckingham was at this time but 26 years of age; a courtier, not a seaman or a soldier. He had accompanied Charles on an unofficial visit to Spain, in 1623, in an attempt to forward Charles' suit for the hand of the Infanta. It was a failure.

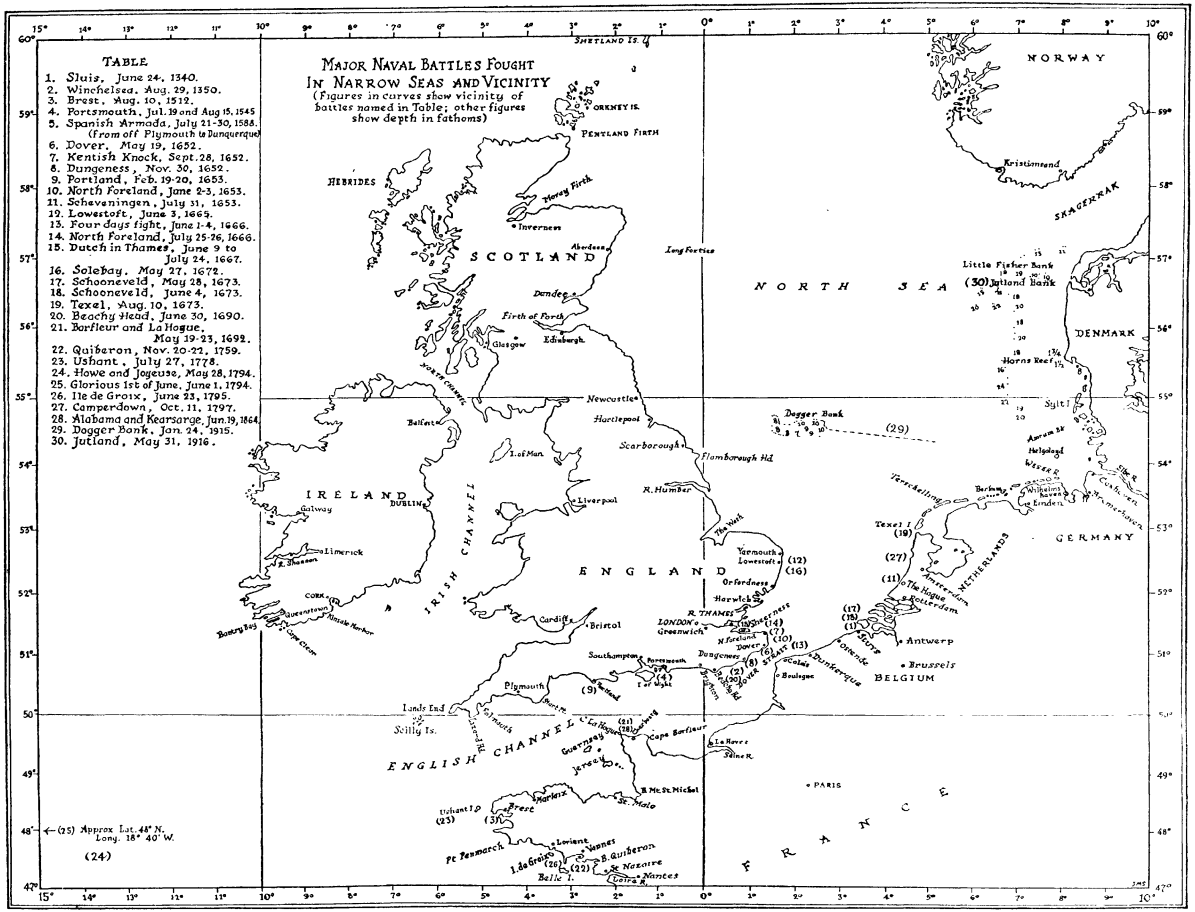

MAJOR NAVAL BATTLES FOUGHT IN NARROW SEAS AND VICINITY
(Figures in curves show vicinity of battles named in Table; other figures show depth in fathoms)
TABLE
1. Sluis, June 24, 1340.
2. Winchelsea, Aug. 29, 1350.
3. Brest, Aug. 10, 1512.
4. Portsmouth, Jul. 19 and Aug 15, 1545
5. Spanish Armada, July 21-30, 1588. (From off Plymouth to Dunquerque)
6. Dover, May 19, 1652.
7. Kentish Knock, Sept. 28, 1652.
8. Dungeness, Nov. 30, 1652.
9. Portland, Feb. 19-20, 1653.
10. North Foreland, June 2-3, 1653.
11. Scheveningen, July 31, 1653.
12. Lowestoft, June 3, 1665.
13. Four days fight, June 1-4, 1666.
14. North Foreland, July 25-26, 1666.
15. Dutch in Thames, June 9 to July 24, 1667.
16. Solebay, May 27, 1672.
17. Schooneveld, May 28, 1673.
18. Schooneveld, June 4, 1673.
19. Texel, Aug. 10, 1673.
20. Beachy Head, June 30, 1690.
21. Barfleur and La Hogue, May 19-23, 1692.
22. Quiberon, Nov. 20-22, 1759.
23. Ushant, July 27, 1778.
24. Howe and Joyeuse, May 28, 1794.
25. Glorious 1st of June, June 1, 1794.
26. Ile de Groix, June 23, 1795.
27. Camperdown, Oct. 11, 1797.
28. Alabama and Kearsarge, Jun. 19, 1864.
29. Dogger Bank, Jan. 24, 1915.
30. Jutland, May 31, 1916.
(25) Approx. Lat. 48° N. Long. 18° 40' W.
(24)
SHETLAND IS.
ORKNEY IS.
PENTLAND FIRTH
HEBRIDES
Moray Firth
Inverness
SCOTLAND
Aberdeen
Long Forties
Dundee
Firth of Forth
Glasgow
Edinburgh
NORTH CHANNEL
Newcastle
Hartlepool
Ballast
I. of Man
Scarborough
Flamborough Hd.
IRELAND
DUBLIN
Galway
Liverpool
R. Humber
Limerick
R. Shannon
CORK
Queenstown
Kinsale Harbor
Bantry Bay
Old Head of Kinsale
IRISH CHANNEL
ENGLAND
Yarmouth
Lowestoft
Orfordness
Harwich
Cardiff
Bristol
R. THAMES
LONDON
Greenwich
Nore
Margate
N. Foreland
Dover
Dungeness
Boulogne
Southampton
Portsmouth
I. of Wight
Dunkerque
Ostende
Antwerp
Brussels
BELGIUM
Rotterdam
The Hague
Amsterdam
NETHERLANDS
Plymouth
Land's End
Scilly Is.
Start Pt.
Torbay
Cape Barfleur
La Hogue
Guernsey
Jersey
St. Malo
St. Michel
ENGLISH CHANNEL
Ushant I.
Brest
Morlaix
Pt. Penmarch
Lorient
Vannes
I. de Groix
Belle I.
C. Quiberon
St. Nazaire
Loire R.
Nantes
PARIS
FRANCE
NORWAY
Kristiansand
SKAGERRAK
Little Fisher Bank
Jutland Bank
DENMARK
Horns Reef
Skyttl
Dogger Bank
Helgoland
Weser R.
Elbe R.
Terschelling
Texel I.
Wilhelmshaven
Emden
GERMANY

CHART II

In 1625, a few months after the death of King James, Buckingham induced Charles to send an expedition against Cadiz.

Allen ignores all naval events between 1620 and 1652. Colomb, in his *Naval Warfare,* does likewise.

The Cadiz expedition is only notable for its flag officers and the fighting instructions they drew up—the first of record since those of Henry VIII in 1545.

Corbett calls it "the most extraordinary naval expedition that ever left our shores. . . every flag officer, both of fleet and squadrons was a soldier." None of any great experience was in command, "even ashore."

The commander-in-chief was Sir Edward Cecil, Viscount Wimbledon. His vice admiral was the Earl of Essex (son of Elizabeth's favorite, whom she eventually sent to the scaffold); the rear admiral was Lord Denbigh.

As on previous expeditions, a Dutch contingent formed part of the fleet, but the "instructions" did not apply to them. They were free to observe their own order and method of fighting.

Wimbledon issued his General Instructions "for the Better Government of the fleet" from the *Anne Royal* at Plymouth on October 3. These comprised 42 Articles which do not differ greatly from Raleigh's.

On October 9, the day of sailing, a second set (of Fighting Instructions only) were sent out. These modified Art. 35 of the General Instructions.

After two days at sea the fleet was becalmed. Wimbledon called a council of war to consider a third set of instructions.

This step, we are told, was taken because Cecil (Lord Wimbledon) considered that the original articles provided no adequate order of battle, such as he had been accustomed to on shore . . . "nothing had been done about the forms of a sea fight."

The new orders were said to have been drawn up by the flag captain, Sir Thomas Love of the *Anne Royal.* They met with strong opposition, but "were recognized as a counsel of perfection, which, though not binding, was to be followed as near as might be."

Article 17 of the first set organized the fleet. Article 35 contained the fighting instructions. Both are quoted in full on page 95.

The second set of four Articles, modifying Art. 35, is also quoted in full.

The third set of 31 Articles is quoted in part. It is the first recorded

order assigning a sailing-ship its position in an order of battle, and is important for that reason.

The third set is prefaced by an account of the Proceedings of the Council. It read, in part, as follows:

Sir Thomas Love's Fighting Instructions were several times read over to the Council of War. After the reading, all parts thereof were well weighed and examined, whereby it was observed that it intended to enjoin our fleet to advance and fight at sea much after the manner of an army at land, assigning every ship to a particular division, rank, file and station; which order and regularity was not only improbable, but almost impossible to be observed by so great a fleet in so uncertain a place as the sea. . . .

Article 17 of the first set organized the fleet as follows:

The whole fleet is to be divided into three squadrons, the Admiral's squadron to wear red flags and red pennants on the maintopmast head, the Vice Admiral's squadron to wear blue flags and blue pennants on the foretopmast head, and the Rear Admiral's squadron to wear white flags and white pennants on the missentopmast head.

The order of rank in colors was thus red, blue, and white. Corbett says that this was "the first known occasion of red, blue, and white flags being used to distinguish squadrons."

The fighting instructions were in Article 35 and differed from any previously issued. After quoting the first part of Raleigh's Article, forbidding boarding, except by order, Article 35 reads:

If we be under the lee of an enemy every squadron and ship shall labor to recover the wind if the Admiral endeavour it, but if we find a fleet to leeward of us, the whole fleet shall fall in their several places, the Admiral's with the head of the enemy, the Vice Admiral's with the body and the Rear Admiral's with the sternmost ships of the chase, all other ships which may be appointed within musket shot of the enemy, giving so much liberty to the leading ship as after her broadside delivered, she may stay and trim her sails. Then is the second ship to give her side and the third and fourth with the rest of that division, which done they shall all tack as the first ship, keeping the enemy under perpetual volley. This you must do upon the windermost ship of an enemy which you shall either batter to pieces, or force him, or them to bear up, and so entangle them and drive them foul of one another to their utter confusion.

The second set reads:

Instructions when we come to fight with an enemy, sent by the Lieutenant-General unto the Earl of Essex.

1. That you shall see the admiral make way to the admiral enemy, so likewise the vice-admiral and the rear-admiral, and then every ship [is] to set upon the next according to his order, yet to have such a care that those that come after may be ready to second one another after the manner here following.

2. If we happen to be encountered by an enemy at sea, you shall then appoint

a sufficient company to assist the gunners. You shall pull down all the cabins betwixt the decks and use the beds and sacks for bulwarks, and shall appoint your muskets to several officers, some to make good the waist, and others abaft the mast, from whence they shall not stir till they be otherwise directed, neither shall they or the gunners shoot a shot till they be commanded by the captain.

3. You shall appoint a certain number of mariners to stand by sails and maintops, that every of them knowing his place and duty there be no confusion or disorder in the command; and shall divide carpenters some in hold, some betwixt the decks, with plates of lead, plugs and other things necessary for stopping up breaches made with great shot; and saw divers hogsheads in halves and set them upon the deck full of water, with wet blankets by them to cloak and quench any fire that shall happen in the fight.

No man shall board any enemy's ships without special order, but every ship if we be to leeward shall labour to recover the wind. If we be to windward of them, then shall the whole fleet, or so many of them as shall be appointed, follow the leading ship within musket-shot of the enemy, and give them first the chase pieces, then the broadside, afterwards a volley of small shot; and when the headmost ship hath done, the next ship shall observe the same course, and so every ship in order, that the headmost may be ready to renew the fight against such time as the sternmost hath made an end; by that means keeping the weather of the enemy, and in continual fight till they be sunk in the sea, or forced by bearing up to entangle themselves, and to come [foul] one of another to their utter confusion.

A part of the explanatory preface to the third set has been quoted. This preface was followed by an order dividing each of the three squadrons into three divisions of nine ships each. These "should advance, set forward and charge upon the enemy" as directed.

Each division of nine ships was further divided into groups, or subdivisions of three ships each, and it was ordered that "these nine ships should discharge and fall off, three and three . . ." as was filed in the list that followed.

The three flagships of the first squadron were the *Anne Royal* (the Admiral's), the *St. George* (the Vice Admiral's), and the *Convertine* (the Rear Admiral's). There was a final group (reserve) of three ships in each squadron to form in the rear of the others and

to charge where and when there should be occasions, or to help the engaged, or supply the place of any that should be unserviceable.

The Dutch squadron should take position on the starboard side of the admiral and observe their own order and method of fighting.

The instructions give the name of each ship in the admiral's squadron, 30 in all. The admiral himself apparently commanded the first division of nine ships, the vice-admiral of his squadron, the second division, and the rear-admiral of his squadron, the third division. The remaining three ships, the *Hellen,* the *Amity of Hull,* and the *Anne Speedwell,* formed the reserve.

Six of the articles containing fighting instruction follow:

8. That if the enemy should be forced to bear up, or to be entangled among themselves, whereby an advantage might be had, then our rear-admiral and his squadron with all his divisions should lay hold thereof and prosecute it to effect.

9. That the rear-admiral's squadron should keep most strict and special watch to see what squadrons or ships distressed of our fleet should need extraordinary relief, and what advantage might be had upon the enemy, that a speedy and present course might be taken to perform the service enjoined.

10. That if any ship or ships of the enemy should break out or fly, the admiral of any squadron which should happen to be in the next and most convenient place for that purpose should send out a competent number of the fittest ships of his squadron to chase, assault, or take such ship or ships so breaking out; but no ship should undertake such a chase without the command of the admiral, or at leastwise the admiral of his squadron.

11. That no man should shoot any great or small shot at the enemy till he came at the distance of caliver or pistol shot, whereby no shot might be made fruitless or in vain; whereof the captains and officers in every ship should have an especial care.

12. That no man should presume or attempt to board any ship of the enemy without special order and direction from the admiral, or at leastwise the admiral of his squadron.

13. That if any of our fleet happened to be to leeward of the enemy, every of our ships should labour and endeavour to take all opportunity to get to windward of them, and to hold that advantage having once obtained it.

The vice-admiral of the fleet was to form his squadron, like the admiral's, into three divisions of nine ships each and take station in battle formation as the left wing of the fleet, with the admiral's squadron in the center and the Dutch on the right, while the squadron of the rear admiral of the fleet, similarly arranged, formed a general reserve.

Assuming that the Dutch squadron was equal in numbers to one of the British squadrons, this fleet must have contained 120 ships.

Some of the other Articles are worth quoting.

5. That the distance between ship and ship in every squadron should be such as none might hinder one another in advancing or falling off.

6. That the distance between squadron and squadron should be more or less as the order of the enemy's fleet or ships should require, whereof the captains and commanders of our fleet were to be very considerate.

7. That if the enemy's approach happened to be in such sort as the admiral of the Dutch and his squadron or the vice admiral of our fleet and his squadron might have opportunity to begin the fight, it should be lawful for them to do so, until the admiral could come up, using the form, method and care prescribed.

14. That the captains and officers of every ship should have an especial care as much as in them lay to keep the enemies in continual fight without any respite or intermission to be offered them; which, with the advantage of the wind if it might be had, was the likeliest way to enforce them to bear up and entangle themselves, or fall foul of one another in disorder and confusion.

Instructions were given that some guns should be loaded with

case shot, hand-spikes, nails, bars of iron, or with what else might do most mischief to the enemy's men upon every fit opportunity and to come near and lay the ordnance along the path for that purpose, which would be apt to do great spoil to the enemy.

To clear ship for action, was called to make "predy." Guns' crews were to consist of ten, eight, six, or four men, as might be required.

The train was to remain near the rear admiral and to receive its instructions from the admiral, or from the rear admiral.

At the rising of the Council, a motion was made to have some of the best sailers of our fleet chosen out and assigned to lie off the main body of the fleet, some to sea and some to shoreward, the better to discover, chase, or take some ships or boats of the enemy which might give us intelligence touching the Plate Fleet, whether it would come home or no. [This Cadiz expedition was seeking treasure as well as battle.]

41. You shall avoid sleeping upon the ground and the drinking of new wines and eating new fruits and fresh fish until it has been salted three hours, and also forbear sleeping upon the deck in the night time for fear of the serene [Spanish *sereno*, the cold evening air] that falls, all which will breed dangerous fluxes and diseases.

10. You shall have a special care to prevent the dreadful accident of fire, and let no candles be used without lanterns, nor any at all in or about the powder room. Let no tobacco be taken between the decks, or in the cabins or in any part of the ship but upon the forecastle or upper deck, where shall stand tubs of water for them to throw their ashes into and empty their pipes.

Here we have the first ships' smoking regulations. Sir Walter Raleigh is credited with having popularized the use of tobacco in England, and the habit must have spread rapidly.

Clowes represents Wimbledon, himself, as utterly incapable. After the fleet sailed it was found that he did not have all of his ammunition aboard; many Dutch ships had not joined; no rendezvous was prescribed; and 500 of the 2,000 troops never embarked. The responsibility for all this mismanagement, however, was primarily Buckingham's.

Parliament, having little confidence in him, refused to appropriate any ready money for the support of the Government.

While the fleet was seeking the Spanish treasure ships, Buckingham visited The Hague to raise money by pawning the crown jewels.

The main object of the expedition was the destruction of shipping in Cadiz harbor. The taking of the town was not directly contemplated, "save so far as it might conduce to the first named purpose" (destruction of shipping), or serve to make the expedition pay for itself. Whether the plate fleet was to be dealt with or not was to be at Wimbledon's discretion.

When the English and Dutch ships entered Cadiz Bay the Spanish vessels took refuge under the walls of the city and in the inner harbor where Wimbledon refused to follow them, although Drake had done so in earlier years. He landed troops, but they were marched into a village where wine for the whole West Indies fleet was stored. "The whole army drank itself to madness." No food was landed for the troops.

They captured a fort and evacuated it; captured a bridge leading into Cadiz and abandoned it; captured a few boats to replace some lost in the passage; then re-embarked and sailed away to look for the plate fleet, which having come up the coast close in shore, reached Cadiz unmolested two days later.

On November 16 this armada started for home, having accomplished nothing.

Oppenheim writes most disparagingly of the personnel and equipment and considers it indicates the low water mark of English seamanship. Every royal ship lost her long-boat crossing the Bay of Biscay. Some sails and much rigging were rotten. Collisions were frequent. Rations were short and poor; sickness everywhere.

> Even before they left port the casks were so faulty that beer came up in the ships' pumps, so that by November they were reduced to a beverage of cider that stinks worse than carrion, and have no other drink.

The next year (1626), Buckingham fitted out a fleet of 39 vessels to repair Wimbledon's disgraceful failure. This fleet sailed, but was broken up by a storm and never reached the Spanish coast.

In 1627, war with France having broken out, Buckingham took personal command of a fleet convoying transports with troops for the relief of the Huguenots, besieged in La Rochelle by the celebrated Cardinal Richelieu, Prime Minister of Louis XIII and the enemy of Buckingham. The Dutch furnished 10 men-of-war for this fleet, which like its predecessors was not properly repaired nor supplied.

Buckingham sailed from England on June 27. Most of the fighting was on shore. The first minor successes were followed by major reverses. The fleet reached home November 11, completely demoralized, and having lost 4,000 troops.

In April, 1628, another fleet with Admiral Denbigh in command was sent to La Rochelle on the same errand. Denbigh attempted to raise the blockade by sending fireships into the blockading fleet, but a shift of wind brought them to his own fleet—one as ill-found as the year before. He made no other attack, and soon sailed for home, losing his storeships en route to French privateers from Dunkirk.

Buckingham began at once to re-fit the entire fleet, with the intention

of again taking personal command. Delays kept the ships in port until late in August and before they sailed Buckingham's inglorious career was brought to an end by the weapon of John Felton.

A transport in the fleet had been fitted out, by the Duke's orders, as a kitchen and store ship for himself and his staff. Oppenheim records a list of her stores and their prices which he found among state papers. They included cards, dice, wine, eight bullocks and a cow, eighty sheep, fifteen goats, ten porklings, two sows with pig, 980 chickens, 2,000 eggs, pickled oysters, lemons, tapestry, and Turkey carpets.

Clowes remarks that Buckingham's failures had brought the Navy into contempt. Barbary corsairs grew more troublesome than ever on the Irish and English coasts.

Denbigh was succeeded by the Earl of Lindsey, who sailed for La Rochelle with a fleet of 29 men-of-war and 31 armed merchantmen in September, but the Earl showed little more resolution than his predecessor. He lay off the port for a month, carrying on a long range cannonade against the French blockading fleet, without results.

After a year's siege the city surrendered to Richelieu. Lindsey remained in favor with King Charles and in 1635 commanded a fleet of 19 royal ships and 26 merchantmen ordered to cruise in the Narrow Seas, ostensibly to protect commerce from pirates, but principally to assert English sovereignty over those waters during the war between Spain and France and the latter's ally, the Dutch.

"Lindsey's instructions were to defend the King's honour, but to make no nation his foe."

The instructions he issued for the conduct of his fleet are quoted by Sir William Monson, his Vice Admiral, in his *Naval Tracts*. In general, they do not differ greatly from earlier sets from which quotations have been made, except in Article 18.

As far as tactics are concerned, however, this Article is, in essentials, a repetition of Lord Lisle's orders of 1530, issued by direction of Henry VIII. It reads:

> Art. 18. If we happen to descry any fleet at sea which we may probably know or conjecture designs to oppose, encounter or affront us, I will first strive to get the wind (if I be to leeward) and so shall the whole fleet in due order do the like. And when we shall join battle no ship shall presume to assault the admiral, vice-admiral or rear-admiral, but only myself, my vice-admiral or rear-admiral, if we be able to reach them; and the other ships are to match themselves accordingly as they can, and to succor one another as cause shall require, not wasting their powder at small vessels or victuallers, nor firing till they come side to side.

The Admiral was to try to get the wind of any fleet which he knew or conjectured might intend to oppose or affront him. Since the real object of the cruise was to assert English sovereignty of the sea—especially of the Narrow Seas—an affront would consist of failing, or refusing to recognize this sovereignty by striking the flag, or lowering the topsails of either men-of-war or merchantmen.

In line with this was Article 15:

If you meet with any men-of-war, merchants or other vessel or ship belonging to any Prince or State, either at sea, or in any road, or other place which you shall happen to come, you are to send to see whether there be any English or any other of his Majesty's subjects. And if any seamen, gunners, pilots or mariners shall be found aboard any of them, you are not only to cause such of His Majesty's subjects to be taken out and brought to me to answer their contempt to His Majesty's proclamation in that kind, but also to admonish the captain and principal commanders and officers in such foreign ships and vessels that they receive or entertain aboard any of their ships no more His Majesty's subjects aforesaid, that His Majesty have no cause to resent it at their hands. . . ."

Article 11 was specific in regard to striking topsails by English merchantmen. Ships of other States were to do homage.

This Article read:

. . . and if you shall chance to meet in the Narrow Seas any fleet or ships belonging to any Prince, King or State, you are to expect that the admiral or chief of them, in acknowledgment of His Majesty's sovereignty, there perform their duty and homage in passing by; and if they refuse to do it, you are to enforce them thereunto; and in any wise you are not to suffer any dishonour to be done to His Majesty, or derogation to his sovereign power in those seas. And if any of His Majesty's subjects shall so much forget their duties as not to strike their topsail in passing His Majesty's ships, you are to enforce them thereunto, and to punish the commanders of such a ship yourself, or to give me advertisement of it that I may take a course with them.

Article 12, if it were known to the belligerent Spanish, Dutch, and French, should have amazed and irritated them.

You are not to suffer any men-of-war to fight with each other, or man-of-war with merchant, in the presence of His Majesty's ships in the Narrow Seas, but you are to do the best in those seas to keep peace for the better and free maintenance of trade and commerce through the same. For that all men trading or sailing within those, His Majesty's seas, do justly take themselves to be *in pace Domini Regis* and therefore His Majesty, in honour and justice is to protect them from injury and violence.

It was already a custom, to some extent, to prevent men-of-war, hostile to each other and lying in a neutral port, from sailing, except at intervals of not less than two tides apart, but Lindsey's Article 12 is unique in establishing as English "territorial waters" the entire

distance from England to the French coast, and forbidding men-of-war of other countries to engage in hostilities therein.

Articles 11 and 12 refer specifically to the Narrow Seas. Article 15, directing search and seizure, contains no such restriction, but says that such action shall be taken "at sea or in any road or other place where you shall happen to come."

British attempts to "search and seize" were the principal cause of the War of 1812.

What were the Narrow Seas? The usual conception of them is the English Channel and the North Sea, but Colomb illustrates them, as shown here, comprising the waters around the British Isles between Lats. 43 and 63 N. and Long. 23 W. and the coasts (as he says, "a very large water area indeed") . . . termed indifferently the "British Seas or the four seas" (Chart III).

Superimposed on the chart of the Narrow Seas is the "barred zone" or "blockade zone" around the British Isles, proclaimed by Germany during the World War, to take effect on neutral shipping, February 1, 1917, and the "Combat Zone" proclaimed by the President of the United States to comply with the U. S. neutrality law of 1939.

The barred area, though more modest than that of the English in the time of Charles I, has the same general shape and is also "a very large water area." It is interesting to speculate whether in laying down the barred zone limits, the Germans had in mind the old English claim.

The chart also shows the route prescribed in the German proclamation for the weekly steamer to and from Falmouth which the United States was to be permitted to operate, if painted as prescribed. The steamer was to arrive at Falmouth on Sunday and to sail on Wednesday.

This proclamation is an example of strategy rather than tactics. Poor—in fact fatal—war strategy. It was the deciding factor which brought the United States into the World War.

The proclamation opened with this threat:

> From February 1, 1917, sea traffic will be stopped with every available weapon and without further notice in the following blockade zones around Great Britain, France, Italy and the Eastern Mediterranean . . .

This meant that ships were to be sunk without notice in the delimited areas—a terror inspiring threat as a substitute for the men-of-war necessary to blockade the coasts of Germany's enemies; the announced intention to run amok on certain parts of the high seas, the joint property of nations.

The result was the exact opposite of that intended.

In 1635 the Dutch vehemently opposed the English claim though they saluted in the Channel and the North Sea. They were upheld by Grotius, the distinguished Dutch authority on international law. King Charles employed a British author named Selden to write a counter-blast, *Mare Clausum.*

Richelieu kept the Franco-Dutch channel fleet out of Lindsey's vicinity, and thus avoided the issue in 1635, but there remained for decision what should be done if, despite Charles' orders forbidding it, an engagement should take place in the Narrow Seas within sight or hearing of an English ship or squadron which might readily be inferior to either of the combatants. After much pressure and not until 1639, when a decision was urgent, as both Dutch and Spanish ships were lying in the Downs, Charles gave directions to assist the side which appeared to be gaining the day.

Finding that the Spaniards were taking on board 500 barrels of powder, obtained in England, the Dutch attacked and dispersed them, driving many of them on shore. The English admiral present, Pennington, erred in his judgment as to who was gaining and fired into the Dutch. The Dutch did not reply but no doubt added this injury to the already long list of overbearing actions of the English.

Pennington was an officer of experience and in high repute. He used plain language when writing to the Commissioners of the Admiralty, both when at dock-yards, and in command afloat. His letters throw light on the internal condition of the royal ships.

Early in 1626, he reported from Plymouth that his ships had no stores, no surgeon, no drugs, and that everything on the returned Cadiz ships would have to be replaced, even the hammocks being "infected and loathsome."

Later he wrote direct to Buckingham that he had 29 ships, but neither victuals, clothes, nor men.

> I wish you were a spectator a little, to hear their cries and exclamations, here eight or ten die daily. . . . If something is not done, you will break my heart. . . . I pray you to consider what these poor souls have endured for the space of these thirteen or fourteen months, by sickness, badness of victuals and nakedness.

The general term "ship fever" is not enlightening as to the exact cause of such a large proportion of deaths among the men. The pages of Oppenheim are filled with accounts of the distressing conditions on all ships, but since his information comes from a study of letters to the Admiralty where all bad news centers, his statements can be dis-

counted to a degree. Even so, ship life below decks seems to us as having been almost unbearable. There were no volunteers; only "pressed men," until the time of the Commonwealth, and then for but a brief period.

Oppenheim says that "Under James, the men considered that the galleys were better than the royal service; thus early in the reign of his son, they had come to the conclusion that hanging was preferable."

Many English seamen were said to have joined the Dutch service. Sir Henry Mervyn, captain of the *Vanguard,* wrote:

> I have used my best cunning to make the *Vanguard* wholesome. I have caused her to be washed all over, fore and aft, every second day; to be perfumed with tar burnt and frankincense; to be aired between decks with pans of charcoal; to be twice a week washed with vinegar . . . yet if to-day we get together two hundred men, within four days afterwards we have not one hundred.

Later (1629), when in command in the Narrow Seas, he wrote from the Downs to the Lords of the Admiralty,

> Foul winter weather, naked bodies, and empty bellies make the men vow the King's service worse than a galley slavery. . . . The *Dreadnaught* and the *3rd Whelp* [gunboat] have neither meat nor drink. The *10th Whelp* hath drunk water these three days . . . mariners fly to the service of foreign nations . . . His Majesty will lose the honour of his seas, the love and loyalty of his sailors and his royal navy will droop.

The Dutch had money. The King and Buckingham had none. Had the Parliament trusted them the men *might* have fared better.

Pennington, who was Lindsey's rear admiral in 1635 and later commanded in the Narrow Seas, disliked hired merchantmen which made up more than half of Charles' fleets. He considered that two men-of-war could beat the 15 he had with him in 1626.

A constant complaint was that English ships could not overtake pirates, either Dunkirkers or Turks, to the great detriment of English commerce. A cruiser having a length of 4½ times her beam was proposed, instead of the proportion of 3 to 1 which then prevailed for men-of-war. What was wanted was "a nimble and forceful ship . . . to meet the Dunkirkers."

Lack of funds caused Charles to build the ten *Lion's Whelps,* on a ratio of 2½ to 1, but fitted to use sweeps as well as sails. Their first service was with Lindsey in 1624. They measured 62 feet on the keel, 25 ft. beam, 9 ft. draft. They were two-deckers, ship-rigged, and carried a heavy battery of 14 guns.

They were much larger than the pinnaces and smaller than the first frigates that were built later. They could keep the sea in winter. As

part of the Royal Navy, they claimed and received the salute from foreign men-of-war and all merchantmen, but they did not clear the Channel of pirates.

Pennington advanced another reason why foreigners and Dutchmen could sail rings around English men-of-war. In 1634 he wrote to the Admiralty that he had just met a fleet of 17 Dutch ships,

> All tallowed and clean from the ground which is a course that they duly observe every two or three months at the most . . . which is the only cause that makes them go and work better than ours, whereas our ships are grounded and graved [scraped] two or three months before they come out and never tallowed, so that they are foul again before we get to sea with them and then they are kept out for eight or ten months whereby they are so overgrown with barnacles and weeds under water that it is impossible that they should go well or work yarely . . . all men-of-war of what nation so ever, whether Turk or Christian keep this course of cleaning their ships over in two or three months but us.

The largest English ships did not draw more than 17 feet. Dutch ships averaged smaller than the English. The rise and fall of the tides in the Narrow Seas made it possible to clean ships' bottoms between tides on almost any protected beach. Dry docks did not need to be pumped out. However, there are no tides in the Mediterranean, so that dry docks, or some kind of rails or greased ways, were a necessity there.

England's first dry dock appears to have been built at Portsmouth by direction of Henry VII, in 1495, and there is a record of one "ingyn" employed for emptying it, but more probably for keeping it dry.

Another of Lindsey's subordinates when he put to sea to protect the king's honour was a hardier type than the commander-in-chief. This was his vice admiral, the veteran Sir William Monson, then 66 years of age.

Monson is best known by his *Tracts* which were published by Oppenheim in five volumes between 1902 and 1914.

He says, "William Monson has the honour, as far as is known, of having been the first English seaman to write any historical and critical account of the warfare in which he took part." Another author says of the *Tracts,* "They form by far the best account, by a contemporary, of the naval life and transactions of the reign of Queen Elizabeth and the beginning of the reign of King James."

But the *Tracts* extend to a later date and appear to have been written over a period of a decade or more with many corrections in the manuscript. Monson did not live to see them published.

The author just quoted says of Monson himself:

> He was the first naval officer in the modern sense of the word, a gentleman by

birth and education who was trained to the sea, and not simply a soldier put in to fight, with a sailing-master to handle the ship for him, or a tarpaulin who was a sailor only.

Oppenheim considers him a capable seaman, devoted to routine, and without imagination, but this estimate is hardly borne out by his life history.

Neither a Drake, a Hawkins, nor a Raleigh, he followed the sea over a period of 50 years, whenever he could get employment, as officer, privateer, captain and admiral.

He served in command of, or hoisted his flag, on 17 royal ships in the reigns of Queen Elizabeth, James I, and Charles I. In the intervals of privateering on the coast of Spain after the days of the Armada, he completed his education and took a degree. He was in prison in Spain and in the Tower of London. Admiral of the Narrow Seas for ten years (1604-14), he advocated attacking corsairs in their Mediterranean ports, instead of merely trying to keep them out of English waters, but this James would not permit.

Monson hated the Dutch and did much to irritate and injure them while in command in the Narrow Seas, and they were delighted when James—for other reasons, however—imprisoned him.

He was born in 1569. At the age of 16, after two years in Balliol College, he ran away to sea, "led thereunto by the wildness of my youth." He was captain of a privateer in 1587. He served in the Armada campaign as a volunteer on board the Queen's pinnace *Charles* and then resumed privateering against the Spaniards under the Earl of Cumberland. He was captured in 1591 and spent nearly a year in the galleys and in Lisbon Castle.

Oppenheim says that he was released without paying ransom and hints that there were conditions attached which Monson did not fulfil. In any case, ten years later, he fought on the Spanish Coast as an admiral and distinguished himself by his intrepidity in an action in the harbor of Cezimbra.

Monson died in 1643. On the whole, he sums up as a good deal of a man, by no means lacking in imagination. The *Tracts* are of interest and of some value to seamen of to-day.

The parts of them most pertinent to tactics are in Book III:

How to fight at sea, one ship with another, or in fleets, or ships against galleys, or galleys against ships and the manner every country has to preserve men in a fight.

In what follows Monson's ideas are partly quoted and partly paraphrased.

Before ships and fleet encounter or enter in the fight he speaks of some of the necessary preparations. One of these was:

To divide the ship's company into three parts; "the one appointed to attack the enemy ship (the boarders); the second to ply the small shot; and the third to attend to the ordnance; but not so precisely but that one may be assisting the other in the three several places."

Sail trimmers—men to work the ship—he takes for granted. The ship is to be brought into its short—or fighting—sails; foresail, mainsail and fore-topsail. This was fighting trim until the end of the sailing period for a gunnery duel, or preliminary to boarding; or getting and keeping position on the bow or quarter of an enemy.

Shortening sail was really part of clearing ship for action. Fighting sails gave steerage way even in light airs and the smallest amount of heel in strong breezes. Way could be regulated by shivering, or throwing aback any of these sails, usually the topsail. All other sails were bent and ready for setting. At this time there were no fore-and-aft sails.

In Monson's own words, ". . . for the other sails are troublesome to handle and make the ship heel so that her lee ordnance cannot be used," besides the danger of having sails ignited by arrows and other wild fire from the enemy.

He considered a high deck ship as more commodious for the men, inspiring terror by her appearance, able to carry more guns and make a better defense when boarded.

England's first three-decker, so called, the *Prince Royal* (55), had guns on three decks, two of them covered. She was launched in 1610. The second three-decker *Sovereign of the Seas* (100) carried guns on three covered decks. She was launched in 1637 (Fig. 16).

Monson looked upon three-deckers as inconvenient, dangerous, and unserviceable.

> It is seldom seen that you have a calm so many hours together, as to keep out her lower tier, and when they are out and forced to haul them in again, it is with great labor, travail and trouble. . . . She casts so great a smoke within board that people must use their arms like blind men, not knowing how to go about their work, or having a sight of the ship whom they encounter.

A flush-deck ship was good to fight in, but not good to defend against boarders. Men on deck were protected by canvas waist-cloths, painted in colors. These were the successors of the pavesades, and predecessors

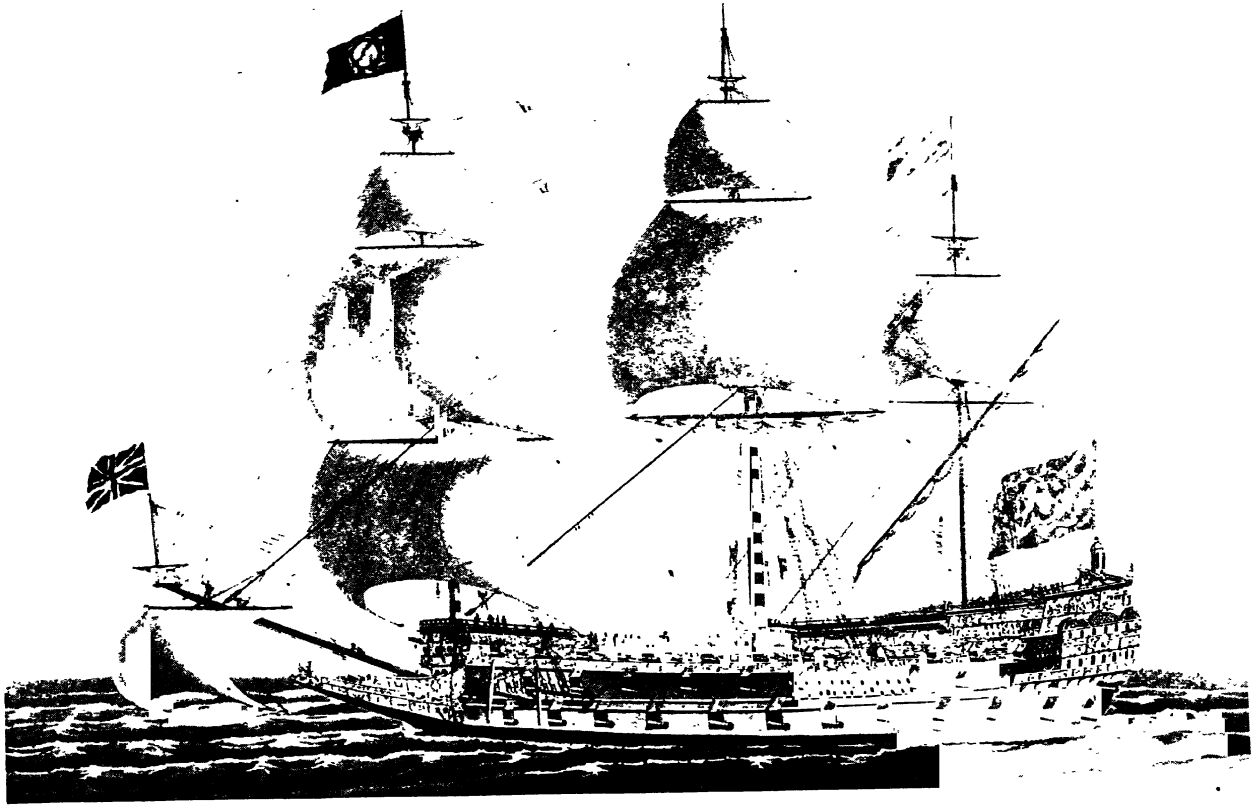


FIG. 16.—*The Sovereign of the Seas* built 1637; from an Original Picture by Vandevelde. Length of keel 127 ft.; length over all 167 ft. 9 in.; beam 48 ft. 4 in.; depth 19 ft. 4 in.; tons 1683; guns 100; men 600. (*Courtesy Office of Naval Records and*

of the defensive boarding-nettings, which were long an item of ship's equipage.

The *Prince Royal,* and to a lesser degree the *Sovereign of the Seas,* were profusely ornamented, bow and stern. The *Prince's* waistcloths were of silk.

Three-deckers were few in number until the next century.

In fighting a flush-deck ship she should be kept to windward and brought within pistol shot of the enemy.

Fighting further off is like a Smithfield fray in times past with sword and buckler, which is naught but waste and consuming powder to little purpose. You should ply her and her ports with small shot, loading some guns with musket bullets, others with cross-bar and langrel. Avoid boarding or being boarded. This I hold the best manner of fighting betwixt ship and ship; it will make short work and the quarrel will be soon decided.

If you board a flush deck ship and drive her crew below, cut away masts and rigging so that she cannot escape.

Monson was not given to drawing the long bow, but the following does credit to his imagination. He says the first fight he ever saw was in 1585.

They boarded a Biscainer which had a flush deck, fore and aft, and

her men being beaten into her other deck spent the most part of their powder in making trains to blow us up, which by fortune we prevented, and with our fire pikes fought them before they could be brought to perfection, and thus after twelve hours fight in the night, we being upon a flush deck and commanding their scuttles aloft [above] that they could not come up to us and they commanding the scuttles below that we could not go to them, what with weariness, want of powder and the death of their people, they yielded.

Monson considered half the strength of a high-sided ship against boarding was in her forecastle.

Of keeping men not engaged under cover, he says:

The French used to stow half their soldiers in hold and to draw them out, causing the others to retire as there shall be occasion or necessity. This I hold dangerous, troublesome and inconvenient, when all men are otherwise busy in their several places to pass to, and again, with their matches lighted, which may unhappily fall on something to take fire.

The Spaniards [in ship fighting] imitate the form of their discipline by land; as namely, a head-front, or vanguard, a rearguard, and a main battle. The forecastle they count their head-front for vanguard, that abaft the mast for rearguard, and the waist their main battle in which they place their principal force. This, in my opinion, will breed great disorders, especially if the ship should fight with all her sails standing; for the labour of the mariners in tacking and handing their sails will confound them, that they know not what to do. But if they strip themselves into their fighting sails that a few men may handle, it would be less inconvenient,

but howsoever here is no provision for safeguard of men who lie open to their enemy.

The Dunkirkers use in fight to place their men flat on their bellies upon their decks, that the shot, great or small, coming from an enemy shall only have their head for their aim. This is to be allowed of in small ships that carry not many men nor ordnance, but inconvenient in greater vessels where men are ever in action running and stirring up and down in the ship.

There is a device made with a plank of elm, because it does not shiver like oak; this plank is musket proof, and removed with trucks from one part of the ship to the other, which is a good safeguard for small shot. But in my opinion I prefer the coiling of cables on the deck and keeping part of the men within them, (as the French do theirs in hold) before all other devices. For the soldiers are in and out speedily, upon all sudden occasions to succour any part of the ship or to enter an enemy, without trouble to the sailors in handing their sails or the gunners in plying their ordnance.

The Hollanders of late years have got a reputation at sea, though for their warlike affairs they have little deserved it. . . .

. . . the Hollanders, wanting natural valour of themselves, use to line their men in the head by giving them gunpowder to drink, and other kind of liquor to make them soonest drunk. Which besides that it is a barbarous and unchristian-like act when they are in danger of death to make them ready for the devil, it often proves more perilous than prosperous to them by firing their own ships or confusing them in the fight, their wits being taken from them Whereas if they had been sober they might have fought in good order.

The *Tracts* contain some fleet instructions which Oppenheim thinks were possibly drawn up by Monson when he took command in the Narrow Seas in 1603. These were not fighting instructions, but covered the internal organization of ships, lookouts, etc. They include an order which Monson said should be in force in all ships of the Royal Navy:

That for as much as the queen's ships carry divers loiterers that are not subject to labour as swabbers, shifters, stewards, coopers and cooks, I would have these men trained up with their pieces until they be made perfect shot and to instruct them how to carry themselves and where to stand in a fight, appointing one above the rest in every squad to direct and govern them, which shall have the name of corporal though the king allow pay but for one.

The terms "loiterers" or "idlers" and "ship's corporal" lasted well into modern times, and a "place for the idlers to stand in a fight" was made by putting them in the powder division of our ships. The "ship's corporal," originally an instructor in musketry, became an assistant to the master-at-arms (also a misnomer in its later signification) as the petty officer in charge of prisoners and internal ship's policing.

Monson's Fleet Orders, which were separate from his Fleet Instructions and contained the men's food allowances, warnings against stealing, gambling, swearing, etc., concluded with the following:

Item. To the intent that these orders may come to the knowledge of every man,

it is commanded that the captain and master do give order that in every ship they be publicly read at the least twice or thrice every week in the service times.

The equivalent of this custom persisted until recent years, when, all hands being able to read, continuous display on ships' bulletin boards replaced monthly reading to officers and crew.

A possible explanation why more detailed information about the organization and operation of men-of-war has not come down to us, may be surmised from one of John Young's "Notes on Sea Service" in Book IV of the *Tracts:* "As fire-works are very necessary, so the knowledge of them is reserved to private speech and not to public writing."

Young descants upon the advantage of getting the wind; upon the station bills of ships, in order to make them efficient; of wetting sails to prevent fire arrows and other fire-works from destroying them; penalties for failing to join in a fight; upon means of boarding and its prevention; how to construct boarding nettings, etc.

Also among the *Tracts* is a copy of the fleet orders of Don Martin de Padilla, the highest ranking Spanish naval officer, Captain General of the Galleys of Spain and of the Navy Royal of the Ocean Sea in 1597.

Padilla's orders were not strictly fighting instructions. Directions for the care of great guns and small arms were included. At sea every captain was required to speak every day with the admiral; soldiers were obliged to learn seamen's duties and vice versa; instructions were given for chasing; prizes offered for the first, second and third men who boarded an enemy's ship; orders to follow the example of the admiral in action; what to do in distress, etc. There were 56 articles in all, many of them similar to those of the English.

Monson, a century later, would have opposed De Chaves' arguments of 1530, had he known of them, but the fact that he did oppose battle formations for sailing ships shows that such formations had been—or were being—advocated.

Monson said:

. . . ships which must be carried by wind and sails and the sea, affording no firm or steadfast footing, cannot be commanded to take their ranks like soldiers in a battle by land. The weather at sea is never certain, the winds variable, ships unequal in sailing, and when they strictly keep their order, commonly they fall foul of one another, and in such cases [and in what follows there was, and is, a general truth] they are more careful to observe their directions than to affront the enemy whereby they will be brought into disorder among themselves.

Battle formations for sailing ships were soon to be prescribed, but

as Monson foresaw, such close order as was occasionally demanded, even to a distance of half a cable between ships, could not be maintained while closely engaging an enemy. He approved of squadrons and divisions gaining the wind before action; i.e., fighting by groups.

One more quotation from the *Tracts* completes the review of sailing and fighting instructions and the principal events at sea from the early days of fighting under sail to 1635. It is an extract quoted by Colomb as proof that Monson understood the importance of control of the sea in naval war.

Monson said:

> Whilst the Spaniards were employed at home by our yearly fleets they never had opportunity nor leisure either to make an attempt upon us or to divert the wars from themselves, by which means we were secure from any attempt of theirs. . . . We may be confident that whilst we busy the Spaniards at home they dare not think of invading either England or Ireland.

Colomb also quotes Sir Walter Raleigh to the same effect and states that Monson, like Drake, urged the importance to the English fleet of setting sail for Spain as early as February. Colomb continued, "To be first in the field was the point, and the force that was first in the field must hold all the superiority of that position until it was beaten at sea." From thenceforth he characterized naval warfare as a struggle for "Command of the Sea." This began in earnest with the First Dutch War.

During the years that Monson was engaged in writing his *Tracts,* Nathaniel Butler (Botelier) was writing his *Dialogues.*

Butler was born in 1577. His early life is obscure and no trace of him exists after 1640. He seems to have borne a prominent part in the affairs of the Virginia Company, whether in England or at Jamestown does not appear.

He was Governor of Bermuda from 1619 to 1622. He returned to England via Virginia, and while in Virginia, was an officer in an expedition against the Indians on the Chickahominy River. His report on Jamestown was said to have induced James I to revoke the Virginia Company's charter and make the settlement a crown colony.

Although John Smith had left Virginia some years before and was living in London, it is probable that he and Butler were well known to each other. It is also probable that Smith's *Sea Grammar* for merchant sailors, which was published in 1627, led Butler to write his *Dialogues.*

The only record of Butler's naval service is as captain of the *Jona-*

than with Wimbledon in the Cadiz expedition of 1625; captain of the *Patient Adventure,* an armed merchantman, with Buckingham in 1627; and of the *None Such,* a Royal Ship, with Lindsey, in 1628, for the relief of La Rochelle—a total of three years.

The exact date that he began his *Dialogues* is not known, but they appear to have been completed in 1634. They did not appear in print until 1685, but the original manuscripts in his own handwriting, with corrections, still exist.

There were six *Dialogues* in all, published under the title:

A
DIALOGICALL DISCOURSE
CONCERNING MARINE AFFAIRES
Betweene
THE HIGHE ADMIRALL AND A CAPTAINE
att Sea
Represented in
SIX DIALOGUES OR DISCOURSES
The Ffirst
About Commanders in Cheife.
The Second
About the Common Mariner.
The Third
About the victuallinge out of ffleets.
The Ffourthe
About the partes and wordes of Arte belonging to a Shippe.
The Ffifthe
About the choyse of the best Shipps of Warre.
The Sixthe
Of the orderings of ffleets in Chases, Bordings, ffights.
Collected and Penned
BY CAPTAINE NATHANIEL BUTLER
Anno 1634.

The *Dialogues* are in the form of question and answer. They are interesting to seamen for the information they give about ships 300 years ago.

The researches of Corbett do not permit him to give Butler a high standing as a naval officer or a seaman. Probably many of his replies to the Admiral's questions were collated from other knowledge than his own. He and Monson were in accord in recommending medium sized ships as best for men-of-war.

Under the title of Fleet Tactics, the Admiral said to the Captain:

Let us therefore hear what kind of ships, and of what size you would propound for the best of ships of war, according to present services at Sea.

Captain. As touching their burthen, I should make choice of those of the middle size; for these when well moulded and contrived, must needs be best for sailing,

and will also bear a very good sail, and are likewise nimble and yare of steerage, capable also of the carriage of sufficient great guns and of convenient numbers of men; and so may every way be fitted to any service, either defensive or offensive.

For though great Princes may (for fame sake) affect the having of some extraordinary great ships, to keep state withal, yet surely I find not how any extraordinary use may be made of them in point of war or battle. It is true that if the lesser ships have a mind to be beaten they may come near unto to them, and be torn in pieces with their great guns."

He gave what he considered other advantages of medium size ships, among them, that being better sailers they could choose or avoid battle and could enter many harbors impossible for large ships. This he felt was particularly advantageous to England.

True it is that long ships are fitter for our seas than the ocean, but yet one hundred foot of length and thirty-five feet in breadth is a good proportion for a great ship in any seas whatsoever.

At this time (1634) England had not more than 15 "great ships," measuring more than 100 feet on the keel. Of these the largest was the show ship *Prince Royal,* whose dimensions, with others, are shown in the subjoined table, with date of building, or last rebuilding.

SHIP	BUILT	KEEL	BEAM	DRAFT	REMARKS
White Bear	1564	110	37		Sold in 1629
Anne Royal	1610	103	37		Rebuilt
Prince Royal	1610	115	43.6		
Rainbow	1618	102	35		Rebuilt
Constant Reformation	1619	106	35.6		
Victory	1620	108	35.9		
Swiftsure	1621	106	36.1		
St. George	1622	110	37		
St. Andrew	1622	110	37		
Triumph	1623	110	37		New
St. Denis	1625	104	32.5		
Vanguard	1630	112	36.4		2nd Rebuilding
Henrietta Maria	1632	106	35.9		
Charles	1632	105	33.7	16.8	
James	1633	110	37.6	17.2	
Unicorn	1633	107	36.4	15.1	

The ratio of length to beam gradually increased from 3 to 1, as shown in the table, to 3.5 to 1, and in some cases 4 to 1 in third and fourth rates during the days of the Commonwealth.

The medium-sized "great ships," which both Butler and Monson preferred, would carry 40 guns in all, mounted on one covered deck, on the upper deck, and on poop and forecastle. The largest gun would be a demi-cannon (32-pounder) or culverin (18-pounder).

At the time they wrote, such a ship would be classed as a second or

third rate, and in the days of the Commonwealth as a fourth rate. That this type was the most generally useful, is shown by the fact that more than half of the total number of English ships, in 1653, during the first Dutch War, were fourth rates, averaging between 500 and 600 tons, draft about 15 feet and carrying crews of about 200 men.

The Admiral wished to get the Captain's opinion on fleet tactics and put a question: "touching the best forms that a great fleet is to put itself into, when it is to combat with another every way equal unto it. . . ."

The Captain replied, in part:

"I say then, that whensover a fleet is to give or take a batle to or from another fleet every way equal unto itself, it will be necessary (whether the squadrons be three in number, as generally they are, or five, as was prescribed formerly for every great fleet) that every one of these squadrons do sub-divide itself into three equal divisions, leaving a reserve of certain selected ships, taken out of every division, to bring up the rears; the which reserve may amount in number to the third part of every one of these divisions. And every one of these divisions is to observe a fit berth or distance one from another; and in a fight to second one another, as cause shall require. And to avoid confusion and falling foul one upon another, they are in the fight to charge and fall off by threes or fives, as they are in number more or less. The ships of reserve being always to be vigilant and ready to come up to the relief of all such ships as shall be any way engaged by the enemy; and to put themselves into the room of such as may chance to be made unserviceable; and this order and form to be constantly observed and made good, during the whole time of the fight and battle.

. . . . .

Admiral. "Have you any other forms of fights to be made use of in a sea battle?"

Captain. "Some other there may be as for a small fleet being to fight in an open sea that it should be brought up to the battle in one only front with the Admirals in the midst of them, and the Chief Admiral in the midst of these, and on each side of him the strongest and best provided ships who keeping themselves in as convenient berth as they shall be able are to have a special regard in the fight to all the weaker ships of the side and to relieve and succour them upon all occasions, and withal by being thus near the Admiral-General they may both guard him and aptly receive instructions from him to be imparted to all the rest of the fleet. And for a numerous fleet the same order may be practiced, provided that there be sea room enough. *Only the ablest ships are here so to be berthed* that the ability of the smaller ships and the strength of the greater may be communicated to a mutual relief and advantage and to answer all occasions either of *charge* or chase, the which and all those vessels that are in the windwardmost part of the front are to be made up of the strongest and best ships that so they may with the better opportunity relieve all such of the weaker ships being to the leewards of them as shall anyway be oppressed by the enemy."

By the "charge," Butler means the approach, bows on, the object being to lay the enemy aboard, if possible.

What he considers the best battle formation for a large fleet differs

very little from that prescribed for the Cadiz expedition, and as he commanded a ship in that expedition, he must have approved of the fighting instructions.

He recognized that small ships were not suited for the main battle, and although he did not coin the expression "ships fit to lie in the line," he presented the idea.

He gave advice on the use of fire-ships, and mine (powder) ships. He also gave rules for chasing and for the way to attack a ship chased; on how and where to board; how to prevent boarding and how to repel boarders.

He considered it ineffectual to fire broadside guns beyond point blank or musket shot.

His account of what he considered proper equipment for himself should he be in command during battle is most interesting.

> For my part, I shall take no further for one and only to have a convenient skulled montero on my head, a good buff jerkin on my back, a half pike or a battle axe in one hand, a tried pistol in the other, with a good short sword by my side to perform anything required at any close fighting or boarding.

CHAPTER VII

GUNS AND GUNNERY: ANGLO-DUTCH WARS

CORBETT, in writing of the Dutch Wars, says:

> In both official and unofficial reports of the actions of this time, an almost superstitious reticence is shown in avoiding tactical details.

The same may be said of gunnery, not only in this (the 17th) century, but also in those preceding and following it. We read much of ships and guns, but little of gunnery. Whether by accident or design (pp. 22 & 111), details of loading, training and firing, rate of fire, and whether by broadside or single gun, are nowhere to be found. We do know that guns at the end of the 17th century differed little from those at its beginning, and that 18th century guns were much the same as those of the 17th.

Powder was put up in bags and brought to guns, one charge at a time, in leather "passing boxes" carried by ships' boys (powder monkeys). Shot were cast-iron. Clowes says that the issue of stone shot for cannon-periers was discontinued after 1625.

At this time, guns with separate chambers (breech-loaders) were obsolete, except possibly in the case of "sakers" (six-pounders). Guns were primed through the vent with loose powder and fired with match or linstock, which of course had to be kept alight for each gun throughout battle.

Guns deteriorated mainly because of vent erosion, which was a serious trouble. To prevent or lessen it, some gun founders placed a steel vent bushing in the mold and cast the gun around it.

Sights and elevating gear for ships' guns were unknown. Raleigh's injunction to fire no gun except at point blank was long the rule with the English and Dutch. However, a means of laying guns was necessary and we find from a sentence in *The Gunner's Glasse* of 1641 that the means then employed were the same as in 1800, of which we have full knowledge. William Eldredge, the author, wrote that field pieces had a "coyne transum" and that the gun was elevated by coynes which rested on the "coyne transum."

A ship's gun carriage, as described by Captain Garbett, R.N.,

> was formed by two wooden sides, termed the brackets, which were joined together by front and rear pieces called the transoms. There were four wooden wheels or trucks, kept in their place on the axles by iron linch-pins. The trunnions of the guns fitted into bearings hollowed out on the fore upper part of the brackets and were

secured by the cap-squares, iron straps working on a hinge, so that they could be thrown back when necessary for dismounting the guns. The upper part of the inboard half of the bracket was cut into three steps, on one of which the hand spikes rested when the gun was being elevated. Between the two brackets and resting on the transoms was the bed (coussin) which was movable, and on this again, was placed the *large* quoin, a wedge-shaped block of wood.

All guns were breech heavy. The handspikes lifted the breech to level, or to the desired elevation. The quoin, sliding on the bed, wedged the breech in place.

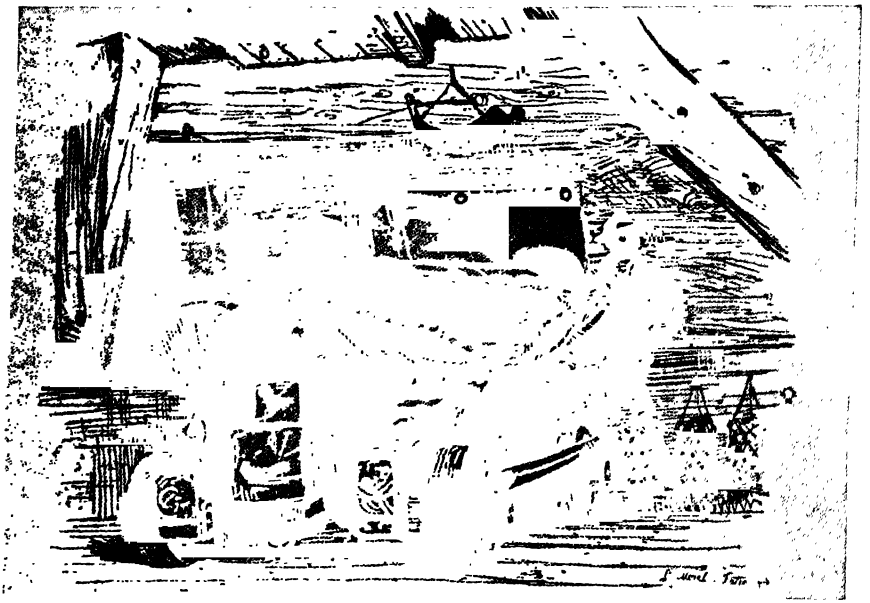


FIG. 17.—On Board the *Redoutable:* French 36-pounder. (*From Fraser's "The Enemy at Trafalgar," published by Hodder & Stoughton, Ltd., London*)

It appears that beds were movable. There is a record of a bed for a 32-pounder, weighing 88 pounds. The quoin for this gun weighed 22 pounds.

Bearing in mind that quoins—and often the bed itself—were displaced by each discharge, the crudeness of this method of elevation is evident, but it prevailed for at least two centuries.

With the same carriage, bed, and quoin, the ship on an even keel, and Tartaglia's quadrant in the muzzle, the axis of the bore could be brought horizontal and reference marks scored on the lowest point of the breech and on the quoin and bed below. Later, quoins were marked

in degrees for both elevation and depression, but in the 17th century such refinement was unnecessary.

One of the first duties of the gunner of a newly commissioned ship, after the guns were mounted, was to "mark the quoins."

The recoil of ships' guns was controlled by a breeching—a piece of very flexible, heavy rope with an eye in each end. The bight was passed around the breech of the gun and the ends shackled to the ship's side, one forward and the other abaft the gun-port. The length of the breeching was such as to bring the gun at full recoil to the loading position (muzzle inside the port).

The gun was held in the loading position by another kind of quoin, called a "chocking quoin," placed in front of one, or both, front trucks of the gun-carriage.

A tackle, on each side was manned by the gun's crew, to haul the gun out to battery after loading. These were known as side or train tackles. With motion on the ship, another tackle called the "in-tackle" was used to control the "running-out."

The in-tackle was unhooked before firing and the side-tackles either unhooked or the falls coiled clear to permit free running during recoil. At the end of the recoil, the gun was quickly chocked on a taut breeching, sponged, loaded, and run out again.

We have found no record of rate of fire from ships' guns in this century.

Eldredge, in *The Gunner's Glasse,* gives this information for field-pieces. He says;

> The rate of firing is given at 8 shots an hour in all the old books I have seen. One may well make 10 shots an hour, if the peeces be well fortifyed and strong; but if they be but ordinary peeces, then 8 is enough, always provided that after 40 shots you refresh and coole the peece and let her rest an hour, for fear lest 80 shots shall break the peece, being not able to endure the force and heat.

The rate of fire from ships' guns greatly exceeded this.

Among Eldredge's thirteen commands for loading, which included orders for ramming a wad over the powder and one over the shot, was one for loading powder with a ladle. He wrote as a man proud of his profession, saying;

> It is a foule fault for a professed gunner to commit to bring back some of the powder when withdrawing a ladle. . . . Let the gunner endeavour to set forth himself with as comely a posture and grace as he can possess, for the agility and comely carriage of a man in handling his Ladle & Spunge and lading Peece is such an outward action as to give great content to the standers by . . . and take heed to shame not yourself in bringing some powder out again in the ladle which is imputed great shame to the gunner.

After such a loading, thus gracefully begun, it is in order to quote Shakespeare!

Behold the ordnance on their carriages, with fatal mouths, gaping on girded Harfleur . . . and the nimble gunner with linstock now the devilish cannon touches and down goes all before them.

Contrast this with gunnery at sea by quoting Sir Jonas Moore, who wrote in 1689, and who had himself experienced the difficulties of accurate shooting from a moving platform, or else had first-hand information from some gun pointer of the day.

TO LAY A PEECE OF ORDNANCE TO PASS AT SEA

To point a Peece of Ordnance, or lay a Peece to pass, is to level it directly against the Mark you intend to strike.

The practice whereof they use at Sea is different from that of the batteries at Land. For at Sea, all exactness of Shot depends upon the motion of the Ship; when you give fire the Heaving of the Ship and setting of the Waves are ordinarily so inconstant that if the Cannoneer doth not well observe his time he misseth his Aim and loseth his Shot, and which depends wholly upon his judgment, having no other way to guide himself than this, which is so well to take time that he expect and see that part the most elevated and raised up upon the water which he intends to strike, that it may not be covered and under water at such time as the powder takes fire and chaseth the Ball, which may happen in several manners, to wit. If we give fire when one of the Vessels ingaging, or ingaged sinketh itfelf into the hollow of the Waves, then when that from whence you intend to shoot abaseth or raiseth its Deck on which is your Battery, your Peece then losing its Horizontal Line, or when the Waves which are betwixt the Enemies Ships swell up and cover your Battery, Judgment only and Experience can put this advice into practice. Those that will apprehend, must first know the thickness of the Metal at the Touchhole, and from thence judge the time that the powder may be a firing to the Chamber. Secondly they must well advise themselves of the distance of moving of the Object against which they aim, which ought to be no farther distant than 1000 Common Paces or more, and then they level the Peece about 20 Paces before, in which time the Vessel overtakes the determinated distance, in the mean time that the Powder in the Touchhole burns and that the Shot flies. Thirdly they must diligently observe the roling and motion of the Vessel, according to which they make tryal of their Judgment.

It may be trite to observe that the "inconstant" waves make Sir Jonas Moore's description applicable for all time.

Gun-ports were made as small as was consistent with a reasonable amount of freedom to train and elevate the guns. This was necessary because of their weakening the ship and the fact that they were vulnerable spots in her armor. It was calculated that about one-eighth of the shot that struck a ship of the line would enter her gun-ports. In other words about 12% of her side was in gun-ports.

The average English gun-port permitted about ten degrees elevation and about five degrees depression, although the gun-carriage allowed

more. Training was limited from 30-35 degrees forward and abaft the beam when the gun was in the center of the port.

In the 17th century, lower gun-ports, in which the heaviest guns were mounted, were not more than from four to six feet above the water-line.

This was a great disadvantage to those who fought, or preferred to fight, from the windward position, as did the English and Dutch, and not a great—in fact, no disadvantage at all—to those who fought, or preferred to fight, from to leeward, as in later years was the case with the French.

Many references are made to the frequent uselessness of the "lower tier."

Admiral Blake, in 1650, describing an engagement with a Portuguese fleet, wrote:

> I made toward the Admirall, whoe being too nimble, I fell on the rere admirall, being a ship of no less force and had above 3 houres dispute with him, it blowing very much so that we could not use our loure tire.

The standard battery of a *first rate* (of which there were few) about 1650 was 26 cannon (42-pdrs.) on the first (lower) deck; 28 demi-cannon or culverins on the second deck; 28 demi-culverins on the third deck; 10 light sakers (6-pdrs.) on the quarter-deck, 4 in the forecastle and 4 3-pounders on the poop.

Second and third-rates carried a few demi-cannon (32-pdrs.) as their largest guns.

These were the main batteries used by the English against the Dutch in the three great wars for the supremacy of the seas.

Accounts say that the heaviest gun mounted on any Dutch ship was a 24-pounder. They were easier and quicker to serve than 42 or 32 pdrs. and it is probable that at point blank, or even a little greater range they would pierce British sides.

About the time of the Armada, and afterward, point blank range was considered to be between 300 and 400 paces.

To fire at "point blank" was usually considered to mean firing when the line of sight was horizontal. For centuries the only line of sight was "the line of metal." It is probable that guns had notches or scores at breech and muzzle to indicate the line of fire.

But the breeches of all ships' guns being greater in diameter than the muzzle, a horizontal line of sight meant that the gun was elevated to an amount depending on its length and the difference between the semi-diameters at breech and muzzle.

Point blank has also been described as the distance to "first graze,"

when the gun's axis is horizontal. This distance depends on the height of the gun above water.

Shots fired at other than point blank were called "random" shots. The French designation was "coup-perdu."

The uncertainty as to where shot fired at a considerable elevation would fall, either in range or direction, arose from a number of causes—balloting in the bore from excessive windage; inequality in powder charges; ships' roll, etc. The French name was most appropriate.

Random shot were sometimes useful for ships chasing.

Serious interference on both open and covered decks with a gun about to fire, by the firing of adjacent guns, was well recognized. It is evident that such interference soon brought about firing by broadsides. That is, firing all guns that would bear on the enemy from one side of the ship, or from one deck, or from all decks, as nearly as possible at the same instant.

The term "broadside" technically has two meanings. First, the number of guns carried, or that can be fired, on the starboard or port side of a ship, and second, the firing of such guns as a unit. In the second sense, we now use the term "salvo."

As soon as guns were mounted on two decks and thus not within the reach of a single voice, the difficulty of firing them simultaneously arose. Very little information as to the means of overcoming this difficulty is found. As ships increased in size and guns were mounted on three and sometimes four decks, the organization to insure simultaneous firing became more complex. It is known that speaking tubes and other means of passing the word were employed, but no detailed ships' gunnery organization of these times is available.

The earliest mention of broadside is found in Hakluyt's *Voyages,* describing an action off Flores Island, in the Azores, May 9, 1597, between three English ships, the *Castle of Comfort,* the *Mayflower,* and the *George,* and three Portuguese ("a great shippe and two caravels"):

> As soon as they were within shotte of us they waved us amaine with their swords, we keeping our course. The greatest ship shot at us freely and the caravel also and we prepared ourselves and made all things clear for our safeguard as neere as we could. Then the great shippe shot at us all her *broadside* and her foure greatest pieces that lay in her sterne, and therewith hurt some of our men, and we did the best we could with our shotte to retourne it.

Shakespeare, in *Henry IV,* written about 1598, puts these words in the mouth of Pistol, Falstaff's "Ancient" (Ensign):

> Fear we broadsides? No! Let the fiend give fire!

CHAPTER VIII

THE DUTCH WARS WITH ENGLAND, 1652-1674

CHARLES I had been at odds with the Parliament and with the people before the assassination of the Duke of Buckingham, but not long after this, in 1628, his quarrels with Parliament became so acute that he dissolved it and for eleven years attempted to govern alone.

Oppenheim says that like his father, Charles felt a keen interest in the navy, and was "fully alive to the weight a powerful fleet gave to English diplomacy."

During his eleven years of absolute power he kept his ships in repair and built, or re-built, thirteen others; among them the *Sovereign of the Seas* (Fig. 16), in 1637, then the largest ship in the world. Until cut down, according to Oppenheim, "she was the largest, the most ornate and the most useless ship afloat."

She was built at Woolwich under the supervision of Sir Phineas Pett, and it appears was intended to carry 90 guns, but the King personally decided that she should mount 102, 90 of which were designed to fire heavy charges. Her battery weighed over 150 tons.

She was profusely ornamented, at bow, stern and sides, and each gun was engraved—at a cost of three pounds—"with the rose and crown, scepter and trident, anchor and cable, and with Charles' motto 'Carolus Edgari sceptrum stabilivit aquarum.' "

In March, 1638, Charles made his second son, James, Duke of York, then under five years of age, Lord High Admiral for life. At the same time, he appointed Algernon Percy, Earl of Northumberland, acting substitute at "the King's Pleasure."

What was later called the "Long Parliament" was convoked in 1640. But King and Parliament again failed to agree. Civil war ensued, culminating finally in the execution of the King in 1649.

Corbett says that before the King was beheaded, Parliament had cause to fear a naval coalition of certain foreign powers in the king's favor and began to strengthen the navy in consequence. Records show nine men-of-war built in 1646-47 and four in 1649.

No English naval occurrences of tactical interest took place between 1635, the year that Lindsey set forth with Monson, to assert sovereignty over the Narrow Seas, and the time of the First Dutch War, which began in 1652 when England was being governed by Committees of Parliament and ended under Cromwell as Lord Protector.

No cruising or fighting instructions are recorded between 1635 and 1648. In the latter year, the Long Parliament issued instructions which showed no advance over those of 1635. The existing copy is "marked as having been delivered on May 2nd, 1648, to Captain William Penn (1621-1670), captain of the *Assurance* frigate and rear admiral of the Irish squadron."

Corbett quotes but one Article, which corresponds to Article 18 of Lindsey's instructions of 1635, but includes a statement that additional instructions might be expected in case of war:

> Instructions given by the Right Honourable the Committee of the Lords and Commons for the Admiralty and Cinque Ports, to be duly observed by all captains and officers whatsoever and common men respectively in their fleet, provided to the glory of God, the honour and service of Parliament and the safety of the Kingdom of England.
>
> If any fleet shall be discovered at sea which may probably be conjectured to have a purpose to encounter, oppose or affront the fleet in the Parliament's service, you may in that case, expect more particular instructions. But for the present you are to take notice, that in case of joining battle you are to leave it to the vice-admiral to assail the enemy's admiral and to match yourself as equally as you can to succour the rest of the fleet as cause shall require, not wasting your powder nor shooting afar off, nor till you come side to side.

The date of the issue of the "more particular directions" is uncertain. Corbett places it about 1650. They were called "Instructions for the better ordering and managing the fleet in fighting." They consist of eight articles none of which need be quoted in full.

Upon discovery of a supposedly hostile fleet, the general (admiral) was to send out scouts to determine "what they are and of what quality, how many fireships and others and what order the fleet is in. . . ." The scouts were "to report to the general or commander-in-chief of the squadron" and not to engage if they were outnumbered, unless they appeared to have the advantage.

> At sight of the said fleet, the vice-admiral or he that commands in the second place, and the rear-admiral, or he that commands in the third place, are to make what sail they can to come up with the admiral on each wing, as also each ship according to her quality, giving a competent distance from each other if there be sea-room enough.

The signal for engaging was to be made by the general or the flagship, "shooting off two guns and putting a red flag on the foretopmast head, that each ship shall take the best advantage they can to engage with the next unto him." Fireships and frigates were to keep to windward, and as near the "great ships" as possible and to watch for signals from the commander-in-chief. These instructions imply no important

change over those of 1635. They do show the introduction of the red flag, to denote "Commence firing."

Article 6, which directs how the enemy's fireships shall be opposed and offers a reward for successful daring, appears, in substance, in all British fighting instructions for over a century, even after fireships had ceased to be a menace. They gradually lost their value as ships began to fight in column. The fact that rewards were offered for the warding off and destruction of fireships, and for no other form of fighting, shows the fear they inspired. Article 6 read:

> That it is the duty of the commanders and masters of all the small frigates, ketches and smacks belonging to the fleet to know the fireships that belong to the enemy, and accordingly by observing their motion to do their utmost to cut off their boat (if possible), or if opportunity serve, that they lay them on board, fire and destroy them; and to this purpose they are to keep to windward of the fleet in time of service. But in case they cannot prevent the fireships from coming on board us by coming between us and them, which by all means possible they are to endeavour, that then, in such a case, they show themselves men in such an exigent, and shear aboard them, and with their boats, grapnels and other means clear them from us and destroy them; which service, if honourably done, according to its merit shall be rewarded, and the neglect thereof strictly and severely called to account.

During the Civil War practically the entire navy had served under the orders of Parliament. The navy wished to be loyal to both King and Parliament and also wished to serve under the Duke of York as Lord High Admiral.

In 1648 the Parliamentary Committee having charge of the navy appointed another commander-in-chief whom the fleet refused to receive. The King being in prison, a number of the ships sailed for Holland and declared for the Prince of Wales, afterwards Charles II. Others supported the Parliament.

The Prince of Wales took personal command and appeared off the English coast in July, hoping to be joined by the other ships of the navy. Disappointed in this, he returned to Holland where he was later succeeded in command by his cousin the famous Prince Rupert, who appointed his brother Maurice second in command.

Rupert took his small fleet to Ireland to support the Royalist cause. The Parliament thereupon declared him a pirate and an outlaw and Continental powers were warned against harboring his fleet.

Rupert evaded the Parliamentary fleet under Blake and Penn, sent to capture him. His subsequent career on the Portuguese coast, in the Mediterranean, and in the West Indies, with a dwindling command, is of the highest romantic interest to seamen, but not pertinent here.

The action of the English in beheading their king was looked upon with extreme disfavor by other powers, especially France, Spain, and Russia. The ambassadors of Parliament, or the Commonwealth—as the Government under Parliament and afterwards under Cromwell was called—were for some time at least refused recognition.

The Commonwealth had to face a hostile Europe. Her instinct of self preservation was appealed to, and this drove England to become a maritime power such as she had never before been. The Parliament saw where its strength should be and fell to increasing the Navy.

In the three years following 1649, 36 ships, large and small, were built and many others taken into the navy. Of the ships built, 18 measured 100 feet or more on the keel—large ships for that period. No three-deckers were built until 1655, and then, only one, the *Naseby* (80).

Ships and squadrons guarding the Narrow Seas were increased to fleets. Long voyages across the Atlantic made for sea endurance, and it was found that ships could keep the sea during all months and all weathers. Penn, on his return in 1651 from fruitless efforts to capture Prince Rupert, could state with truth that he had not set foot on shore for a year.

Long standing disputes and jealousies between the English and Dutch over commerce, navigation, and salutes in the Narrow Seas became so acute by 1652 that the Dutch sent ambassadors to London to negotiate a settlement of all differences.

Many acts of reprisal had been going on between the two nations which, to all intents and purposes, were acts of war. Either before, or about the time of the arrival of the Dutch ambassadors in England, there had been an action off the Isle of Wight (May 14, 1652) between the *President* (42), with two accompanying frigates, and three Dutchmen, convoying some homeward bound merchant ships. The English attacked because the Dutch admiral refused to render honors by striking his flag. The Dutch ships returned the fire, but finally saluted.

A few days later, on May 18, a Dutch fleet of 42 ships, under Admiral Martin Harpertzoon Tromp (commonly called Tromp), driven on the English coast by stress of weather, took refuge in the Downs. Tromp found at anchor there a small British squadron, commanded by Captain Nehemiah Bourne. Bourne, who was evidently aware of the occurrence of May 14, believed that the Dutch were seeking revenge, but it is unlikely that Tromp knew of that affair.

After anchoring, Tromp sent two ships to communicate with Bourne,

who was flying a flag which he mistook for Blake's, explaining that his presence was due to foul weather and that all he desired was shelter. Bourne sent word that the Dutch would best show their sincerity by getting away from the coast as soon as possible. The next day Tromp beat down to Dover.

At first sight of the Dutch, Bourne had sent to Blake for assistance, believing he was in danger of attack. Blake with a small fleet was lying

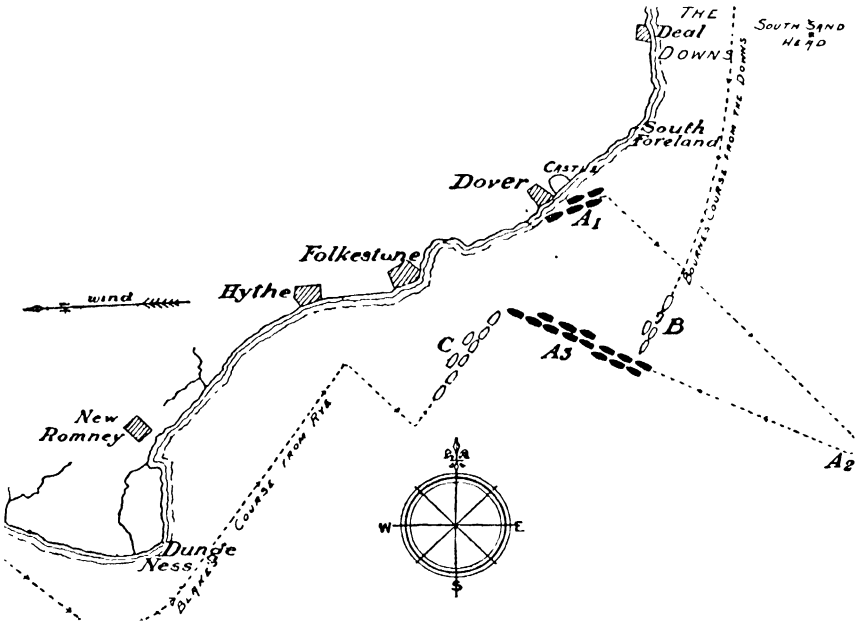


FIG. 18.—The Battle off Dover, May 19th, 1652. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

off Rye, about 50 miles away. He received Bourne's message the same day and sent him word to join the fleet. His message reached Bourne on the forenoon of the 19th. That morning, Tromp having sighted Blake beating up for the Downs, made sail for Calais. When the two fleets were in signal distance, Blake fired a gun for Tromp to strike his flag, in acknowledgment of British sovereignty of the Narrow Seas. Clowes says:

As this [Blake's gun] had no effect, it was followed by another, and by a third, to the last of which, Tromp made answer with a broadside. This was promptly answered and Tromp "having put abroad the *bloody flag* under his Holland colors" other ships engaged as they came up.



FIG. 19.—English Admirals and Generals at Sea.
(*Top, left*) Blake; (*top, right*) Penn; (*bottom, left*) Monck; (*bottom, right*) Prince Rupert. (*Top, left; bottom, left and right: From Allen's "Battles of the British Navy," George Bell & Sons, London; top, right: From Granville Penn's "Memorials of the Professional Life and Times of Sir William Penn, Knt.," James Duncan, London*)

Thus war began without any previous declaration by either power. Clowes' quotation indicates that with the Dutch, as well as the English, the red (bloody) flag was the signal for action.

Bourne attacked the rear of the Dutch fleet while its van was engaged with Blake. Tromp had no intention of attacking either Bourne or Blake. His instructions had been to protect trade in the Channel, keep off the English coast, do nothing discreditable to his country, and to use his own discretion as to striking his flag in salute.

The engagement was indecisive, the greater loss being on the Dutch side. Both fleets anchored after the battle. The following day Tromp stood towards the French coast and Blake proceeded to the Downs.

Not long after the battle in the Downs, Admiral Sir George Ayscue, in command of a squadron just returned from the West Indies, attacked a convoy of 40 Dutch merchantmen off the French coast, and captured, or destroyed, 30 of them.

Negotiations with the English fell through. The Dutch ambassadors embarked for home July 4, 1652, and war was declared on July 8.



FIG. 19a.—Edward Montagu. (*From Allen's "Battles of the British Navy," George Bell & Sons, London*)

FIG. 19b.—H.R.H. James, Duke of York, Lord High Admiral (Afterwards James II). (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)



FIG. 20.—Dutch Admirals.

(*Left*) Martin Harpertzoon Tromp; (*center*) Michael de Ruyter. (*Courtesy Naval War College. From Macpherson Collection*); (*right*) Cornelis Tromp as Lieutenant-Admiral of the Maze. (After the engraved portrait by A. Blotelingh.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London.*)

Blake was at once sent to the north of Scotland to drive off, or capture, the Dutch herring fleet. Ayscue was ordered to collect a fleet in the Downs.

The ambassadors, returning to Holland, fell in with Tromp off the Scheldt and informed him of Ayscue's position. Tromp sailed for the Downs, but calms prevented any progress and in the meantime Ayscue directed his course to the westward (for Plymouth) and Tromp stood north after Blake, whom he sighted July 26.

While both fleets were preparing for battle, a gale came on which dispersed the Dutch during the night. Three of their fireships foundered, and two ships were wrecked on the Shetlands. Blake was able to take refuge in the lee of the islands. Tromp's shattered fleet finally arrived in home ports.

After this series of misfortunes, Tromp's earlier fame did not avail to keep him in command. His successor was Michael Adrianzoon de Ruyter.

Colomb considers this war as the first struggle for the command of the sea as distinguished from cross-raiding. But no clear recognition of this principle appears to have governed the actions of either power.

The admirals on both sides were experienced men. All, except Blake, were professional seamen.

Blake, then 53, and at the height of his powers, had been a "General at Sea" for three years, pursuing, blockading, and fighting Prince Rupert, and the Portuguese for sheltering the sailor Prince. For his successes he received the thanks of Parliament in 1650, and a year later he and Ayscue were similarly rewarded for the capture of the Scillies, which had been a royalist base for two years.

Blake was born in 1599. He entered Oxford at 16, remaining two years. He was successful in business, a Member of Parliament, and an intrepid soldier, serving the Parliament during the Civil War.

Ayscue, whose dates of birth and death are uncertain, had been in command since 1646, was loyal to Parliament and had been twice thanked for his services. When war was declared, he had just returned from the West Indies, where he had captured Barbados and other royalist islands.

Penn, who had wavered between King, Prince, and Parliament, had been a rear admiral at 27 and was now but 31 years of age. He was bred to the sea by his father, a successful merchant and sea captain of Bristol, and had distinguished himself in command of a ship early in the Civil War. He had also been arrested in 1648 as a royalist sympa-



FIG. 20a.—(*left*) Jacob Van Wassenaer, Lord of Obdam, Lieutenant-Admiral of Holland and Westvriesland. (After the engraved portrait by J. Suijderhoef); (*center*) Egbert Meussen Cortenaer, Vice-Admiral of Holland, Westvriesland. (From the engraving by Jan Kralinge); (*right*) Lieutenant-Admiral Geerit Van Callenburgh. (From the engraving by P. Tanjé after the picture by J. Vollevens.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

thizer, but was released not long before his appointment to the *Assurance*. He is best known in America as the father of William Penn, the founder and proprietor of the Colony of Pennsylvania.

Neither of the Dutch admirals, Tromp and De Ruyter, had influential connections. Each entered through the "hawse pipe" and rose to command by his own force and ability.

De Ruyter—younger than Tromp by 8 years—was but 45 when war was declared, and had in one sense to win his spurs again, having been in the merchant service since 1642. He had begun his service in the navy as a cabin-boy, at the age of 11, cruised in command against the French in the English Channel at 29, and was a distinguished rear-admiral in the Dutch war against Spain at 34, after which, as related, he entered the merchant service.

Tromp, on the other hand, born in 1597, was nearly the same age as his great antagonist Blake, and was famed as the victor of two great battles in the war against Spain in 1639 and 1640. He had served in the Dutch navy since 1624 and had been at sea since the age of 8, a part of this time in the English navy. He was captured in the East Indies and served several years before he escaped.

Thus, at the beginning of the first Dutch War, the admirals on both sides knew all that was known about war on the sea.

Corbett quotes part of Tromp's orders of 1652 which indicates that his fleet organization differed little from that of Wimbledon in the Cadiz expedition of 1625. Tromp was then 26 and in the Dutch navy. The Dutch were an important part of Wimbledon's fleet as they had formed a part of every expedition of consequence against Spain, from and including the time of the Armada. This association makes it certain that the two navies were familiar with each other's views on how to fight, i.e., tactics.

Tromp's order—referred to above—is dated from June 20, 1652. This was after his engagement with Blake and before the declaration of war.

The translation reads:

> The resolution of Admiral Tromp on the distribution of the fleet in case of being attacked.
>
> Each captain is expressly ordered, on penalty of 300 guilders, to keep near the flag officer under whom he serves. Also he is to have his guns in a serviceable condition.
>
> The squadron under Vice Admiral Jan Evertsen is to lie, or sail, immediately ahead of the Admiral. Further, Captain Pieter Floriszoon [who provisionally carried the flag at the mizzen as rear-admiral] is always to remain with his squadron close

astern of the Admiral, and the Admiral, Tromp, is to take his station between both with his squadron. The said superior officers and captains are to stand by one another with all fidelity, and each squadron when another is vigorously attacked shall second and free the other, using therein all the qualities of a soldier and seaman.

Three mutually supporting squadrons was Tromp's plan for his fleet of forty. Corbett says that the detailed organization of each squadron was a division into three sub-squadrons, as in Wimbledon's fleet.

Later in the year, captains were enjoined,

. . . that they shall all keep close up to the others and as near together as possible to the end that thereby they may act with united force and prevent any isolation or cutting off of ships occurring in time of fight. . . .

Each ship may have had its regular station in its sub-squadron and the sub-squadrons probably had their stations assigned by the squadron commander, but nothing in writing confirms it, and there is no indication of a reserve, or of ships told off for special duties—such as fireships and the like. But undoubtedly there were orders or well established customs in these respects. In both navies the "bloody flag" was the action signal.

An eyewitness, writing half a century later, says that when Blake sighted Tromp, on May 19, 1652, the Dutch had the weather gauge and were standing toward the English on the starboard tack,

upon which the general made a signal for the fleet to attack. After which having their starboard tacks aboard (the general's ship, the *Old James* (48) being the southernmost and sternmost ship in the fleet) the rest of his fleet tacking first, placed themselves in a line ahead of the general, who after tacking, hauled up his mainsail in the brails, slung his yards, and ran out his lower tier of guns and clapt his foretopsail upon the mast.

In other words he lay to, to leeward on the same tack to await the Dutch approach, and as described, Blake fired a gun for Tromp to strike his flag.

The eyewitness—according to Corbett—says nothing of the Dutch formation, if any there were. If his description of how the English, on tacking, formed ahead of their admiral were correct, they already had column for action before it was enjoined by written Fighting Instructions.

De Ruyter's first duty, after taking command, was to convoy a large merchant fleet down the Channel and sufficiently far to the westward to place it beyond danger of attack from the English. For this duty, he had a fleet of 26 ships, including 4 fireships. He kept his convoy well clear of the English coast, but on August 18th he encountered Ayscue south of Plymouth, with a fleet of 38.

Clowes says that in the heavy engagement that took place no formation was attempted on either side.

Both countries claimed victory, but De Ruyter got his convoy to sea without loss, and Parliament evidently considered that Ayscue had failed. He was removed from command, and Blake, on his return from the north, was made Commander-in-Chief, with Penn as his second. They failed, however, to prevent De Ruyter's return up Channel with a homeward-bound merchant fleet.

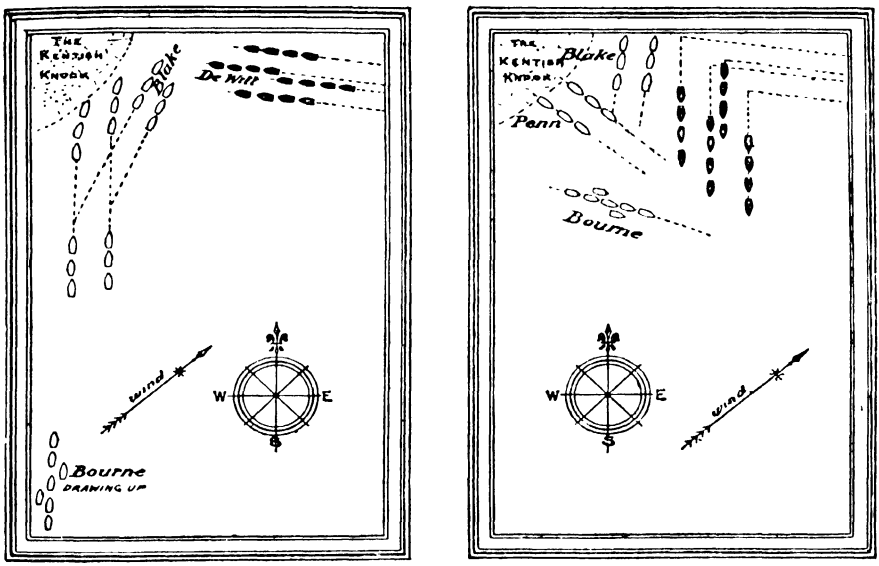


FIG. 21.—Two phases of the battle of the Kentish Knock, September 28th, 1652. English, white. Dutch, black. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

After De Ruyter had foiled Blake and Penn he joined the main body of the Dutch fleet off Calais, under Witte Corneliszoon de Witt, an admiral described by Laughton as of undoubted ability and courage, but unpopular with the men. "He had come out to better the work done by Tromp" and "felt he was bound to seek out the enemy and give battle at once."

He steered for the mouth of the Thames in search of Blake, who, with a large fleet was anchored in the Downs. De Witt's fleet of 64 was somewhat inferior in numbers. He divided it into four squadrons: De Ruyter in the van; himself in the center; and De Wildt in the rear. The fourth squadron was a reserve, in command of Jan Evertsen. (This is

the first indication that the Dutch felt the need of a *reserve* squadron.)

Accounts say that De Witt, who had sailed in a 40-gun ship, intended to shift to Tromp's old flagship, the *Brederode*, but the crew refused to receive him. He commanded during the action from a former East Indiaman of 56 guns.

Blake, on sighting the Dutch, got underway as soon as the weather permitted. The fleets engaged—at least partially—on opposite tacks, the wind being off shore and the British to windward.

This action, which took place on September 28, is called the Battle of the Kentish Knock, a shoal north of the mouth of the Thames. Some of the larger British ships grounded on the Knock. The Dutch, being of lighter draught, passed over, standing to the southward.

The British wore, after passing, and renewed the action. It is said that Blake was re-enforced with 16 ships during the battle. Accounts do not entirely agree. Apparently there were no great losses on either side. The results favored the English. The Dutch returned to their own coast, followed by Blake, who chased for two days, took a few prizes, and returned.

De Witt was about 30 years of age. His appointment to supersede Tromp and rank De Ruyter, both much older and of high reputation, caused great dissatisfaction and after the return of the Dutch fleet Tromp was restored to the command.

As it was unusual to keep the sea during the winter, the English believed that the Dutch would not appear again before spring. Blake's fleet was divided. A part of it, under Penn, went north to convoy colliers to Newcastle and another squadron was sent west to Plymouth, leaving Blake with about 40 ships.

With these, on November 29, Blake was lying off Dover, his flagship being the *Triumph* (60), when Tromp, with a fleet of nearly 80 ships and a large merchant convoy, was sighted to leeward. Blake got underway to attack and the leading ships encountered each other before noon on the 30th, between Dover and Dungeness (No. 8, Chart II).

A fierce battle ensued, lasting from noon until night. Colomb says that the English were badly cut up. They lost two ships and an English author remarks that they would have lost more, had not some of their captains been backward about coming into action.

Blake withdrew to Dover, and then to the Thames. He offered to resign and complained of the conduct of many of his captains, some of

whom were punished. However, a part of these were merchant captains who owned the vessels they commanded, which had been hired or pressed into the service.

Tromp did not pursue, but contended himself with capturing some British merchant ships and raiding the coast of Kent on what Colomb calls a cattle stealing expedition. He then proceeded to the westward down the Channel unmolested, carrying, it is said, a broom at his masthead, to show that he had swept the English from the Narrow Seas.

After getting his convoy safely out of the Channel, he anchored off the Isle de Rhé, where after a week's waiting, he gathered a homeward bound merchant fleet of 250 ships with which he sailed for home.

During the months following Blake's retreat into the Thames, anxiety in England was general. Steps were taken to collect every ship that could be made serviceable, to meet Tromp on his return.

Richard Deane, who in 1649 was one of the first generals at sea with Popham and Blake (all three were colonels during the Civil War but had been out of the service for a time), was put in joint command with Blake.

Penn was made Vice Admiral in February, 1653, and placed in command of the White squadron. General Monck, however, elected to go to sea as Admiral of the White and Penn became Admiral of the Blue.

Next to Cromwell, Monck was the most powerful man in England. He became the third general at sea, replacing Popham who had died in 1651.

Accounts differ as to the number of ships in Blake's fleet. Clowes states that when Tromp, homeward bound, was south of Plymouth on February 18, he found Blake waiting for him with 66 sail. Other accounts say that the English numbered not less than 80. The White squadron, to which Penn was originally appointed, consisted of 22 men-of-war and 9 armed merchantmen. If the Red and Blue squadrons each contained an equal number, Blake's command would have numbered 93. The most probable estimate is that he had about 80 men-of-war. He and Deane were in the *Triumph* (62) as joint flagship, with Monck in the *Vanguard* (56) and Penn in the *Speaker* (64).

Each squadron commander had vice admirals and rear admirals as second and third in command. This would make the divisional commands about nine ships. Whether they were still further divided into sub-divisions of three each does not appear.

On the day of the battle the wind was west of south. Tromp, his convoy to windward, proceeded at once to attack the somewhat scattered English.

Clowes says that details of the engagement are lacking, but that Tromp himself commanded the center Dutch squadron, De Ruyter the left, and Evertsen the right, and that Tromp, according to the usual custom, attacked Blake.

Penn and Blake were engaged from the start, but Monck's squadron, being to leeward, was out of the action until shortly before its close, at

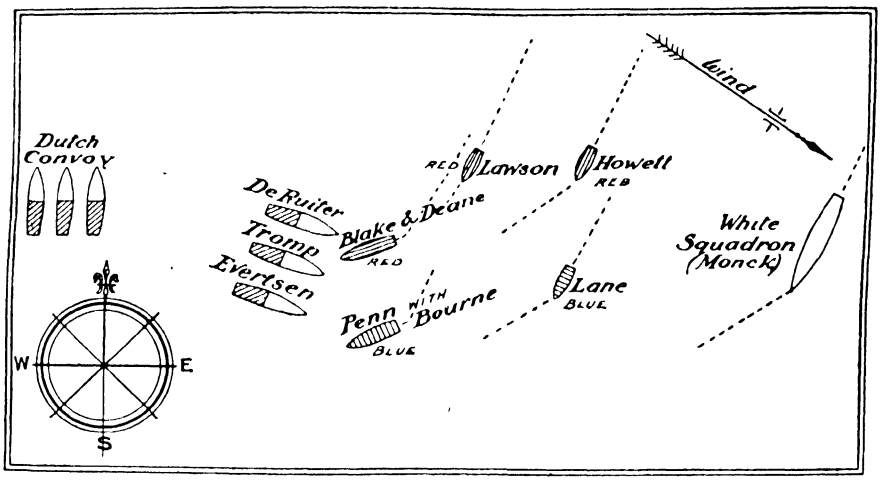


FIG. 22.—The Battle Off Portland, February 18th, 1653. The Fleets at the moment of impact. (Note—Groups, and not single ships, are represented in the above plan.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

four o'clock, when Tromp withdrew and rejoined his convoy to protect it. The British suffered severe losses in men, but not in ships. Blake was badly wounded. The Dutch lost three ships by capture and one blown up.

On the morning of February 19th, looking back to August 1588, it might be said that history repeated itself. Tromp was following his convoy up the Channel before the wind, his fleet in a crescent formation—probably an angular retreat formation—between the British and the convoy. He was overtaken by part of the English fleet off the Isle of Wight, the wind having fallen. The fighting was partial, but heavy. De Ruyter's flagship had to be taken in tow. The British captured a few merchantmen.

On the 20th, a running fight took place. The British captured some additional merchantmen, but the majority of the convoy, as well as the Dutch fleet, with Tromp in the *Brederode,* with possibly the broom at her masthead, reached port without further molestation. The British evidently were not in condition to follow.

This action is known as "The Three Days Battle." Neither side could claim a victory, as far as the engagement was concerned, but Tromp achieved his object, without great loss, while Blake was frustrated.

The total result was so unsatisfactory that the generals and admirals

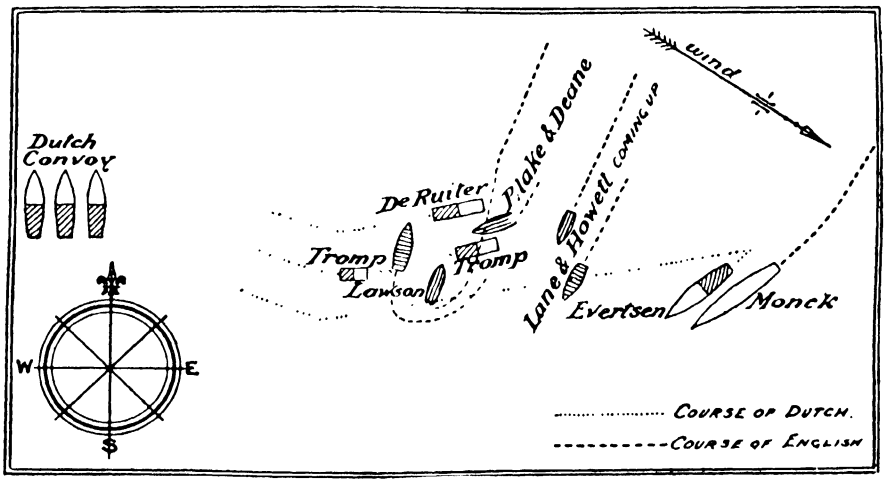


FIG. 22a.—The Battle Off Portland, February 18th, 1653. The Fleets engaged. (Note —Groups, and not single ships, are represented in the above plan.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

cast about for a better means of fighting the Dutch, with Penn, certainly, as one of their advisers, if not the principal one.

By consent or direction of Parliament, "The Right Honorable the Generals and Admirals of the Fleet" issued new Instructions, on the 29th of March, "for the Better Ordering of the Fleet in Fighting."

Corbett says they are

> the earliest known "Fighting Instructions" in any language which aimed at a single line ahead as a battle formation. . . . Compared with preceding orders, these new ones appear nothing less than revolutionary. But it is by no means certain that they were so. Here again it must be remarked that it is beyond all experience for such sweeping reforms to be so rigorously adopted, and particularly in the middle of a war, without their having been in the air for some time previously, and without their supporters having some evidence to cite of their having been tried and tried successfully, at least on a small scale.

The new Fighting Instructions comprised 14 articles. Getting to windward, joining up, and action signals were the same as before, but Article 3 was new:—In order to engage to the best advantage,

all the ships of every squadron shall endeavour to keep in line with the chief, unless the chief be maimed or otherwise disabled (which God forbid) whereby the said ship which wears the flag should not come in to do the service which is requisite. Then every ship of the said squadron shall endeavour to keep in a line with the admiral, or *he that commands in chief* next unto him, and nearest the enemy.

If the flagship of the admiral, or any flagship, should of necessity "bear away from the enemy to stop a leak or mend what else is amiss, which cannot otherwise be repaired," the ships of the fleet or of the squadron were to endeavor to keep in a line as close as possible between the flagship and the enemy.

Article 7

In case the admiral should have the wind of the enemy, and that other ships of the fleet are to windward of the admiral, then upon hoisting up a blue flag at the mizen yard, or the mizen topmast, every such ship then is to bear up into his *wake and grain upon severest punishment.* In case the admiral be to leeward of the enemy, and his fleet or any part thereof to leeward of him, to the end such ships to leeward may come up into the line with their admiral, if he shall put abroad a flag as before and bear up, none that are to leeward are to bear up, but to keep his or their luff to gain the wake or grain.

Corbett says that "grain" was the opposite of "wake" and to come into a ship's grain, meant to take position ahead of her.

The instructions for requiring squadrons to form column on their own flagship, combined with Article 2, repeated from those of earlier issue which directed the vice admiral to form with his squadron on the commander-in-chief's right and the rear admiral of the fleet to form his squadron on the commander-in-chief's left, would if obeyed, produce a battle formation of line of squadrons. It should be noted that each squadron was further directed "to engage with the enemy next unto them."

The new Instructions bore this validation:

Given under our hands at Portsmouth, this March 29th. 1653.

Robert Blake.
Richard Deane.
George Monck.

The Three Days Battle with Tromp had been Monck's first sea experience, although he had held the rank of general at sea for four years. Blake was laid up on shore with his wound for some time after the battle. It is probable, therefore, that the three generals had little to do

with the Instructions which they signed. It appears that the new Instructions resulted from a council of war of which Penn, and no doubt other experienced admirals, were members.

Cromwell, for various reasons, had difficulties with the Parliament which came to a head on April 20, 1653. He dissolved it, and as commander-in-chief of the army became the supreme authority, later taking the title of Lord Protector. The navy acknowledged his rule.

After the Three Days Battle, both antagonists had trouble in repairing and adding to their fleets.

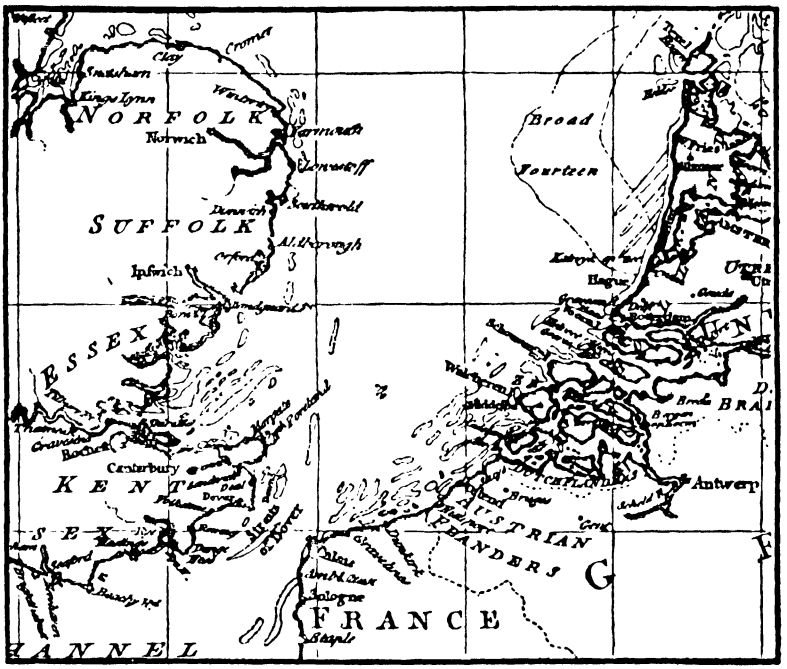


FIG. 23.—The Strait of Dover, and Part of the North Sea. From a chart in the *London Magazine*. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

By the end of May, however, Tromp, De Ruyter and Evertsen were again at sea on the English coast, searching for the English fleet. Tromp anchored off the North Foreland, on the south side of the entrance to the Thames, on June 1, 1653, with a fleet of 98 men-of-war and 6 fireships. The British fleet at this time comprised 100 men-of-war and 5 fire ships.

An engagement was welcomed by both sides. The Dutch were underway on the morning of June 2, to meet the British generals, both fleets, according to Clowes, in the recognized three squadrons, with probably a fourth of the lighter ships as a reserve.

L. C. Laughton, who wrote the chapter in Clowes' *History* covering the period 1649-1660, says that the actual facts concerning squadron or fleet movements in this battle "are involved in a mass of unintelligible contradictions" (No. 10, Chart II).

The accounts given by Allen in the revised edition (1900) of *Battles of the British Navy* and by David Hannay in the 1910 edition of the *Encyclopaedia Britannica* do not differ markedly and will be followed here.

Blake, Deane, and Monck were still in command. Monck and Deane evidently embarked on the same flagship. When the Dutch were sighted, June 1, the main part of the British fleet was anchored in Yarmouth Roads. Blake, not yet fully recovered from his wound, was in the Thames with a portion of the fleet.

Monck and Deane attacked the Dutch on the morning of June 2. At first the English were to windward, and they bore down with Rear Admiral John Lawson in command of the van. Tromp, conscious that his ships were the weaker in build, at first drew away, firing at the spars of the British in order to cripple them. A shift of wind having given him the weather gauge, he concentrated on the British van, but the wind changed again and gave the weather gauge to the English.

The action became general. About noon, Deane was cut in two by a cannon ball, and it is recorded that Monck, seeing him fall, took the cloak from his shoulders, and with the utmost composure covered the body. During the afternoon a Dutch rear admiral, Van Kelson, was blown up in his ship.

At six in the evening, being to leeward, the Dutch bore up for their own coast, endeavoring to escape.

The sound of the cannon was heard in the Thames. It brought Blake out with 18 ships. He overtook the pursuing British fleet in the night. The Dutch were overtaken the next day, when another fierce engagement occurred. Tromp attempted to board Penn's flagship, the *James,* but was repulsed with much loss and his own flagship was boarded and his men driven below. "Upon which, Tromp ordered the deck to be blown up, which was performed successfully with great losses to the English."

Allen continues, "Notwithstanding this repulse, his ship was a second time boarded by the crew of the *James* and of another ship, but De Witt and De Ruyter bore down and saved Tromp from certain capture." His fleet was driven into the Texel, with a total loss of 20 ships destroyed or captured. The English ships were much cut up, but none were lost. Blake went ashore on account of his wounds and Monck was left to blockade the Dutch coast.

Tromp told the States-General that they must build better ships if they wished to beat the English at sea.

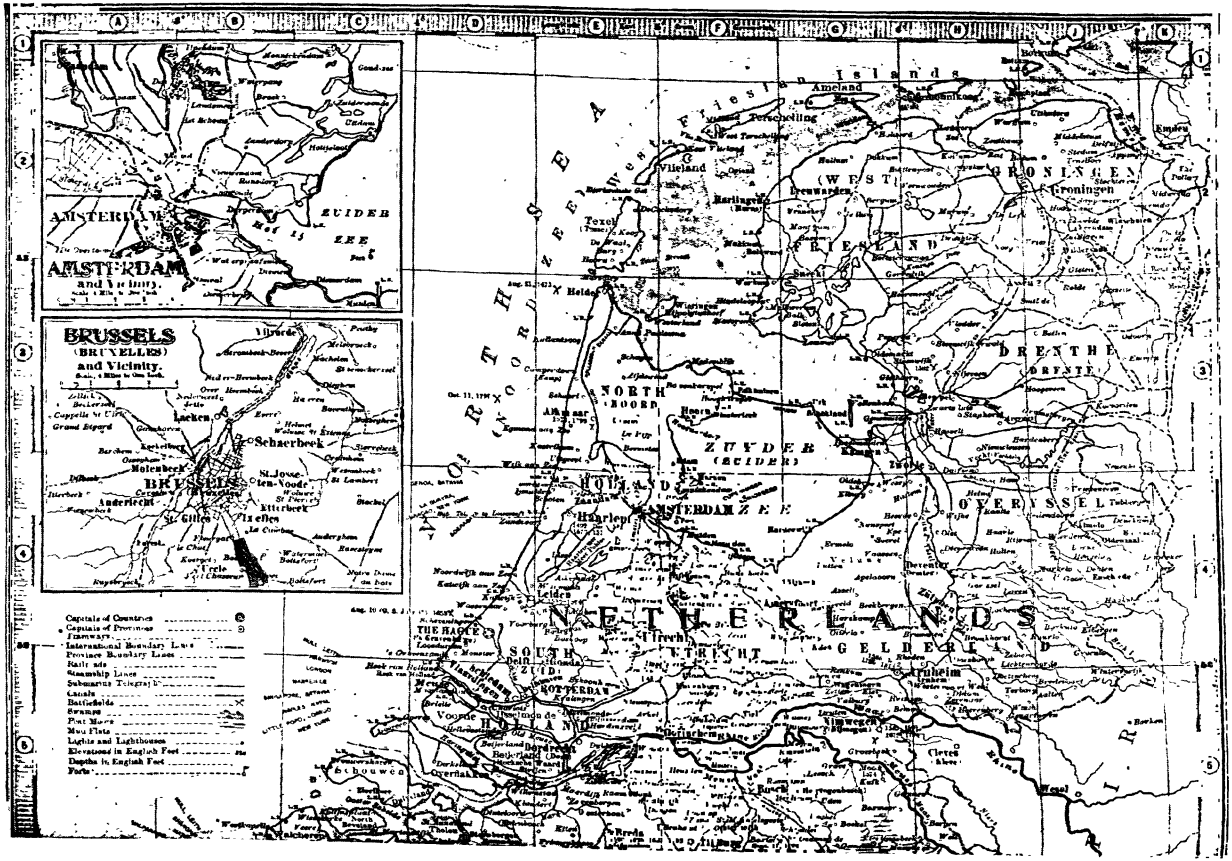
The Dutch, in their estimate of the British formation at the opening of the two days battle, said that "having the wind they stayed on a tack at half cannon shot for half an hour, until they put themselves into the order in which they meant to fight, which was in file at half cannon shot," and the Dutch believed this method of attack was observed by the English on both days. An English account states, "Our fleet did work together in better order than heretofore and seconded one another."

Corbett considers that the Instructions of March 29 were followed and apparently the English admirals regarded the new system as a success, because when they were re-issued in March, 1654, about a year after their original issue, only some slight amendments and verbal alterations were made, which he, Corbett, did not think important enough to print, except in notes.

Laughton says, "It is certain that there was some attempt at a line formation." The squadron, he notes, was the unit of the fleet, but there was already an appreciation of the line and there existed evidence to support the statement that the ideal battle formation of that time "with men of wide seamanship" was column of small squadrons with the wind abeam. This was nearly as high as ships of the day would lie, and varied little from the close hauled line, later prescribed.

Laughton, writing earlier than Corbett, thinks that, whatever British sea generals may have embodied in their Fighting Instructions, they gained the idea of the line from the Dutch.

The result of the battle was the closing of the Dutch ports and the establishing of a blockade by the English. Negotiations for peace were undertaken. It was proposed that the Commonwealth, as a republic, should unite with the States-General, as a republic, under one government. This plan fell through, due to the fear of the Dutch that Holland would not be an equal partner in the union, but would be overshadowed


AMSTERDAM
and Vicinity.
BRUSSELS
(BRUXELLES)
and Vicinity.
NETHERLANDS
NORTH SEA
ZUYDER ZEE
(SUIDER)
Capitals of Countries
Capitals of Provinces
Railways
International Boundary Lines
Province Boundary Lines
Rail ads
Township Lines
Submarine Telegraph
Canals
Battlefields
Swamps
Post Marsh
Mud Flats
Lights and Lighthouses
Elevations in English Feet
Depths in English Feet
Forts

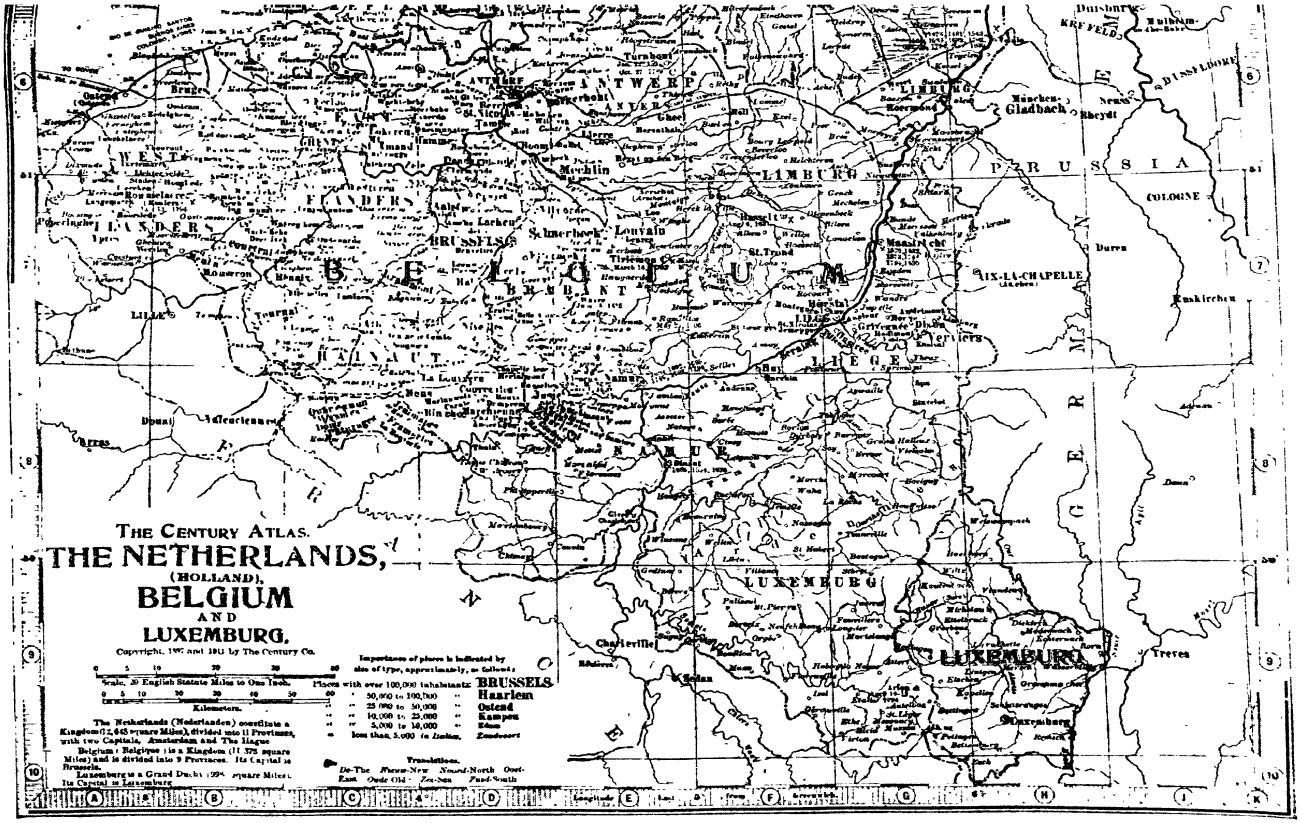


FIG. 24.—(*From "The Century Dictionary and Cyclopedia," D. Appleton-Century Company, Inc., New York*)

by England, and moreover, Cromwell's demands were considered excessive.

The Dutch bent their energies to fitting out another fleet at Flushing and in the Texel.

On July 24, Tromp, with a fleet of 80 ships and 5 fireships, had a partial but indecisive engagement with Monck, the object being to draw him away from the Texel where De Witt was lying with 27 men-of-war and 4 fireships. The diversion succeeded. De Witt got to sea and joined Tromp, who was thus enabled to meet the enlarged English fleet on even terms.

The Dutch fleet, after De Witt joined, had 120 ships, as against the English 90, with 26 victuallers and small craft. This mighty aggregation was formed in five squadrons, with Evertsen commanding the center and Tromp himself on the right.

The two fleets met off Scheveningen on the Dutch coast, on the morning of July 31. The encounter is described as the last and bloodiest fleet engagement of the war. It began at seven o'clock in the morning, with the English to windward, about one mile and a half from the Dutch fleet.

Laughton says, "Again we have no record of the disposition of the ships or squadrons, but again on good evidence we can assert that the English fleet was drawn up in a line of squadrons."

When the English bore down on the Dutch, the latter stood to windward to meet them and broke through the English line; but the entire Dutch fleet failed to weather the English and was somewhat scattered in consequence. The wind was light. Smoke interfered with vision.

Tromp was killed in the action. A council of Dutch flag officers decided to keep his flag flying and that Evertsen should assume command, although De Ruyter was present in command of another squadron.

The battle lasted until six o'clock. Both sides suffered heavy losses. About one o'clock, the English, due to a shift of wind, weathered the Dutch and the latter withdrew under command of De Witt, Evertsen's flagship having been disabled and towed into the Maas. The chase, and battle in retreat, lasted until eight o'clock, the Dutch maintaining a fighting formation until that time, when they took flight and were pursued until midnight. They ran into the Texel, August 1.

The English returned to their own coast to re-fit, thus raising the blockade and allowing De Witt to convoy the outgoing Dutch merchant ships to sea and to bring back those homeward bound—400 in all—

despite the efforts of the English to re-establish the blockade with a fleet of 45 ships.

Blake, Monck, Penn, and Lawson were the British admirals particularly honored as a result of the battle of Scheveningen, although Blake was not present in person.

Not long before Scheveningen, Cromwell summoned another Parliament known as the Little or Barebones Parliament which met on the 4th of July. He accepted the "Instrument of Government," a sort of written constitution, which named him Protector for life and established a Parliament and a Council. The members of the Council were given life tenure.

The new Parliament changed the organization for the government of the navy and appointed Blake, Monck, Disbrowe, and Penn as Commissioners of Admiralty and Navy on December 3.

On December 12 the Speaker and the moderate members of the Barebones Parliament marched to Whitehall and returned their powers. The other members were expelled by the army. On the 16th Cromwell was installed in his new office and governed without a Parliament for about nine months.

At the end of the following March (1654), the new "admirals and generals of the fleet of the Commonwealth of England" re-issued the fighting instructions of 1653, with no changes except a few improvements in phraseology. A change in the first Article from "in what posture the fleet is" to "in what formation the fleet is" shows the British expected an enemy fleet to be in some regular order.

Peace was made a few days after the re-issue of the Fighting Instructions. The peace was a hard one. It included the formal acknowledgment by Holland of England's claims to the sovereignty of the Narrow Seas; the wording being "that the ships of the Dutch, as well ships of war as others, meeting any of the ships of war of the English Commonwealth in the *British* Seas shall strike their flags and lower their topsails in such manner as hath ever been at any time heretofore practiced under any form of government" (Chart III).

Blake and Penn were not left idle long after the peace with Holland. The former, after recovering from his wound, sat as a member of the Barebones Parliament until it was dissolved.

In September, 1654, Cromwell, during the time that he was without a Parliament, began operations against the Spanish, although the two countries were nominally at peace. A fleet, with Blake in command,

sailed to the Mediterranean to curb the African pirates and to make reprisals against the French, but with orders to be friendly to Spain, while Penn, with another fleet, was sent to the West Indies to capture Spanish possessions. Since news travelled slowly, Blake was receiving civilities in Spanish harbors, while Penn was operating against Spain in the West Indies.

The re-issued Fighting Instructions were in force in both fleets, but no sea engagements took place. Blake's expedition was an entire success.

Penn, as has been mentioned, was a royalist at heart, and after the death of Charles I had continued his personal allegiance to the Prince of Wales. He is credited—or rather, discredited—at the time of this West Indian expedition, with a proposal to deliver his fleet, when fitted out, to the Prince, if a secure port could be named in which to deliver. Prince Charles, unable to name a port, desired Penn to continue his West Indian enterprises and wait a favorable opportunity.

The expedition was aimed principally at Spain, and incidentally at France. Penn's fleet consisted of 17 men-of-war and 20 transports. The transports carried 3,000 soldiers. Additional troops were raised in the English West Indies.

The fleet sailed on Christmas, 1654, the troops being under General Venables, though he did not share the command of the fleet with Penn. They reached Barbados at the end of March, 1655, and after embarking re-enforcements, landed about the middle of April for an attack on Santo Domingo. The attack was unsuccessful. Re-embarking the troops, they reached Jamaica May 10 and at once bombarded Kingston, which surrendered without any resistance, and Jamaica has ever since remained on English possession.

After a month's stay, spent in pacifying the island and cruising in search of Spanish merchantmen and treasure ships, Penn, with General Venables, sailed for England, leaving behind a sufficient garrison.

The fleet reached home on August 31, 1655. The Admiral and General were summoned before the Council in September, questioned about the resources of Jamaica and on other subjects, and then were both committed to the Tower. No assigned reasons were given for this step, and in neither case was the imprisonment for long.

War was not declared against Spain until February, 1656. Blake was then sent to cruise off Cadiz and the neighboring coasts for the purpose of intercepting Spanish shipping. Before he sailed, and at his

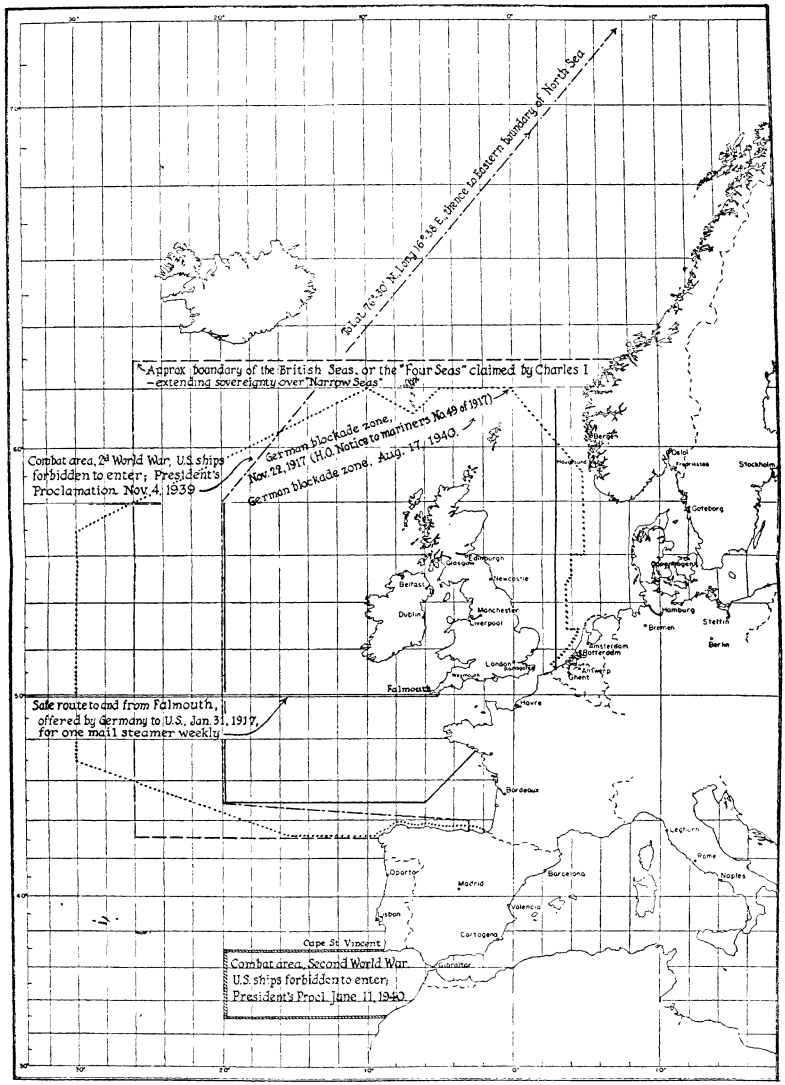

Approx. boundary of the British Seas, or the "Four Seas" claimed by Charles I – extending sovereignty over "Narrow Seas"
Combat area, 2d World War, U.S. ships forbidden to enter; President's Proclamation Nov. 4, 1939
German blockade zone, Nov. 12, 1917 (H.O. Notice to mariners No 49 of 1917)
German blockade zone, Aug. 17, 1940.
Safe route to and from Falmouth, offered by Germany to U.S., Jan. 31, 1917, for one mail steamer weekly
Combat area, Second World War. U.S. ships forbidden to enter; President's Proc. June 11, 1940.
Falmouth
Cape St Vincent
Gibraltar
Bordeaux
Le Havre
Oporto
Madrid
Lisbon
Barcelona
Valencia
Cartagena
Leghorn
Rome
Naples
Stockholm
Gothenburg
Hamburg
Bremen
Stettin
Berlin
Amsterdam
Rotterdam
Antwerp
Ghent
London
Liverpool
Manchester
Dublin
Belfast
Glasgow
Edinburgh
Newcastle

CHART III

request, General Montagu, afterwards Earl of Sandwich, was appointed joint General and Admiral of the fleet. They fell in with the Spanish fleet on July 15, but were not in fit condition to attack. They blockaded the coast of Spain, but there were no fleet engagements. Much treasure was captured, however.

On April 20, 1657, the defenses of Teneriffe were bombarded with part of the fleet, while the other part destroyed 6 Spanish galleons lying in the harbor and a number of smaller ships.

Blake died on the way home to England on August 7. He was in his prime, 58 years old.

No further English naval engagements of importance occurred until the time of the Second Dutch War. In the intervening years, the Danes and the Dutch, fighting against Sweden, gained some naval experience in a bloody battle in the Sound, in November, 1658. England was neutral in this war but probably drew some lessons from such naval operations as took place.

A state of what has been termed anarchy which succeeded the death of Cromwell, on September 3, 1658, led eventually to the restoration of the monarchy.

Before Richard Cromwell's resignation, in 1659, General Montagu was again given a high naval command and after some vicissitudes, was deputed when the Restoration was decided upon, to bring Charles II from The Hague to England.

Penn, as General and Commander-in-Chief, turned over the command of the English fleet to Montagu, who then proceeded to Holland on his commission. The fleet, with the King, Charles II, who had been proclaimed May 8, 1659, arrived at Dover May 26, where Charles was greeted by Monck. He was not crowned until April 23, 1661. The English navy deteriorated during the first years of his reign.

The Second Dutch War

Clowes says that informal war between England and Holland began soon after the Restoration but only assumed a regular and official character at the commencement of 1665, being first declared by the Dutch on January 14 of that year, and a little later by the English on February 23. Hannay says that active operations against the Dutch trading posts on the coast of Africa had been undertaken in 1663 and that De Ruyter was sent to the African coast and also to New York, which had been captured by the British. He succeeded in the first enterprise, but failed to re-take New York. Before his return to

Holland, however, he did much injury to English commerce, and Montagu, now Earl of Sandwich, sailed from Portsmouth, in January, 1665, with a squadron of 15 ships to blockade the Dutch coast. Sandwich was an intimate friend of Cromwell's and had been in command of a regiment of the Parliamentary army at the age of 18. He distinguished himself at the battles of Marston Moor and Naseby. In 1653, at the age of 28, he was made a member of the Council of State for life and began his career at sea as a colleague of Blake's. His voyage of 1665 is of interest because on February 1, while in the Downs before sailing for the Dutch coast, he issued some additional Fighting Instructions, of which two deserve notice:

On Board the *London* in the Downs.
1665, February 1st.

If we shall bear up, putting abroad the standard on the ancient staff, every ship of this squadron is to draw up abreast with the flag on her side in such berth as opportunity shall present most convenient, but if there be time they are to sail in the foresaid posture.

The "foresaid posture" evidently refers to a previously ordered position of each ship in battle formation.

If the Admiral put up a jack flag on the flag staff on the mizzentopmast head and fire a gun then the outwardmost ship on the starboard side is to clap upon a wind with his starboard tacks aboard, and all the squadron as they lie above or as they have ranked themselves are presently to clap upon the wind and stand after him in a line. [This is the starboard line of bearing.]

And if the Admiral makes a weft with his jack flag upon the flag staff on the mizzentopmast head and fire a gun, then the outwardmost ship on the larboard side is to clap upon a wind with his larboard tacks aboard and all the squadron as they have ranked themselves are presently to clap upon a wind and stand after him in line. [This is the port line of bearing.]

It seems that the Admiral might have made a more distinctive difference between the signals. He displays the same flag in the same place for two different maneuvers, the only difference between the signals being that in one case the flag flies free, and in the other is partly rolled up.

These orders were to ships above the fifth rate (30 guns). Fifth and sixth rates were to keep abeam of the admiral on the side away from the enemy, and watch for signals.

The English, through Sandwich's orders, had now added to their Fighting Instructions two new formations:

(1) Column with each ship in a previously assigned position; (2) column in each of the two close-hauled lines, port and starboard. No doubt it had already been learned that ships could be more easily

kept in position close-hauled, than with wind abaft the beam, and moreover, sailing close-hauled was necessary to keep, or gain, advantage of the wind.

The navy which had desired the Duke of York for its Lord High Admiral when he was but 5 years old, now achieved its desire. The Duke, then 26 years of age, was a passenger to England with his brother Charles, in Sandwich's squadron in 1659. After the Restoration, he was made Lord High Admiral and Warden of the Cinque Ports. He took personal command of the British fleet after the declaration of war in 1665.

In consequence of false intelligence concerning the Dutch movements, the fleet put to sea while still short of stores, provisions, and men. The Duke arrived off the Texel on April 24, 1665, where he was joined by Sandwich. The junction brought his fleet to 109 men-of-war and frigates, with 28 fireships and bomb ketches, manned by 21,000 men (seamen, marines, and soldiers).

The Duke's flag was on the *Royal Charles* (80). Penn was with him as "Great Captain Commander" (chief of staff). Penn was then 44 years of age, 12 years older than the Lord High Admiral. Though far from being highly esteemed personally, he was the most distinguished and experienced living British naval officer.

Prince Rupert, restored to favor under monarchy, had a command in the fleet with the rank of admiral.

There were three vice and three rear admirals, which indicates the old division into three squadrons, with three divisions in each squadron, or nine major sub-divisions. In a fleet of 109 men-of-war this was not enough, and no doubt there were other minor sub-divisions, including the frigates, fireships, ketches, etc.

The Dutch, on their part, had assembled a fleet of 103 men-of-war, 7 yachts and despatch vessels, 11 fireships, and 12 galliots. (A galliot was not dissimilar to a bomb ketch.) In ordnance they outnumbered the British, mounting in all 4,869 guns, as compared with 4,192 in the British fleet. The personnel of the two fleets was not widely different, the greater number being on the side of the Dutch.

According to Clowes, there was a difference in the organizations. The Dutch fleet was divided into seven squadrons of nearly equal strength, each made up of three divisions. Each squadron commander had under him two junior flag officers—or captains acting as such—so that there were 21 senior officers' flags flying in the Dutch fleet, as compared with 9 in the British fleet.

The Dutch commander-in-chief was Jacob Van Wassenaer, Lord of Obdam, in the *Endracht* (76). There were two lieutenant admirals and three vice admirals, among whom appear two Evertsens; one Jan, as lieutenant admiral, and the other Cornelis, as vice admiral. The former has already been mentioned as serving in the First Dutch War. Another vice admiral was Cornelis Tromp, son of Admiral Martin Tromp, who was killed at the battle of Scheveningen.

On April 10, before sailing for the Dutch coast, the Duke of York as Commander-in-Chief and Lord High Admiral gave his fleet a new set of Fighting Instructions. The preface read:

> James, Duke of York and Albany, Earl of Ulster, Lord High Admiral of England and Ireland etc., Constable of Dover Castle, Lord Warden of the Cinque Ports and Governor of Portsmouth.
>
> Instructions for the better ordering His Majesty's fleet in time of fighting.

Corbett says of these Instructions that they are but a slight modification of those issued in March, 1654, with a few—but not unimportant—additions. We know that the Instructions of 1654 were practically the same as those of March, 1653, signed by Blake, Deane, and Monck.

Corbett does not give special credit to Penn for the Instructions of either 1653 or 1654, but he certainly drew up those issued by the Duke of York and it was only natural that he should repeat earlier Instructions of which he was, in great part, the originator, making merely such changes as subsequent experience suggested.

The Instructions were in two parts. The first contained 16 Articles; the second, 10. The latter was issued the same day, or later in the same month. On April 27 a supplementary order was sent out containing the signal which would be hoisted by the Admiral when he wished all ships to take up a previously described battle order (battalia) and to this were added signals for making sail and for chasing.

The most important of the new Instructions were:

> 2. On sighting an enemy fleet "the vice-admiral, or he that commands in chief, in the second place and his squadron, and the rear-admiral, or he that commands in chief in the third place and his squadron are to make what sail they can to come up and put themselves into the place and order which shall have been directed them before in the order of battle.
>
> 3. As soon as they shall see the admiral engage or shall make a signal by shooting off two guns and putting a red flag on the fore topmast head, that then each squadron shall take the best advantage they can to engage with the enemy according to the order prescribed.
>
> 7. If the admiral should have the wind of the enemy and that other ships of the fleet are in the wind of the admiral, then upon hoisting up a blue flag at the

mizen yard or mizen topmast, every such ship is then to bear up into his wake or grain upon pain of severe punishment. If the admiral be to leeward of the enemy, and his fleet or any part thereof to leeward of him, to the end such ship may come up into a line with the admiral, if he shall put abroad a flag as before and bear up, none that are to leeward are to bear up, but to keep his or their ship or ships luff, thereby to gain his wake or grain.

. . . . .

9. If we put a red flag on the mizen shrouds or the mizen yard-arm, we would have all the flagships to come up in the wake or grain of us.

. . . . .

13. That the fireships in every squadron endeavour to keep the wind, and they, with the small frigates, to be as near the great ships as they can, to attend the signal from the admiral and to act accordingly. If the admiral hoist up a white flag at the mizen yard-arm or topmast-head all the small frigates of his squadron are to come under his stern for orders.

. . . . .

15. If, the fleet going before the wind, the admiral would have the vice-admiral and the ships of the starboard quarter to clap by the wind and come to their starboard tack. then he will hoist upon the mizen topmast-head a red flag, and in case he would have the rear-admiral and the ships on the larboard quarter to come to their larboard tack then he will hoist up a blue flag in the same place

16. That the commander of any of his majesty's ships suffer not his guns to be fired until the ship be within distance to (do) good execution; the contrary to be examined and severely punished by the court-martial. (The principle of this order dates from Raleigh's time.)

Additional Instructions for Fighting

1. In all cases of fight with the enemy the commanders of his majesty's ships are to endeavour to keep the fleet in one line, and as much as may be to preserve the order of battle which shall have been directed before the time of fight.

2. If the enemy stay to fight us, we having the wind, the headmost squadron of his majesty's fleets shall steer for the headmost of the enemy's ships.

3. If the enemy have the wind of us and come to fight us, the commanders of his majesty's fleet shall endeavor to put themselves in one line close upon a wind.

4. In the time of fight in reasonable weather, the commanders of his majesty's fleet shall endeavour to keep about the distance of half a cable's length one from the other, but so as that, according to the discretion of the commanders they vary that distance according as the weather shall be, and the occasion of succouring our own or assaulting the enemy's ships shall require.

5. The flag officers shall place themselves according to such order of battle as shall be given.

. . . . .

8. In case it shall please God that any of his majesty's ships be lamed in fight, not being in probability of sinking nor encompassed by the enemy, the following ships shall not stay under pretence of securing them, but shall follow their leaders and endeavor to do what service they can upon the enemy, leaving the security of the lame ships to the sternmost of our ships being (assured) that nothing but beating the body of the enemy's fleet can effectually secure the lame ships. This article is to be observed notwithstanding any seeming contradiction in the fourth of fifth articles of the (fighting) instructions formerly given.

The articles referred to directed that if a squadron was "overcharged or distressed" the next squadron should proceed to its relief, and that if a ship were disabled "those next to him are strictly required to relieve him."

The problem of how best to relieve lame ships has never been satisfactorily solved. At this period, ships under fighting sail moved very slowly. Disabled ships were generally close by. Steam and present battle speeds have changed this. Perhaps there is no better general solution than that given by the Duke—"Nothing but beating the body of the enemy's fleet can effectually secure the lamed ships."

While the Duke presented a half-cable (120 yards or about three ship's lengths) as standard distance, he foresaw that it might not be practicable to keep it.

The Duke's "Fighting and Chasing Instructions," the important parts of which have been quoted, were found in Sir Edward Spragge's *Sea Book,* among a collection of naval manuscripts belonging to Spragge's cousin, the Earl of Dartmouth. The existence of this collection was unknown until 1900, when it was placed at the disposal of the British Navy Records Society.

When the Duke sailed for the Texel, on April 21, 1665, it was with the object of capturing Dutch merchantmen, as well as engaging their fleet, were it abroad. The Dutch were not at sea and he met with no great success against merchant shipping. His fleet suffered from bad weather, and he returned to anchorages off Harwich and the mouth of the Thames, to re-fit and re-provision.

The Dutch did not come out until about the middle of May, and then captured a large number of British merchantmen, laden with marine stores of great value to the English, as well as to their captors. This loss was very keenly felt.

Learning that the Dutch were out, the Duke again hurried to sea, seeking battle. Obdam desired to avoid a general engagement until his fleet was better drilled, but he received orders from his government to keep close to the English coast, and to find and engage the foe. Obeying these orders, he came in sight of the English fleet, on June 1, at anchor in Southwold Bay (No. 12, Chart II).

The action which followed is usually called the Battle of Lowestoft.

On sighting the Dutch, the Duke immediately got under way and the two fleets maneuvered for 48 hours to gain positions of advantage. A shift of wind, on the morning of June 3, gave the English the weather gauge.

Prince Rupert was then in the van, the Duke in the center, and the Earl of Sandwich in the rear.

The battle began at 3:30 A.M. on June 3. According to Clowes, the two fleets were on opposite tacks and passed each other in column, though some accounts declare that they passed through one another. After passing, the Dutch seem to have countermarched by tacking or wearing in succession, but the English tacked or wore together. Thus the Dutch fleet on the new tack retained its original formation, while the English formation was reversed. They passed again at one P.M., the Dutch trying to gain the weather gauge, but in vain. "Sandwich's squadron (now in the English van) found itself mixed up with the Dutch center and either by accident or by design broke through it, so cutting the enemy's fleet into two parts. . . . English accounts admit that by that time, owing to the smoke, there was great confusion, and that friendly vessels narrowly escaped firing into one another. . . . Order on both sides almost ceased to exist and the action degenerated into a gigantic mêlée."

Obdam, in his flagship the *Endracht* (76), found himself close to the Duke of York in the *Royal Charles,* and the two Commanders-in-Chief promptly and hotly engaged one another.

The Dutch made an unsuccessful attempt to board, at the same time damaging the *Charles* with their guns. Three of the British nobles in the Duke's suite were killed at his side by a single chain shot, and the Duke himself was slightly injured by a splinter from the skull of one of the officers killed. The *Charles* was on the point of having to surrender or be sunk, when the Dutch flagship blew up, with the loss of all but 5 of her officers and crew of over 400.

Jan Evertsen assumed command, but Tromp, not knowing Evertsen's whereabouts, took charge of that part of the Dutch fleet in his immediate vicinity. Disorganized by the loss of their Commander-in-Chief, the Dutch made for their own coast, Evertsen taking the ships that were with him into the Maas. Tromp with the remainder sailed into the Texel.

The battle of Lowestoft is the first great sea engagement, in which both fleets were, at the beginning, disposed in a formation previously described in detail, and, as far as can be determined, fought in formation for some time before the mêlée commenced. Also, before the action, they had maneuvered for position during two entire days. But it must be further remarked that, in the end, chance determined the result.

Up to this time, too much stress had been laid upon succoring flag,

and other ships in distress. Articles 4, 5, and 6 of the Duke's Instructions directed how assistance should be rendered: to a squadron by the squadron next to it; to a ship, by the ship, or ships, adjacent to it; in response, in both cases, to a signal from the squadron or ship in distress. If the commander-in-chief, or any flagship, should have to bear away "to stop or mend what else is amiss" or should make the proper signal, Article 6 required that the ships of that squadron, or the fleet, in the case of the admiral "are to endeavour to get up as close in a line between him and the enemy as they can. . . ."

These instructions were mandatory; to be obeyed regardless of the state of the action. Their defect was partially remedied, however, by Article 8 of the Additional Instruction which has been quoted in full, and which recognized "that nothing but beating the body of the enemy can effectually secure the lame ships."

But the requirements of Article 6, dealing with the subject of flagships in distress, were still in force.

Although the Dutch losses greatly exceeded those of the British, the Duke was criticized for not having pursued the enemy more vigorously. He and Prince Rupert hauled down their flags for a time, leaving Sandwich in chief command, with Penn as chief of staff.

On the Dutch side, De Ruyter, who was on his way home from America, replaced Obdam.

Sandwich put to sea from Southwold Bay, on July 5, with the object of intercepting De Ruyter and also for the purpose of capturing Dutch merchant ships. He failed to achieve his first purpose and was only moderately successful in his second. No other important actions took place during 1665.

France came into the war at the beginning of 1666 as an ally of the Dutch. The British fleet was re-organized and placed under the joint command of Prince Rupert and Monck—now Duke of Albemarle. Sandwich was given other employment. The Duke of York, still Lord High Admiral, remained on shore. Penn refused to serve under Monck, but retained his position as one of the Commissioners of the Navy.

The English fleet of 1666 was smaller in numbers than that of the year before. The heavier average tonnage of the 80 ships that composed it is shown by the facts that it mounted more guns and was manned by about the same number of officers and men as the fleet of 109 at the battle of Lowestoft. The 85 ships of the Dutch fleet of 1666 mounted 300 fewer guns than their fleet of 103 ships of the previous

year. The British had two ships carrying more than 90 guns. The Dutch had none above 90, but in ships above 60 guns they outnumbered the British in the ratio of 34 to 25.

Both fleets were ready by the end of May, 1666. France, at that time an ally of the Dutch, had a fleet of 36 vessels, under the Duc de Beaufort, en route from the Mediterranean to the Channel to join them. Under these circumstances, the British made the great mistake of dividing their fleet, with the hope of defeating the French before they could unite with the Dutch.

Prince Rupert, with about one-third of the fleet, was sent to intercept the Duc de Beaufort off the Isle of Wight. It was intended that he should be re-enforced there by 10 ships from Plymouth.

Mahan refers to this division of the English fleet as a very unwise move because it exposed each division to be beaten separately. Even though Rupert with his re-enforcements might meet Beaufort on equal terms, Monck was decidedly inferior to De Ruyter.

After Rupert sailed, Monck remained at anchor in the Downs, De Ruyter left port and anchored in thick weather at a point midway between Dunkirk and the Downs. The weather having cleared, the two fleets sighted each other about nine o'clock, on the morning of June 1.

Corbett says of Monck and Rupert:

> They had the reputation of being two of the hardest fighters alive, and both were convinced of their power of sweeping the Dutch from the sea by sheer hard hitting, a belief which so far as Monck was concerned, the country enthusiastically shared.

When the two fleets sighted each other, the Dutch were at anchor. Monck was either under way or about to get under way. The wind was southwest and the sea too rough to permit either fleet to use its lower tiers to leeward.

As the Dutch fleet lay at anchor, its rear was to windward of the center and van and nearest to the English. Monck saw an opportunity to attack to advantage before the Dutch could get up their anchors and form. He stood down in column to attack the enemy's rear, but was unable to keep more than 35 of his ships in formation. The remaining 20 straggled (No. 13, Chart II).

The Dutch cut their cables and made sail on the starboard tack with the English, both standing towards the French coast. The Dutch van and center were so far to leeward that they were out of the action till nearly noon, when Monck went about.

With both fleets on the port tack—the English to windward—what had been the English rear became its van, and this assisted in bringing the Dutch center—and probably the rear—into action.

What followed this, the first of the so-called Four Days Battle, was more a series of individual actions than a fleet action. Fireships were used on both sides with some success. Both De Ruyter and Cornelis Tromp had to shift their flags. Evertsen was killed. Being to leeward,

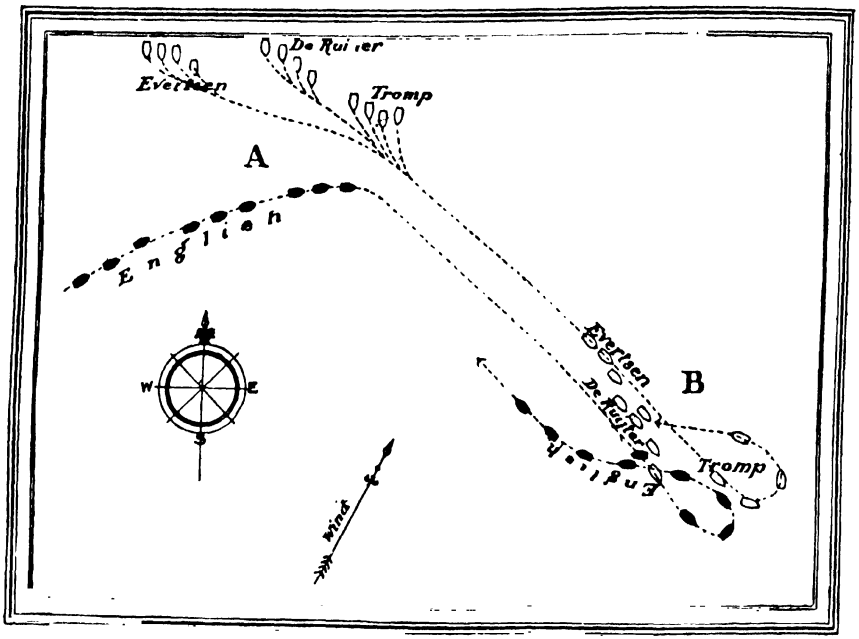


FIG. 25.—The Four Days Fight, 1666. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

the Dutch could use all their heavy guns and did great damage to the English. A number of ships on both sides were sunk or blown up and several captains killed.

Admiral Berkeley's flagship and two other English vessels with him were attacked by an overpowering Dutch force. The admiral and most of his crew were killed and all three ships captured.

The battle continued until about 10 P.M., when Monck is said to have anchored and then to have got underway again as the Dutch approached. At the end of the action the British were to the westward of the Dutch. Both fleets spent the night and—due to a calm—part

of the next morning in repairing damages, resuming the engagement about noon, with the Dutch to windward, although the British soon regained the weather gauge.

The first attack of the day was made by the two fleets passing each other on opposite tacks. Tromp tacked with part of the Dutch fleet and gained the weather gauge of the English, but this divided the Dutch.

The battle, during the rest of the day, was mainly conducted on opposite tacks, with consequent lulls, as the fleets—or parts of the fleets—went about and re-formed, to again pass each other.

The day ended with the British in retreat to the northwest, and the Dutch pursuing, but the British, with their smaller fleet, had inflicted approximately the same amount of damage as had their enemies.

Some writers treat these fiercely fought battles as squadron engagements, designating the different squadrons by the first letters of their colors. Their descriptions lead to the belief that the individual ships in each squadron of both fleets endeavored to follow more closely the elder Tromp's orders to keep near their admiral, than to preserve any definite formation as prescribed in the English fighting instructions.

The very slow rate of transfer (speed) is evident when we read of accounts of admirals being called to the flagships of their seniors for conference during the action.

Corbett says that Monck, to cover his disabled ships on the night of the second day's battle, formed the others "in a line a-breadth," and that this formation was the result of a council of flag officers. It was called a "rear line of battle" and is the first known use of the term, "line abreast."

A published account says, "By 3 or 4 in the morning, a small breeze sprang up at N.E. and at a council of flag officers, his grace the lord general resolved to draw the fleet into 'rear line of battle' and make a fair retreat of it."

The third day, with an easterly wind, Monck continued his retreat to the westward to endeavor to join Prince Rupert. Admiral Ayscue's flagship, the *Royal Prince* (64), rebuilt in 1641 and mounting ninety guns, grounded on the Galloper shoal, where, being attacked by the enemy and two fireships, she was forced to surrender.

On the afternoon of this day, Rupert and Monck joined forces, having with them a total of 60 ships. The Dutch still numbered about 78.

On the morning of the fourth day, with a fresh southwest wind, both fleets on a port tack, the English to leeward, action began and continued for two hours, many English ships getting through the Dutch

line to windward and producing much confusion, but the majority of the Dutch fleet with the Commander-in-Chief was to windward and the majority of the English fleet, with Monck, to leeward.

De Ruyter finally charged the English center, in what Clowes says was probably a very irregular line. After the charge, the British were to windward, although much damaged. The wind had strengthened to almost a gale and the battle was over.

The British lost 5,000 killed and wounded and about 3,000 prisoners, two flag officers, a number of captains, and 20 or more ships. The Dutch loss was supposed to have been six or seven vessels sunk or burned and about 2,000 men killed or wounded.

They had hoped to effect a landing on the English coast, but, though victorious at sea, had failed in their plan.

There was considerable discontent in England with Monck, but he had influence enough to prevent any official action being taken against him. When the Duke of York hauled down his flag Penn had served for a short time as Admiral of the White under the Earl of Sandwich as Commander-in-Chief, but when it was decided to displace Sandwich and give the joint command to Rupert and Monck for the next expedition, Penn's biographer says that seeing the fleet

> thus irrevocably condemned, for the ensuing campaign, to the chief command of those two discordant and mutually jealous land-admirals; of whose fundamental defect of naval skill, their reckless imprudence, and also their personal hostility towards himself, Sir William Penn had certain assurance, he was extremely averse to hazard his long and well established professional reputation, by acting under them; and the King and Duke [of York], candidly sensible of the validity of his objection, were graciously pleased to dispense with his serving in the expedition then preparing.

Of Monck it was said, "he was as impatient upon the sight of an enemy to engage with him, as Prince Rupert himself, and had a natural contempt of the Dutch; and truly, in all consultations with his flag-officers whoever proposed any wary advice, ran great hazard of being reputed a coward." Penn's biographer says, "He [Monck] held in supreme contempt the recent improvement in naval operations, by which a fleet was brought to act together as one body; and, with the most obstinate pertinacity adhered to the promiscuous fighting of a former age."

On June 10, following The Four Days Battle, Pepys records in his celebrated *Diary:*

> I met with Pierce, the surgeon, who is lately come from the fleet and he tells me, that all the commanders, officers, and even the common seamen, do condemn

every part of the late conduct of the Duke of Albemarle; both in his fighting at all, running among them in his retreat, and running the ships aground; so as nothing could be worse spoken of. He says, however, that the Duke of A. is as high as ever, and pleases himself to think he has given the Dutch their bellies' full, without sense of what he hath lost us; and talks how he knows now the way to beat them. But he says, that even Smith, himself, one of his creatures, did himself condemn the late conduct from the beginning to the end.

Penn's biographer states that in the meantime, Sir William Penn was making extraordinary exertions to repair the fleet and get it ready for sea that its commander might as speedily as possible have the opportunity to redeem his own reputation and that of the country which he had so recklessly sacrificed.

On July 1, 1666, Pepys writes,

Comes Sir William Penn to town, which I little expected. . . . And though I do not love him, yet I find it necessary to keep in with him: His good service at Sheerness, in getting out the fleet, being taken much notice of, and reported to the King and Duke, even from the Prince (Rupert) and Duke of Albemarle (Monck) themselves . . . therefore I think it discretion, great and necessary discretion, to keep in with him.

On the 4th he wrote,

In the evening Sir William Penn came to me and talked of the late fight. I find him very plain that the whole conduct of the late fight was ill; that two-thirds of the commanders of the whole fleet have told him so: they all saying, that they durst not oppose it at the council of war, for fear of being called *cowards,* though it was wholly against their judgment to fight that day, with the disproportion of force; . . . Besides, we might very well have staid in the Downs, or any where else, till the prince [Rupert] could have come up to them. . . .

He says, three things must be remedied, or else we shall be undone by this fleet. 1. That we must fight in a line, whereas we fought promiscuously, to our utter and demonstrable ruin: *the Dutch fight otherwise, and we whenever we beat them.* 2. We must not desert ships of our own in distress, as we did; for that makes a captain desperate, and he will fling away his ship, when there are no hopes left him of succour. 3. That ships, when they are a little shattered, must not take the liberty to come in of themselves, but refit themselves the best they can, and stay out; many of our ships coming in with very small disablenesses.

He told me, that our *very commanders, nay, our very flag-officers,* do *stand* in need of *exercising among themselves, and discoursing* the *business* of *commanding* a fleet: he telling me, that even one of the flag-men in the fleet did not know which tack lost the wind, or kept it, in the last engagement. He says, it was pure dismaying and fear that made them all run upon the Galloper, not having their wits about them; and that it was a miracle they were not all lost. He much inveighs upon my discoursing of Sir John Lawson's saying heretofore that *sixty* sail would do as much as *one hundred;* and says that he was a man of no counsel at all; but had got the confidence to say as the gallants did, and did propose to himself to make himself great by them, and saying as they did; but was no man of judgment in his business and hath been out in the greatest points that have come before them. And then in the business of forecastles, which he did oppose, all the world sees now

the use of them, for shelter of men. He did talk very rationally to me, insomuch that I took more pleasure this night in hearing him discourse, than I ever did in my life in anything that he said.

While Pepys was writing in his *Diary,* the refitting of the British fleet continued and also that of the Dutch, and by the evening of July 22, both fleets were again at sea.

Colomb writes that after the Four Days Battle "each fleet returned to its own harbors. Ours was in a terrible plight." He quotes another author as saying,

The sad spectacle, more than half that bulwark of the kingdom miserably shattered; hardly a vessel entire, but appearing so many wrecks and hulls, so cruelly had the Dutch mangled us.

The celerity with which the British re-fitted and took the sea again was remarkable. The Dutch had hurried the re-fitting of their own fleet in order to convoy transports with troops for an invasion of England. When they appeared at the mouth of the Thames their discomfiture was great to find a new English fleet lying at the Nore.

These ships were the repaired and re-fitted remains of the beaten fleet, with additions, all collected and approaching completion by the great exertions of Sir William Penn, now one of the Commissioners of the Navy.

Reference has been made to "Spragge's *Sea Book.*" He was a captain when he commenced it. At the battle of Lowestoft he commanded the *Lion* (52) in the White (Prince Rupert's) squadron. He also commanded a ship of the Prince's squadron in 1666, when the latter was despatched to intercept the Duc de Beaufort. He seems to have been a favorite of Rupert's, possibly because he was as headstrong and intrepid a fighter as that Prince himself. He was raised to the rank of vice admiral of the Blue and knighted on the last day of the Battle of June 1-4, in place of Admiral Berkeley, killed in the first day's action.

Pepys says that Spragge's desire to get away with his chief, on a separate command, influenced the division of the fleet, and it may be that Spragge also influenced, or helped to draw up, three Additional Fighting Instructions found in his book, and apparently issued by Rupert before he rejoined Monck, and which may, or may not, have been enjoined on the entire British fleet in the next battle. These instructions read:

1st. In case of an engagement the commander of every ship is to have a special regard to the common good, and if any flagship shall, by any accident whatsoever, stay behind or (be) likely to lose company, or be out of his place, then all and every

ship or ships belonging to such flag is to make all the way possible to keep up with the admiral of the fleet and to endeavor the utmost that may be the destruction of the enemy, which is always to be made the chiefest care.

This instruction is strictly to be observed, notwithstanding the seventeenth article in the Fighting Instructions formerly given out.

2ndly. When the admiral of the fleet makes a weft with his flag, the rest of the flag officers are to do the like, and then all the best sailing ships are to make what way they can to engage the enemy, that so the rear of our fleet may the better come up; and so soon as the enemy makes a stand then they are to endeavour to fall into the best order they can.

3rdly. If any flagship shall be so disabled as not to be fit for service, the flag officer or commander of that ship shall remove himself into any other ship of his division at his discretion, and shall there command and wear the flag as he did in his own.

Rupert.

For Sir Edward Spragge, Knt., vice-admiral of the blue squadron.

Article 17 of the regular Instructions, referred to in Rupert's 1st Additional Instruction, is Article 1 of the Duke's Additional Instructions of the preceding year, and directs captains of ships to keep in one column and preserve the order of battle prescribed before the fight. Rupert's instruction directs that they shall do their utmost to keep up with the admiral of the fleet and to destroy the enemy, "which is always to be the chiefest care."

The Duke's 8th Additional Instruction also recognized that destruction of the enemy should always be borne in mind, rather than the succor of one's own ships, except flagships. "Nothing but beating the body of the enemy's fleet can effectually secure the lame ships." Rupert stated the same truth more emphatically.

Corbett is enthusiastic over Rupert's injunction. He says:

> Both Monck and Rupert must therefore receive the credit of foreseeing the danger that lay in the new system [of fighting the fleet in column], the danger of tactical pedantry that was destined to hamper the action of our fleets for the next half century, and of being the first to declare, long before Anson or Hawke, and longer still before Nelson, that line or no line, signals or no signals, 'the destruction of the enemy is always to be made the chiefest care.'

Corbett does not take cognizance of the fact that maintaining formation and destroying the enemy are not incompatible requirements. If Rupert's maxim were the sole guide, every captain would be the judge of his own movements. Rupert, himself, in his 2nd Instruction, says when the best sailing ships are signalled to overtake an enemy, and the latter makes a stand, "then they are to endeavour to fall into the best *order* they can."

The Duke's injunction, "to endeavour to keep the fleet in one line,"

would have been better phrased, if he had used the words "each squadron," instead of "fleet." A squadron of a fleet during the Dutch Wars numbered from 20 to 35 ships, enough to maintain in one column. To keep a fleet of 80 to 100 ships in one column was impracticable. As a matter of fact, all descriptions of the great battles of all three of the Dutch wars agree that they were fought by squadrons on both sides.

Order, as an essential pre-requisite for doing the most damage to the enemy, had been rightly stressed from the days of Lord Lisle, in 1545. And Queen Mary, in 1558, had put Rupert's maxim in a sentence, whose essence was for centuries the motto of English captains. Her Fighting Instructions direct "every man to choose his match as nigh as he can, and to have regard that succours may be given as occasion serves."

Lord Lisle, in his Fighting Instructions, relative to squadrons keeping in one line (British line abreast), says:

> It is to be considered that the ranks must keep such order in sailing that none impeach another. Wherefore it is requisite that every of the said ranks keep right way with another, and take such regard to the observing of the same that no ship pass his fellows forward, nor backward nor slack anything, but (keep) as they were in one line, and that there may be half a cable length between every of the ships.

The re-fitted English fleet comprised 81 sail, with 18 fireships, as against De Ruyter's 88 sail, 10 yachts, and 20 fireships.

De Ruyter's squadron commanders were Jan Evertsen and Cornelis Tromp. The English were under the joint command of Monck and Prince Rupert, both flying their flags in the *Royal Charles.*

The Duke of York still carried the title of High Admiral of England and Ireland, and when the fleet sailed he gave Penn orders to embark on the King's yacht *Henrietta* to inspect ships left behind in the Thames, Harwich, or any other place, to the end that they might be fitted out and despatched as quickly as possible to join the fleet. He was empowered to inspect also any ships returned from the fleet, and if he found they returned without just cause, or their captains had otherwise misbehaved themselves, he was to commission new officers in their places as he saw fit, and return all such ships to the fleet with such instructions as he considered desirable. All ships and yachts in port were placed under his orders, and his powers were to continue as long as the fleet remained at sea.

Pepys says that the fleet was considered to be "much the best fleet for force of guns, greatness and number of ships and men, that ever

England did see, . . ." and that the *Loyal London* had a crew of about 800 men and was the best ship in the world.

Both Monck and De Ruyter had put to sea as soon as conditions would permit and were apparently in sight of each other on July 23, but unable to engage on account of calms. The following day, after a night of strong winds, the Dutch were to windward, and the English spent the day endeavoring to weather them, both fleets maneuvering off the mouth of the Thames, the Dutch being to the northeastward. The British fleet, being in shore, anchored for the night, weighed in the morning, and approached the Dutch. Clowes says particulars of the manner of approach are few and conflicting. The English seem to have been in column, close-hauled, or nearly close-hauled, on the port tack, heading about east. The Dutch came to the attack in line, or line of bearing, with the wind on their port quarters, Evertsen leading. The Dutch formation was said to have been bowed into the shape of a half moon, with the ships crowded in the van and center, and straggling in the rear. De Ruyter commanded the center, and Tromp the rear.

Clowes says,

> On the other hand it is probable the English line (column) was as regular as a line of such length, five or six miles at least, could be. The regularity of the English line during that war often extorted the admiration of foreign and even of hostile critics.

The action began about 10 A.M., when the two vans arrived within gun shot of each other. One, or both, must have then changed course, since the accounts are that they steered parallel courses on the port tack, the Dutch being to windward. The statement was also made that the wind had veered to the northwest, which indicates, unless a decided change of course had been made, that both were running free, with the reduced sail used in action (No. 14, Chart II).

Tromp, in the Dutch rear, put his helm up and broke through just ahead of the English rear. This took place about two hours after the beginning of the action, during the last hour of which the wind had shifted to north.

Clowes says that De Ruyter was mystified by Tromp's maneuver, and that Tromp and Smith (commander of the English rear), engaged in a more or less confused mêlée, eventually went away on a starboard tack, and were lost to sight in the direction of the English coast, while the two vans and centers, broadside to broadside, headed nearly due east.

The English van showed its superiority in fighting over the Dutch

van, and by one o'clock, after three of the Dutch flag officers, including Evertsen, had been killed, the remaining Dutch ships fled.

De Ruyter, himself, commanding the Dutch center, fought until four o'clock on almost even terms. His own and the English center were badly injured and both seem to have drifted before the wind, trying to re-form and continue the action. However, when the British resumed the fight, De Ruyter began to retreat.

His retreat was continued through the night, but the hours of darkness at that season being few, the battle also continued and was resumed with greater vigor on the following morning.

The wind, in the meantime, shifted to the northeast and the two fleets being close to the Dutch coast, the British gave over the pursuit.

Tromp's actions against the British rear were apparently successful during the 25th, but the British gained the wind on the 26th, and Tromp having learned that the remainder of the Dutch fleet had been defeated, refused action and escaped into Dutch ports. The entire British fleet anchored off the Dutch coast.

The result of this action was the reverse of that of June 1 to 4. It is known as the Second Battle of the North Foreland. The Dutch lost about 20 ships, 4,000 killed, and 3,000 wounded, among them four flag officers and numerous captains. The British lost but one man-of-war, several fireships, and a relatively small number of men, no flag officers and few captains.

Tromp was dismissed for conducting an independent action and for failing to follow the lead—or the movements—of his Commander-in-Chief. De Ruyter, on the other hand, was commended both by the States-General and Louis XIV.

The British ravaged the Dutch coast and inflicted much damage ashore and afloat during the next month while the Dutch were unable to get to sea, but on August 26, when the British fleet had returned to its own coast, De Ruyter again sailed with 81 men-of-war, 13 fireships, and other craft, and by the end of the month was again off the North Foreland. He found the English anchored in Southwold Bay.

De Ruyter's intention was not to engage until he had joined up with the long delayed French squadron, which was again reported to be en route to the Channel from La Rochelle. The English, however, having a fleet of 100 ships, chased, and would have overtaken and forced a battle but for a violent storm. They returned to port and De Ruyter took his fleet into Dunkirk, and later, back to the Dutch

coast. The French failed to join, although de Beaufort had collected a fleet of 42 vessels with 15 fireships.

With both English and Dutch fleets in their own ports, overtures for peace were made. The English, in the meantime, because of financial embarrassment, laid up many of their men-of-war and devoted their efforts to preying on Dutch commerce with small squadrons. The Dutch apparently maintained themselves in readiness both to protect their merchant ships and to attack the English when opportunity offered.

In April, 1667, a small Dutch fleet of about 20 ships, with four fireships and some ketches, was sent to sea to convoy 150 merchantmen. This fleet, after seeing the convoy safely away, entered the Firth of Forth and attempted to burn the shipping at Leith. Some prizes were taken.

Meanwhile the Dutch were planning what Allen terms a treacherous proceeding; that is, collecting a fleet when the English monarch had been led to believe that nothing was to be feared.

De Ruyter sailed from the Texel for the Thames, on June 4, with 64 ships of the line and frigates, 7 armed yachts, 15 fireships and 13 galliots, mounting 3,330 guns and manned by 17,416 officers and men.

His plan was to take the main body of his fleet into the mouth of the Thames, send a squadron up the river to do what damage it could to property and shipping, and to seize Sheerness.

This squadron was a strong one, composed of 2 ships of 60 guns, 6 of 50, 4 of 40 to 45, 5 of 32 to 36, with 5 of the yachts, most of the fireships and all of the galliots. It was commanded by Lieutenant Admiral van Ghent, a colonel of marines, who had replaced Tromp when he was dismissed. His appointment was political. The vice admiral and rear admiral of his squadron were both seamen of experience.

News of what the Dutch were planning must have reached England for, as early as March 6, according to Pepys' *Diary* of that day, the possibility of an invasion had occupied the minds of the English.

> . . . great preparations therefore, are to fortify Sheerness and the Yard at Portsmouth and force their throwing down both of those places and elsewhere by the seaside so that we have some fear of an invasion and the Duke of York (still Lord High Admiral), did himself declare his expectation of the enemy's blocking us up here in the river and therefore directed that we should send away all the ships that we have to fit out, hence.

On the 23d, he says,

> . . . Sir W. Penn came, being returned from Chatham from considering the means of fortifying the river Medway by a chain at the Stakes and ships laid

there with guns to keep the enemy from coming up to burn our ships, all our care being now to fortify ourselves against their invading us.

Pepys was secretary to the Admiralty and in position to know nearly everything that occurred. Three days previously, Penn and Spragge, both admirals and seamen, had held a consultation at Sheerness, with 14 other British officials, to concert action for its security. The record of this conference is in Penn's handwriting. It provided for Sir Edward Spragge to be in command afloat, for fireships, ketches, grapnels, and chains or batteries on shore and men to man them.

Charles II himself and the Duke of York participated in a conference on March 24. Arrangements were made in connection with fortifying Harwich and Portsmouth, as well as the Medway, and Thames, and to keep the news from the Dutch.

In the meantime the British treated for peace to escape the threatened invasion.

Many of the best English men-of-war, including the *Royal Charles,* were lying in the Medway.

The Dutch did not accomplish much on the 11th. On the 12th, De Ruyter arrived in person. Having with their fireships got by the obstruction offered by seven sunken ships placed by Monck as a protection below the chain, the Dutch not only succeeded in breaking it, but captured a British man-of-war which lay above it and turned her guns against Monck's land batteries that he had established to guard the passage.

The *Royal Charles* was captured. The Dutch flag was hoisted on her at once, and from her decks Van Ghent directed operations during the rest of the day.

Below Chatham, that day, quoting from Clowes, "The river was full of moving craft and burning wreckage. The roar of guns was almost continuous. The shrieks of the wounded could be heard even above the noise of battle, clangour of trumpets and roll of drums and the cheers of the Dutch, as success after success was won. The following day the Dutch penetrated to higher reaches and set fire to the *Royal Oak* (74), the *Loyal London* (96), and the *Old James*. This was done after a hard struggle. All their fireships had been used up and expended except two."

On the 14th, De Ruyter retired, carrying off with him the *Royal Charles* (100) and the *Unity,* a much smaller vessel.

The total Dutch loss did not exceed 150 men. The entire Dutch fleet assembled in the mouth of the Medway, where it was re-enforced

by sufficient men-of-war and fireships to bring the total strength of fighting ships up to 84.

De Ruyter despatched three squadrons, two to cruise on the British coast to do such damage as might be possible, the third to convoy Dutch East Indiamen to Dutch ports, although it does not appear that any English force of importance, other than privateers, was at sea.

Although De Ruyter soon withdrew to the mouth of the Thames to prevent possible injury by enemy fireships, London was practically blockaded.

The French were still the nominal allies of the Dutch, but they did not participate in this attack or offer assistance elsewhere.

On July 1, Harwich was attacked by land and sea, but the Dutch were obliged to withdraw. De Ruyter again assembled his fleet in the mouth of the Thames. He entered the English Channel and excited much alarm on the south coast of England but did not do much damage.

Monck escaped censure for his failure to be prepared against the Dutch invasion. According to Penn's biographer,

> In 1668 the King and Duke (of York), being surfeited of land admirals, were pleased to make appointment of Sir William Penn, the commander-in-chief of the fleet appointed for the summer's expedition, but Penn, being in bad health and seeing nothing to be gained, and realizing the jealousy of both Rupert and Monck—especially the latter—refused the dubious honor.

Penn died September 16, 1670, at the comparatively early age of 49 years.

One of his last official duties was as president of a court-martial at the end of 1668, ordered by the Duke of York in pursuance of a recent Act of Parliament entitled, "Act for the establishing articles and orders for the regulating and better government of His Majesty's Navy, ships of war and forces by sea." This indicates the genesis of our present "Articles for the Better Government of the Navy."

The Dutch admiral left to blockade the Thames in 1667 was Van Nes. On July 23 he attacked a small squadron which had been assembled by the British, with Spragge in command. After expending a dozen fireships, Van Nes destroyed 6 or 7 of the British squadron, but was obliged to retreat as the result of a counter-attack by Spragge on the following day. On the 26th, Spragge having been joined by 20 small vessels from Harwich which entered the Thames through shoal water, Van Nes was driven out.

The Treaty of Breda, signed July 31, ended the war. It was made between the English on one hand, and Holland, France, and Denmark

on the other. By creating dissension among the three other parties to the treaty, England lost less than she otherwise would have, changes of territory being largely confined to the West Indies and the American coast. The provinces of New York and New Jersey were confirmed to England; also the salutes to her flag in the British Seas. Louis XIV apparently proved himself false to his nominal allies, the Dutch, first, failing to assist them at sea, and second, preventing them from obtaining any real advantage from their successes.

It is said by Clowes that Louis XIV was more in sympathy with the English than with the Dutch, and that although the English people preferred the Dutch to the French, Louis bribed Charles to project another war. This was done partly with money, partly with promises of Netherlands territory, and partly with the agreement that an English officer should have chief command afloat; it was on this account that the peace of 1667 lasted less than five years.

The times of both the First and Second Dutch Wars were periods of governmental turnmoil in the countries of the two principal antagonists. In England, moreover, the Plague of London, which lasted more than a year, followed by the Great Fire of September 16, 1666, covered almost the entire period of the Second Dutch War. It might have been expected that these calamities would have paralyzed all outside effort, but the war at sea went on, though British fleets were less well equipped, manned, and provisioned than would have been the case in normal times.

In both wars, contrary to former and subsequent custom, fleets were kept manned and employed during the winter months. This seems to have been largely due to the initiative of the Dutch, who persisted in carrying the war to the enemy's coasts.

Allen comments as follows on the opening of the Third Dutch War:

> The peace with Holland continued till the year 1672, when it appearing desirable to quarrel, Sir Robert Holmes was ordered to intercept the Dutch homeward-bound Smyrna fleet, and under pretence of demanding the homage of the flag, which it was known would be resisted, to capture them.

In this war, the Dutch were attacked both by land and sea, Charles II and Louis XIV being allied against them. Mahan remarks that, contrary to their former practices, the Dutch, except at the beginning, kept their fleets on their own coast and made use of the channels and anchorages among its shoals, to wage what he called a defensive-offensive warfare against the odds of the combined French and English forces. Under De Ruyter, they attacked when the wind served them

and retreated to the shelter of their islands and shoals when it failed. He speaks of tactical combinations on De Ruyter's part, of a higher order than had been met; notes that the French were inexperienced and that the English fought with their old gallantry, but less of their old discipline, while the Dutch attacks were made with "a sustained and unanimous vigor that showed a great military advance."

Clowes says that the first object of the allies was to effect a conjunction of their fleets and utilize them for making a descent on the Dutch coast to assist the French army, which was commanded by Louis XIV in person. The Duke of York, as Lord High Admiral, was commander-in-chief at sea, with the *Prince* as his flagship. The English contingent consisted of 65 ships of the line and frigates, with 22 fireships, also ketches and small craft, manned by 23,500 officers and men, and mounting about 4,100 guns. It was organized in two squadrons, the red (center) and the blue (rear). The white squadron (the van) was made up of the French contingent. Jean d'Estrées, Vice Admiral of France, a Lieutenant General of the French army in 1668, flew his flag in the *Terrible* (70). His fleet consisted of 33 ships of the line and frigates, 8 fireships, and 4 store ships, mounting about 1,900 guns and manned by about 11,000 officers and men. This was the most formidable fleet ever yet assembled.

Against the allied fleet of 98 ships of the line, frigates, and auxiliaries, at the outbreak of the war, the Dutch fleet under De Ruyter opposed 75 ships of the line and frigates, 36 fireships, and 22 yachts and small craft. It mounted about 4,500 guns and was manned by about 20,700 officers and men. This somewhat exceeded the English fleet alone but was much inferior in ships, men, and guns to the combined fleets of France and England.

The Dutch made a great effort to fit out their fleet to strike at the English in the mouth of the Thames before the French could join, but the project failed, on account of poor naval administration beyond De Ruyter's power to overcome.

In England, according to Corbett, there was pretty clear evidence of two schools of tactical opinion, at this time, the one represented by the Duke of York and Penn,

> which inclined to formality and by pedantic insistence on well-meant principles tended inevitably to confuse the means with the end. On the other hand, we have the school of Monck and Rupert which was inclined anarchically to submit all rules to the solvent of hard fighting and to take tactical risks and unfetter individual initiative to almost any extent rather than miss a chance of overpowering the enemy by a sudden well timed blow.

Corbett goes on to say that "it would be wrong to claim that either school was right," and that only by conflict between the two schools of naval thought can the best adjusted compromise be worked out between "free initiative and concentrated order."

His own inclination appears to have been towards the dashing school of Monck and Rupert, but he states that the school of the Duke and Penn had triumphed at the close of the three great naval wars against the Dutch.

The Duke, on taking command, re-issued his "Instructions for the better ordering of His Majesty's fleet in fighting." In them, he combined all those of the Second Dutch War in one set of 26 articles. He included in these Rupert's third instruction of 1666, authorizing admirals of disabled flagships to transfer their flags to any other ship of their squadron or division.

He did not include Rupert's 1st instruction for other ships to disregard injuries to flagships, but "to keep up with the Admiral of the fleet. . . ." He retained his own 8th additional instruction of 1665, which became Article 22 in the combined Set, and which carried the injunction that beating the body of the enemy's fleet was the best way to protect "lame ships."

He also modified his orders relative to succoring disabled flagships by directing that if a flag, or any other ship, were disabled and fell out of the line, the small craft should come to its assistance and that other ships should close the line, and in case of a flagship, keep between it and the enemy, with the view of defending it should it be attacked.

As usual, before going into action, the Duke issued some supplementary instructions. These contained important new material and are therefore quoted in full. The combined Instructions of 1672 and the supplementary Articles of the same year are found in the Dartmouth Collection, already referred to, in what Corbett calls Spragge's "Second Sea Book."

THE DUKE OF YORK'S SUPPLEMENTARY ORDERS, 1672.

Further Instructions for Fighting.

1. To keep the enemy to leeward.

In case we have the wind of the enemy, and that the enemy stands towards us and we towards them, then the van of our fleet shall keep the wind, and when they are come to a convenient distance of the enemy's rear shall stay until our whole line is come up within the same distance of the enemy's van, and then our whole line is to stand along with them the same tacks on board, still keeping the enemy to leeward, and not suffering them to tack in the van, and in case the enemy tack in

the rear first, then he that leads the van of our fleet is to tack first, and the whole line is to follow, standing all along with the same tacks on board as the enemy does.

2. To divide the enemy's fleet.

In case the enemy have the wind of us and we have sea-room enough, then we are to keep the wind as close as we can lie until such time as we see an opportunity by gaining their wakes to divide their fleet; and if the van of our fleet find that they have the wake of any part of them, they are to tack and to stand in, and strive to divide the enemy's body, and that squadron which shall pass first being come to the other side is to tack again, and the middle squadron is to bear up upon that part of the enemy so divided which the last is to second, either by bearing down to the enemy or by endeavouring to keep off those that are to windward, as shall be best for service.

3. To keep the line.

The several commanders of the fleet are to take special care that they keep their line, and upon pain of death that they fire not over any of our own ships.

It is said that the 3rd Instruction—to keep the line, and upon pain of death, not to fire over any of their own ships—was the result of occurrences in the Four Days Battle, when some ships, in endeavoring to reach the enemy, injured those of their own side.

The orders about standing along the enemy's line, until time to tack, so as to bring the two fleets abeam of each other, contains nothing of special interest, but the 2nd Article, which treats of how to divide the enemy's fleet, double on the rear and prevent the van from coming to its assistance, is new and important. However, though earnestly advocated by some tacticians in later years, attempts to divide an enemy fleet from leeward was always considered by the best officers as a dangerous evolution, which could be easily frustrated, and was not to be attempted, except to take advantage of a large opening in the opposing column.

The increased numbers of fireships in both fleets, at the commencement of the Third Dutch War—36 in the Dutch and 30 in the combined French and English fleets—would indicate either that it was not realized that ships sailing in a column could easily avoid fireships, or that they were considered of great value in later phases of an action, when formations were broken up or dispersed.

The Dutch failed to get to sea in time to prevent the junction of d'Estrées with the Duke of York, which occurred in May at Portsmouth. The allies promptly put to sea, and, sailing up Channel, entered the North Sea. On May 19 they fell in with the Dutch under De Ruyter, but the latter although desirous of bringing on an engagement was unable to do so. The Duke, with his fleet, anchored in Southwold Bay

(Solebay), an indentation in the coast between Harwich and Yarmouth. The three squadrons anchored close to the shore in a north and south line with the French to the southward.

On May 27, the wind being from the northward and eastward, making of the English coast a lee shore, De Ruyter attacked from the northeast in double line, or, as Clowes says, "in two grand divisions of line abreast." His first line consisted of 18 ships of the line or "frigates" accompanied by a large number of fireships. There is no record of who commanded the first line, or whether it was commanded as one body. The second line consisted of the bulk of the fleet, with Lieutenant Admiral Banckers on the left, Lieutenant Admiral Van Ghent on the right, and De Ruyter in the center.

Clowes says the wind was northeast, and that the Duke stood out on the starboard tack, which was impossible with the wind in that direction. It is probable that De Ruyter came down before the wind and that the wind was nearly east, otherwise the Duke would have been obliged to stand to the southward. D'Estrées actually did this, thus separating the French squadron from the two English squadrons under the Duke and the Earl of Sandwich. De Ruyter detached Banckers from his left wing, with a comparatively small force to hold the French in check; but he was still inferior to the Duke and Sandwich in numbers.

The wind was light. The Duke, although warned by Sandwich as to the possibilities of a Dutch attack, had been taken by surprise and it was only by the assistance of their boats that the English were enabled to form some kind of column.

The wind shifted to the southeast, thus putting the French and Banckers to windward. The French, however, made no attempt to rejoin but conducted an indecisive engagement with Banckers.

The battle was quickly joined between the commands of Sandwich and Van Ghent on the one hand, and the Duke and De Ruyter on the other.

Sandwich's flagship, the *Royal James,* was attacked by two fireships, and by Van Ghent in person, while she was engaged with a Dutch 60-gun ship. Sandwich sank the fireships and Van Ghent was killed after an engagement lasting two hours, but about noon a third fireship was successful and the English ship burst into flames. Sandwich started to transfer his flag to another vessel of his command, but the boat in which he embarked sank and he was drowned with his boat's crew.

Van Ghent's command withdrew in part from the action, allowing the remainder of Sandwich's squadron to join the Duke against De Ruyter.

The battle continued during the afternoon, but the Dutch finally withdrew to the northward. Both sides claimed the victory. Clowes considers it was a drawn battle, even though the Dutch withdrew.

Each side lost a squadron commander: Van Ghent and Sandwich. Banckers was wounded. The British lost eight captains, among them Penn's successor, Sir John Cox, Captain of the Fleet. The Duke was obliged to shift his flag twice during the action, first from the *Prince* to the *St. Michael* and then to the *London.*

This was the only battle of the year and by it the Dutch accomplished their main object which was to delay the Allies in crossing the North Sea to co-operate with the French armies in the Netherlands. De Ruyter stated he had never before been present in so hard fought and obstinate an engagement. The losses on both sides were heavy

Among the English captains killed was the Honorable Francis Digby, commanding the *Henry.* He was a captain in the "Duke of York and Albemarle's Maritime Regiment of Foot." Out of twelve captains of this regiment, three others were killed in the action. It was said, "Those Marines of whom I soe oft have wrote to you, behaved themselves stoutly."

Clowes notes that this is the origin of the term "marine," applied to sea soldiers. He says the force had been raised a few years earlier, especially for service afloat.

The Duke was not long delayed. He and D'Estrées crossed the North Sea in June with a large body of troops. However, a storm, and De Ruyters' presence in the vicinity, prevented them from landing.

De Ruyter, having partially re-fitted his fleet, preserving a watchful attitude among the shoals on the Dutch coast, again foiled the Allies. Though they could not induce him to venture out and give battle, he was in sufficient strength to prevent them from employing any large part of their fleet in covering a landing.

After the battle of Solebay the Duke of York thought it advisable as "an encouragement for the captains and companies of fireships, small frigates and ketches" to offer special rewards for the destruction of enemy men-of-war and enemy fireships. These rewards were in money, paid to the individual, or in case of his death, to his heirs.

The next year, 1673, the Duke, because of his almost fanatical Catholicism, was obliged to resign all of his offices. Before his detach-

ment, however, he re-issued his Fighting Instructions in 24 Articles. They were published by Granville Penn in "Memorials of Penn." No signed copy of them is known to exist. They are among the Penn papers in the British Museum. Corbett says, ". . . an annotated copy, beautifully written and richly bound" in princely form, is in the Admiralty Library.

Except for changes in wording the revised Instructions introduced but little new matter and only two of the notes seem to be important. Prince Rupert's Second Instruction of 1666 provided for using the best sailing ships to chase and bring an unwilling enemy to action. The Duke did not include this, nor any similar plan in the Instructions of 1672 but in the final note (Set 6), he proposed to use frigates for this purpose. The notations in the Admiralty copy are ascribed to an unknown author, probably some officer who had served under Sir Edward Spragge, and certainly some one who had served in the Second and Third Dutch Wars.

The most probable author of the notations, according to Corbett, was George Legge, Lord Dartmouth, who served under Sir Edward Spragge as a lieutenant in the Second Dutch War, and in later life commanded fleets. Spragge was his cousin and his "sea daddy," and all the notes refer to occurrences in Spragge's career.

The first Instruction (I) is practically a copy of former instructions, directing what shall be done when an enemy's fleet is sighted, to ascertain the number of ships and their formation and the number of fireships. The attached note laments the lack of a sufficient number of signals to enable the general (admiral) to convey his orders to the fleet. It then continues on a subject which is a matter of discussion at the present day: namely, how an admiral in command can best follow the progress, and intelligently direct, an action in which he is engaged. It reads:

> It is most certain that in all sea battles the Flags, or Admiral-Generals, are equally concerned (engaged) in any conflict, and no manner of knowledge can be gained how the rest of the battle goes until such time as it is past recovery. To prevent this, let a person fitly qualified command the reserve, who shall by signals make known to the general in what condition or posture the other parts of the fleet are in, he having his station where the whole can best be discovered and his signals answering the General's may also be discerned by the rest of the fleet.

This is analogous to the question, whether the senior in command during an action can better control or conduct the action from a station in the line of battle, or a station outside of the line of battle, or if in the

line of battle, whether from the head or the center, and if outside the line of battle, in what class of ship he should be embarked.

II is for deployment when an enemy fleet is sighted. Signal for this was the union flag at the mizzenmast head of the commander-in-chief's flagship, this to be repeated by all admirals, vice admirals, and rear admirals of all squadrons. All ships, at this signal, "are to make what sail they can to come up and to put themselves into that order of battle which shall be given them."

III directs what should be done in case the enemy's fleet was to windward and on the same tack. All ships were to "keep the wind as close as they can lie until such time as they see an opportunity by gaining their wakes to divide the enemy's fleet." The van if it found it could get to windward was to tack and strive to divide the enemy's line and any squadron that got to windward was to bear down and attack the ships to leeward. The middle squadron was to observe (contain) the enemy's van. The note to this reads:

> Unless you can stretch their headmost ships there is hazard in breaking through the enemy's line, and [it] commonly brings such disorders in the line of battle, that it may be rather omitted unless an enemy press you near a lee shore. For if, according to this instruction, when you have got the wind you are to press the enemy, then those ships which are on each side of them shall receive more than equal damages from each other's shot if near, and in case the enemy but observed the seventh instruction—that is, to tack with equal numbers with you—then is your fleet divided and not the enemy's.

The remainder of this instruction is far from clear. It is to the effect that the middle English squadron, in case the English van got to windward of any considerable part of the enemy's fleet, should contain the enemy's van while the remainder of the English fleet concentrated on that part of the enemy's fleet which had been cut off.

IV is brief:

> If the enemy have the wind of his Majesty's fleet and come to fight them, commanders of his Majesty's ships shall endeavor to put themselves on one line close upon a wind according to the order of battle.

V provides a signal for ordering ships to endeavor to "gain the wind of the enemy."

VI gives the signals and instructions for forming column when the English fleet is to windward or to leeward, or for chasing. Instructions for chasing are new:

> If it shall please God that the enemy shall be put to run, all the frigates are to make all the sail that possibly they can after them and to run directly up their broadsides and to take the best opportunity they can of laying them on board and

some ships which are the heavy sailers (with some persons appointed to command them) are to keep in a body in the rear of the fleet that so they may take care of the enemy's ships which have yielded.

VII is the same as the former for meeting on opposite tacks, the English being to windward.

VIII directs that when the British have the wind the headmost squadron of the English fleet shall steer for the headmost of the enemy's ships. This afterwards was taken to mean the most windward of the enemy's ships.

IX gives signals for coming to the wind on the port or starboard tack when running free.

X, signals for tacking by squadrons.

XI, signal for flagships to form ahead or astern of the commander-in-chief.

XII, signal to squadrons other than his own to make more sail.

XIII, signal to engage

as soon as the fleet shall see the Admiral engaged or make a signal by putting out a red flag on the foretopmast head. Each squadron shall take the best advantage to engage the enemy according to such order of battle as shall be given them.

XIV prescribes distance when weather permits of half a cable. "And as for the flag officers, they shall place themselves according to such order of battle as shall be given."

XV forbids the firing of any gun until close enough to do good execution, and prescribes punishment by court-martial for failure to carry this out.

XVI reads:

In all cases of fight with the enemy commanders of his Majesty's ships are to keep the fleet in one line and (as much as may be) to preserve the order of battle which they have been directed to keep before the time of fight.

This was afterwards modified to include "having regard to press the windmost ships and relieve those as are in distress."

XVII forbids leaving the line to pursue enemy ships before the main body of the enemy fleet is disabled or runs.

XVIII forbids firing on an enemy ship that is being boarded, unless the firing ship is sure that it will not damage the boarding ship or the boarders.

XIX, "The several commanders in the fleet are to take special care on pain of death that they fire not on any of their own ships."

XX offers rewards to captains of small frigates, ketches, and smacks for capturing enemy fireships, etc.

XXI directs fireships, with their small frigates, to keep to windward, but as near ships of the line as possible, and to watch for signals.

XXII is the old one forbidding a ship to succor another unless it is in danger of sinking or being captured. All ships are directed to follow their leaders, beating the enemy's ships being the best method of succoring their own injured ships. Ships actually in danger of sinking are to make a signal indicating the fact. Other ships are then authorized to rescue. Small craft are directed to come to the assistance of disabled ships, including flagships.

> And if any of the chief flagships or other flagships shall happen to be so much disabled as that they shall be unfit for present service, in such a case any chief flag officer may go on board any other ship of his own squadron as he shall judge most convenient; and any other flag officer, in that case, may go on board any ship in his division.

An interesting note is attached to this Instruction:

> In changing ships be as careful as you can not to give the enemy any advantage or knowledge thereof by striking the flag. In case of the death of any flag officer, the flag to be continued aloft till the fight be over, notice to be given to the next commander-in-chief, and not to bear out of the line unless in very great danger. It hath been observed what very great encouragement the bare shooting of an admiral's flag gives the enemy, but this may be prevented by *taking in all the flags before going to engage.* It was the ruin of Spragge in the battle of August '73 by taking his flag in his boat which gave the enemy an opportunity to discover his motion, when at the same (time) we saw three flags flying on board the main topmast-head of three ships which Tromp had quitted.

The idea in the phrase italicized has been revived in modern warfare.

XXIII is the old one, forbidding chasing beyond sight of the admiral and requiring all chasing ships to return at night.

The 24th and last instruction provided signals for anchoring at night after an engagement and signals for continuing a retreat without anchoring. Later, a suggestion was made, which Corbett says is the first of its kind, that in place of using guns to make anchoring and retreating signals, skyrockets would be proper, as easier to distinguish.

Prince Rupert succeeded the Duke as Commander-in-Chief, with Spragge as second in command. The King himself took a very active share in the management of the Admiralty. Apparently he and Prince Rupert were not in agreement as to how the fleet should be fitted out for the summer campaign of 1673. The result was delay, which allowed the Dutch to get to sea first.

The Dutch proposed to block the mouth of the Thames by sinking hulks laden with stone in the channel. They had prepared the necessary vessels, but Rupert's personal activity enabled him to get together

enough ships to defeat the purpose, although the Dutch actually entered the mouth of the Thames on May 2.

Rupert's main objective of 1673 was the same as that of the Duke in 1672: namely, to proceed with a fleet of overwhelming force, made up of his own and French ships, to land troops for the purpose of assisting France in the Netherlands.

D'Estrées' command this year consisted of 27 ships of the line, 2 frigates, and 18 fireships. Rupert and Spragge had 54 ships of the line, 8 frigates, and 24 fireships. The combined allied fleet was thus made up of 81 ships of the line, 10 frigates, 42 fireships and other small craft, as against the Dutch fleet of 52 ships of the line, 12 frigates, and 25 fireships and small craft, under De Ruyter, whose chief subordinates were Banckers and Tromp, the latter having been re-instated in the Dutch service to take the place of Van Ghent, who was killed in the battle of Solebay.

On this occasion, although some troops were embarked in the allied fleet, the main body of 6,000 was at Yarmouth, ready to embark for Holland in case the Allies obtained command of the sea.

As far as is known, Rupert issued no new fighting instructions.

The Allies sailed on May 20 and reached the Dutch coast on the 25th. The Dutch were found anchored at Schooneveld, near the mouth of the Scheldt. First calms, and then storms, prevented any steps being taken to bring them to action until the 28th. On that day, the wind was such that ships could both leave and enter De Ruyter's anchorage. The Prince, therefore, sent in a light squadron of 35 small vessels, accompanied by 13 fireships, to tempt the Dutch to come out. Apparently this aggregation of vessels was in no designated order and without any designated commander.

The Dutch weighed quickly and attacked this formless body of English and French vessels, which crowded back on Rupert's main body, pursued by the Dutch in formation. Clowes says, "A general engagement resulted sooner than Prince Rupert anticipated."

Each allied squadron was composed of both French and English ships. There was lack of proper organization, and when the ships of the advance attempted to rejoin their respective squadrons and form in order of battle, much confusion resulted. The battle began at noon, before Rupert had been able to get his fleet in order. He could not open fire at the oncoming Dutch until his advance squadron was clear.

Tromp, as usual, got himself into difficulties and was separated from his fellow admirals. He was obliged to shift his flag three times during

the action. De Ruyter tried to rescue him, with only partial success, and in so doing broke through D'Estrées' command. The French fought well. The action, on the whole, was indecisive.

De Ruyter retreated to his safe anchorage inside the shoals, while the Allies anchored about two miles outside.

Clowes quotes a letter, written by Tromp to his sister the day after the action, that is too interesting to omit.

> Dear Sister:
> Yesterday we went into the dance, and God be praised, we are sound, and have enjoyed ourselves like kings. I am in my fourth ship, the *Comestar*, and mean to have a fine dance to-day. We make the French run, so that they have to set sky-scrapers and everything else; and, if things go on today as before, I trust that our prayer and that of all our friends will be heard, and that we shall be freed from tyranny. Adieu. Courage. Things are bound to go well.

In this, the first battle of Schooneveld, the Dutch lost two admirals and the British none, although a number of captains were lost in both the Dutch and Allied fleets. The Allies' total loss of life was greater than that of the Dutch.

De Ruyter, being on his own coast, had an advantage in re-fitting. The British not only lacked facilities, but were obliged to be on guard both night and day against a sortie. This induced extreme watchfulness on both sides, the English guarding against a surprise attack, the Dutch endeavoring to make one.

De Ruyter finally came out again on June 4. The sortie did not find Rupert unprepared. According to Clowes,

> . . . On the evening of June 3rd, the wind coming from off the land, he made certain preparations and afterwards sat up the entire night.

Contemporary accounts of the second battle of Schooneveld are held by historians to be confusing and even contradictory. The British were delayed in getting underway even after De Ruyter was sighted, due to the fact that the Admiral of the Blue, Spragge, was visiting on board Rupert's flagship. Rupert himself got underway by cutting his cable, but Spragge's squadron had to await the return of their admiral.

Rupert tried to draw the Dutch away from the coast by forming his fleet in column on a starboard tack on a northwesterly course. The Dutch finally overtook the British at five P.M., engaging to windward, Tromp in the van against Spragge, De Ruyter against Prince Rupert in the center, and the Dutch Admiral Banckers against D'Estrées in the British rear, in a parallel fight on the same tack. It appears that the French and British ships were distributed throughout the Allied

Fleet so that Spragge, Rupert, and D'Estrées each had ships of two nations in their squadrons.

The action was inconclusive after five hours. Darkness was coming on. The Dutch steered for their own coast, thinking the Allies were bound for the English coast. The Allies, on the other hand, altered their course at two A.M., and pursued the Dutch until six of the following day, but the French admitted that they knew the Dutch had changed course at midnight and that they made no attempt to follow until two hours after.

The Allies seem to have had somewhat the worst of the encounter. Not being able to overtake the Dutch, the British retired to the westward and the French to their own ports.

The Dutch, with a refitted fleet under De Ruyter, took the offensive and were off the British coast by June 25, but had to return on account of an infectious disease, apparently the plague, which broke out in their ships.

The English were still alarmed over a possible Dutch invasion. Their fleet was visited personally by King Charles and the Duke of York in order to urge its preparation for sea, but neither the English nor the French were able to get out until the middle of July. The composition of the fleets as refitted was, English, 62 ships of the line and frigates; French, 30; Dutch, 75; fireships, Allies, 28; Dutch, 22; ketches and yachts, Allies, 23; Dutch, 18; a total of 143 sail for the Allies as compared with 115 for the Dutch.

De Ruyter, Rupert, and D'Estrées were still in command of their national forces.

De Ruyter offered battle until July 20, but the Allies refused, for reasons best known to themselves.

The English fleet carried a large number of soldiers whom it was intended to land on the Dutch coast. After refusing battle with De Ruyter, the Allied Fleet stood on and off near the mouth of the Maas, threatening to effect a landing there, and later at Schveningen, but the presence of the Dutch Fleet at Schooneveld only 60 or 70 miles to the southward, "must have inclined the allied admirals to think twice ere beginning an operation which they might not have time to complete without being disturbed by interference from seaward."

The Prince of Orange, afterwards King William III of England, visited the Dutch Fleet at the end of July and determined that De Ruyter should attack the Allies as soon as possible. The two fleets met off the Texel, on August 10, 1673. When they sighted each other on the

forenoon of the 10th, they were on opposite tacks, but not close hauled, the Dutch heading north-northwest and the Allies south-southwest, with an easterly wind, the Allies to leeward. The Allies gained the weather gauge during the day, when the wind veered to northwest, but the Dutch were so close in shore that the Allies dared not attack.

The following day, the wind being east-southeast with the Dutch to windward, the latter attacked. The Allies were on the port tack, with D'Estrées leading, his squadron being entirely made up of French ships, Rupert in the center, Spragge in the rear. Banckers commanded the Dutch van, De Ruyter the center, and Tromp the rear, but Banckers' squadron was small, consisting of only 10 or 12 ships, with which De Ruyter decided he could hold the French in check, and engage the English center and rear on even terms. D'Estrées tried to double on the small Dutch van, but Banckers defeated this effort by breaking through the leeward French column, thus putting the entire French squadron to windward. He then wore, to rejoin the Dutch center, but without being closely pursued by the French. The rear squadrons of the Allies and Dutch became separated from the centers by reason of the fact that Spragge commanded one and Tromp the other. Clowes says Tromp and Spragge were

> men of kindred kidney, brave, rash, and insubordinate, and they seem to have delighted in personal conflict. Both forgetting everything else, they engaged in personal combat; both flagships were disabled, both shifted their flags, and Spragge was shifting his flag for the second time when he was killed by a round shot striking the boat in which he embarked.

The two centers engaged fiercely with De Ruyter having somewhat the advantage, especially after being reinforced by Banckers, who had returned from his engagement with the French. During the course of the day, after many losses, Prince Rupert, seeing that his rear did not rejoin him, went about to rejoin *it,* pursued by the Dutch. When the British center and rear reunited, action was resumed and continued until seven P.M., when the Dutch Admiral withdrew, as Clowes states, "not actually victorious yet with every reason to feel satisfied, for he had freed the Dutch ports from blockade and had reduced the Allies to such a condition that they had no further thought of landing troops." The losses of ships were few but the loss of life was great.

The British lost no other admiral than Spragge, but the Dutch lost two vice admirals.

The result was considered discreditable to the Allied commanders. Mutual recriminations between Rupert and D'Estrées accentuated

the bad feeling already existing. Although allied with the French, the English people liked the Dutch better. Charles II and the Prince of Orange, therefore, had little difficulty in arranging a peace.

The battle of the Texel ended English naval war during Charles' reign. The peace treaty concluded at Westminster, February 9, 1674, is said to have been particularly advantageous to England. The Dutch paid an indemnity of 800,000 pounds and the right of the English flag in the Narrow Seas was fully and formally admitted. Places taken by each side during the war were restored.

The time was soon to come when these antagonists in the Dutch Wars were to fight at sea side by side, as in the past, during the reigns of Elizabeth and James I.

In descriptions of the actions during this period some mention has been made of those who played leading parts in them. But the fact that they were the first *consciously* waged for the *command of the sea,* seems to justify grouping and extending these biographical sketches in order to give a more living quality to those who commanded when the lasting foundations of naval tactics were being laid.

Of the English admirals and generals at sea who reached positions of fame or prominence in the struggles with the Dutch, but four—Popham, Penn, Spragge, and Ayscue—could lay claim to early naval training, although it is possible that Blake and Deane may have made some early sea voyages.

There were many other officers of rank, bred to the sea, who were the backbone of the fleet and who undoubtedly had much greater influence in formulating the fighting instructions than those over whose signatures they were issued.

Popham, Blake, and Deane, all parliamentary colonels, were the first admirals and generals at sea. Of these, Blake was the oldest, but he had served under Popham in the army. At the time of his appointment as Admiralty Commissioner, Admiral, and General at Sea, he was about 50 years of age, having been born in 1599.

Popham and Deane, both born in 1610, were about forty years old. Blake, although Popham's junior on shore, appears to have been his senior at sea.

Popham was a lieutenant in the navy in 1636, and a captain in 1637, after which he served about 10 years in the army before returning to his early profession. He died on board his flagship at Dover, in 1651.

Neither Blake nor Deane, his colleagues, had had any naval experience prior to their appointments, except possibly as voyagers.

Deane was a relative of Cromwell and was one of the Commissioners who tried King Charles I and signed the warrant for his execution. Deane's vigor and apparent familiarity with nautical life gave rise to the tradition that he had served at sea in his youth. As has been related, he was killed at the battle of the North Foreland in 1653, only a short time after Cromwell had dissolved the Parliament and seized supreme authority.

Blake became, in many respects, the most famous of British admirals. Penn, who next appears, was not born until 1621. He was 22 years younger than Blake and 11 years younger than Deane and Popham. He entered the navy at an early age, had served in the Irish Seas, and when he was appointed vice admiral to Blake, in 1652, was only 31. Previous to that time he had held the rank of rear admiral in the Irish squadron. His subsequent services have been described. Politically, he was first Royalist, then Cromwellian, then once more an adherent to the Crown.

Of the early life of Sir Edward Spragge little is known, except that he probably served with Rupert in the Royalist fleet, when that prince was being pursued by Blake, Penn, and other British admirals in the Mediterranean, on the coasts of France and Spain, and in the West Indies. He may have had some British army service during the Civil War, preceding the Protectorate. His subsequent career and his character have been touched upon.

He was one of the main reliances of the panic-stricken British during the time the Dutch were in the Medway, in 1667. He distinguished himself before the Third Dutch War as commander-in-chief in the Mediterranean where he destroyed the Algerine pirates. It is said of him that at the battle of the Texel he pledged himself to bring in Tromp, alive or dead. Instead he lost his own life.

The discovery of his *Sea Book* brought to light tactical instructions of which there had been no previous record.

The other British seaman who attained nearly equal prominence with Spragge, but somewhat less than Penn, was Sir George Ayscue. Like Spragge, the date of his birth is not on record. He was a captain in the British Navy in 1646, was loyal to Parliament, and held the rank of admiral in 1649, was second to Blake in 1651, and between that date and the Second Dutch War commanded a squadron in the West Indies.

He had served under Blake in the First Dutch War, and later, at Cromwell's suggestion, accepted a commission as rear admiral in the Swedish service. He was appointed a Commissioner of the Navy on the Restoration, served as rear admiral of the Blue under the Duke of

York in the Second Dutch War, then as vice admiral of the Red under Montagu, as admiral of the Blue under Prince Rupert and admiral of the White under Monck. He was taken prisoner by the Dutch in the second battle of the North Foreland, in 1666, and held a prisoner until peace was made. The date of his death is not known, probably about 1671.

The services of Edward Montagu, Earl of Sandwich, have already been mentioned.

The Duke of York, second son of Charles I, was made Lord High Admiral by his father in 1638, at the age of five, but a few days later Algernon Percy, Earl of Northumberland, was named acting substitute. Percy had had previous experience as an admiral and a reformer of the navy but served in the army during the Civil War.

The Duke was of course too young to render any naval service during that period. Before its end he was taken prisoner, but managed to escape to Holland in 1648. He was then fifteen. He later served in the French and Spanish armies with distinction and at the Restoration was again made Lord High Admiral by his brother, Charles II.

After his adoption of the Roman Catholic religion he was forced by the Test Act to resign all of his offices. He was in exile for a time, and was later employed in Scotland. After 11 years, he was restored to the office of Lord High Admiral, one year before he succeeded to the throne as James II.

During the three years of his reign he brought the British fleet to a high point of material efficiency. He was then still popular as a naval officer, though violently opposed by the English Protestants because of his ardent Catholicism, and in the end he excited disloyalty in the fleet by appointing a Roman Catholic to chief command and encouraging the celebration of Mass on board his ships.

He was dethroned in 1688 by a bloodless revolution and fled to France. He afterwards fought in Ireland in an unsuccessful attempt to regain his crown and then returned to France, where he died in exile in 1701, ending a tragic and eventful life.

His naval career was highly creditable, and in his conduct of the Admiralty he showed "patient industry and unflinching probity." His name has come down to us as the author of the first tactical naval code which prescribed definite fighting formations.

The career of Prince Rupert, the Duke's cousin, might have been taken from a volume of high romance, rather than the chronicles of

history. At the date of the Duke's birth, Prince Rupert, then 14 years of age, was serving in the Dutch army. He returned to England and after a year, went again to Holland and was with the Dutch forces until 1638, when he was taken prisoner by the Spaniards. After three years of captivity, he once more returned to England, via Holland. He became a noted commander of cavalry in the Royalist forces during the Civil War, at the end of which he joined the French army and was wounded in 1647.

In 1648, he obtained command of the ships that had revolted against the Parliament and went to Holland for the third time. By selling the brass guns of one of his vessels and by pawning the jewels of his mother, the Queen of Bohemia, he fitted out two frigates with which he captured prizes sufficient to enable him to equip ten ships and get to sea.

He managed to reach Kinsale, where he recruited piratical and semi-piratical vessels and fitted out captured merchantmen, until at one time, he had under his command a total of 28 craft. He engaged the attention of the admirals and generals at sea, as well as that of Penn and Ayscue, who had small commands on the Irish coast.

He escaped from Kinsale in a storm which had dispersed the blockading fleet and found refuge in Portuguese harbors and later in the Mediterranean. He was declared an outlaw by Cromwell and all countries warned against giving him asylum. He maintained himself for more than four years, by captures, the taking of prizes, and by plundering, with little regard to nationality.

He was blockaded by Blake and pursued by Penn. His men-of-war never numbered more than 13. By May, 1651, they were reduced to five, the *Constant Reformation* (flag), *Swallow, Revenge of Whitehall, Loyal Subject,* and *Honest Seaman.* With these, eluding Penn, he sailed from Toulon to the West Indies, via the Azores, where two of his ships were lost in a gale. The *Constant Reformation* (42) went down with all on board except Rupert and a handful of men. The other was the *Loyal Subject.* Rupert was saved by a boat from the *Honest Seaman.*

This left the Prince with but three men-of-war, the *Swallow,* the *Revenge of Whitehall,* and the *Honest Seaman,* and a few unarmed prizes.

The crew of the *Revenge of Whitehall* mutinied and carried her to England.

After reaching the West Indies he had many misfortunes, culminating

in another gale in which his brother Maurice was lost with all hands in the prize *Defiance*.

With only the *Swallow*, last of the men-of-war with which he had left Kinsale, and two prizes, Rupert finally returned to Europe, arriving at Nantes in the spring of 1654. From Nantes, he made his way to Germany, where he spent the next six years.

After the Restoration he returned to England and was made a Privy Councillor by Charles II, and later Admiral and General at sea. His battles during this period have been described.

Retiring from active service in 1674, he remained in his adopted country, engaged in intellectual and artistic pursuits, and died peacefully in his bed at his home in Spring Gardens, Westminster, at the age of 63.

He was a soldier, a sailor, an artist, something of an inventor, and an expert in ordnance. He carried with him to sea the dashing methods of attack of a cavalry leader.

Monck's life history is too well known to be repeated here. As an Admiral and General at Sea, he fought only in the Narrow Seas.

As for the Dutch—the Evertsens, the two Tromps, father and son, and the great De Ruyter—it can be said that they were worthy antagonists. There is no precise record of their Fighting Instructions. Whether they originated their tactics, took them from the English, or vice versa, has always been a matter of controversy. Judged by results on the great game-board of war, their tactics, whether original or adopted, were certainly not inferior.

Authorities agree that the Dutch ships, though staunch, were not as handy as those of the English and that the French ships were handier than either.

The accounts of confusion in the majority of battles and the apparent failure to maintain formations, may be laid, in part, to the strong and ever changing currents, resulting from the great rise and fall of tides and the steep seas from even moderate winds which prevail in the Narrow Seas and which may affect unequally different parts of the same fleet. But above all other causes, were the shifts of wind, which in a few minutes could—and often did—change the whole complexion of a fight.

The elder Tromp made a voyage to the East Indies at the age of eight, was made prisoner and learned British naval seamanship and customs on board an English cruiser, from which he finally escaped and

entered the navy of his own country. In 1637, after 11 years' service, he reached flag rank at the age of 40 and attained renown long before the First Dutch War, having destroyed a Spanish fleet off Gravelines in 1639 and a combined Spanish and Portuguese fleet off the English coast the same year.

Tromp's son, Cornelis, whose character has been described, entered the navy early and was in command of a squadron when but 19. During the years 1652 and 1653 of the First Dutch War, he served in the Mediterranean. The final complete victory of the Dutch in those waters had the effect of disposing Cromwell towards peace negotiations. For his services during this time, Tromp was promoted to rear admiral. In 1675, he visited England as an honored guest of the King. In the next year, he was named Lieutenant-Admiral of the United Provinces.

Tromp died at Amsterdam, May 29, 1691, just after having been given command of a fleet that was to be sent to join the English under Russell against the French. Both he and his father are buried at Delft.

De Ruyter, like the elder Tromp, went to sea in his extreme youth. He was a cabin boy at the age of 11. In 1636, he had his first command, a cruiser of Flushing, his native town, employed against the French pirates.

He entered the service of the States in 1640, and was appointed admiral of a fleet fitted out by Holland to assist Portugal against Spain. It was in an action off Cape St. Vincent, during this campaign, that De Ruyter attained distinction. In 1642, he left the navy and for nearly 10 years was a captain in the merchant marine. On the outbreak of war with England, in 1652, he re-entered the naval service and in the First Dutch War fought under the elder Tromp and De Witt.

After some duty in the Mediterranean, his services were enlisted by the King of Denmark in a war against Sweden. He was ennobled by that monarch, who also bestowed a pension on him.

Employed again by his own country in the Mediterranean, he was most successful in his operations against the Tunisians and the Algerine pirates, and it was from these achievements that he was recalled to command in the Second and Third Dutch Wars. In 1676, he was sent wth a fleet to aid Spain against France. He was vanquished and mortally wounded in an action off Messina, April 21, 1676. His opponent was another celebrated admiral, Duquesne.

De Ruyter is considered the greatest naval leader of his century. In the Second and Third Dutch Wars, the French, who were first allies

of the Dutch and then of the English, became familiar with the Fighting and Sailing Instructions of both. But no record exists of contemporary French fighting or tactical instructions of this period.

The Dutch, from earlier association with the English, were thoroughly acquainted with their methods of fighting.

It is noteworthy that on every occasion when the English were allied with the Dutch or French, the English were in command. When the Dutch and French were allies, the Dutch commanded. When France and Spain united their fleets, the French were in command.

The Dutch and English always tried for the windward position before engaging. The French were prone to accept the lee gauge.

Corbett says that the British Admiralty library contains a "beautifully written and richly bound manuscript" which includes the final form of the Duke of York's Fighting Instructions in the last Dutch War, with comments on some articles and 216 water-color illustrations of battle formations . . . "and to every plan are appended tactical notes, relating to the actions represented. . . ."

In the manuscript comment on Article I, which gave the procedure to be followed on the discovery of an enemy fleet, the lack of suitable signals was deplored. Corbett quotes from the Notes:

> There have happened several misfortunes and disputes for want of a sufficient number of signals to explain the general's pleasure. . . . Signals were slow in the making; their intent often obscure, and the flagship frequently not visible from other flagships.
>
> To prevent this, let a person fully qualified, command the reserve, who shall by signals make known to the General in what condition or posture the other parts of the fleet are in; he having his station where the whole can be best discovered, and his signals, answering the general's, may also be discerned by the rest of the fleet.

This is the first reference as to the desirability of a "repeating" ship in large fleets.

Eighty ships of the line, in column, even at half cable distance, would extend nearly five miles, or two and a half miles in each direction from the middle of the center squadron. Clarity and celerity in signaling was an unsolved problem.

The comment indicates a commander of the reserve, yet none of the Fighting Instructions issued during the Dutch Wars contemplated a reserve. This military term was a carry-over from Wimbledon's Instructions for the Cadiz Expedition in 1625. It may have remained in use as a general term for the supply, fireships, tenders, and possibly the frigates used for scouting.

Another interesting comment, of some length, is on Article III. The comment and the Article both show full comprehension of the occasional desirability, but extreme difficulty of dividing an enemy fleet from leeward.

A century later, after Rodney, by accident or design, divided De Grasse's fleet at the Battle of the Saintes, volumes were written on this supposedly new and unheard of maneuver.

The full text of Article III of the Duke's final Fighting Instructions will bear repetition:

> In case the enemy have the wind of the admiral and fleet, and they have sea-room enough, then they are to keep the wind as close as they can lie, until such time as they see an opportunity by gaining their wakes to divide the enemy's fleet; and if the van of his majesty's fleet find that they have the wake of any considerable part of them, they are to tack and stand in, and strive to divide the enemy's body; and that squadron shall pass first, being got to windward, is to bear down on those ships to leeward of them; and the middle squadron is to keep her wind, and to observe the motion of the enemy's van, which the last squadron is to second; and both of these squadrons are to do their utmost to assist or relieve the first squadron that divided the enemy's fleet.

Assuming two large fleets, close-hauled and abreast of each other, just out of gun range, the van of the lee fleet, by tacking together could break through the windward fleet, probably abaft of the center, with the object of creating confusion in the windward fleet and putting some of its ships—center and rear—between two fires, while the lee center kept the windward van employed. When passing on parallel courses, but opposite tacks, either fleet could "break" the line if it pleased; one by bearing up, the other by coming to the wind.

Under Article III, the van could act on its own initiative, but this was apparently changed to require asking permission by making the signal for tacking and if the admiral approved, he made the same signal.

The comment on "breaking" the line found in the Admiralty manuscript, has already been quoted.

We shall see later that the French fully appreciated the uncertainty of success in attempting this maneuver, because they knew how to meet it.

CHAPTER IX

WARS BETWEEN ENGLAND AND FRANCE, 1689-1697

A YEAR BEFORE Charles II's death in 1685, the Duke of York was reinstated as Lord High Admiral and at once set about improving the fleet.

James, when Duke of York and Lord High Admiral, and again as King, until his bigoted Catholicism caused his removal, not only interested himself in tactics, but in bettering the fighting, sailing, and seakeeping qualities of his ships.

He copied the models of captured Dutch and French ships to get "the lower tiers" higher out of water, raising them from 3 feet to 4 and 4.5 feet above the water line. He sheathed the bottoms of some ships with lead to prevent fouling, and increased the proportion of length to beam.

It was said that a British ship taken by the French could always be re-captured by using a captured French ship to chase her.

On his brother's death, the Duke succeeded to the throne as James II, but after three years his ardent devotion to the Roman Catholic church caused such discontent among the people and even in the navy, that he was dethroned. The culminating act was his appointment of a Catholic to chief command in the fleet and encouraging the celebration of mass aboard his ships.

In 1677, James' daughter Mary had married William, Prince of Orange. After the repeal of the Test Act and the appointment of Roman Catholics to office, a party—in which naval officers were prominent—grew up, determined to offer the crown of England to Mary and her husband, jointly.

Arthur Herbert, later Admiral Lord Torrington, who had been dismissed from the Navy for opposing the repeal of the Test Act, became William's principal naval adviser.

Another naval officer, Captain, later Rear Admiral, Edward Russell, served as messenger between William and his English supporters.

James, though evidently aware of his son-in-law's activities, kept his own fleet of 40 of the line and 18 fireships on his own coast, while the collection of a much stronger force in Holland went on without interference.

On November 1, 1688, William sailed for the Humber with an armada of 50 ships of the line, 25 frigates, 25 fireships, and 400 transports,

carrying an army of 15,000 horse and foot. Admiral Herbert was in command.

The English fleet under Lord Dartmouth (George Legge, Spragge's cousin) was directed by James to prevent William from landing. Dartmouth was an experienced officer who had distinguished himself on more than one occasion, both as junior and senior, but his biographer says that he purposely avoided an engagement with the Dutch. William while en route changed his destination from the Humber on the east coast of England, to Torbay in the Channel (Chart II). Dartmouth, lying in the mouth of the Thames, permitted the Dutch fleet to pass without attacking, then got under way and followed as far as Portsmouth.

William landed without molestation on November 9. James fled to France. Dartmouth left the fleet and took the oath of allegiance to the new sovereigns. By the beginning of 1689, the entire English navy was serving under William and Mary.

Dartmouth, however, was not trusted. During the war with France he was charged with offering to hand Portsmouth over to the French, and also for expressing his willingness to take command of a French fleet. In July, 1691, he was arrested for treason and confined in the Tower of London, where he died before his trial.

A few days before William sailed from Holland, Dartmouth had reissued James' final Fighting Instructions of 1673, when he was Lord High Admiral. The new issue combined Articles III and IV of the original in a new Article III, and changed the wording. Dartmouth's Article III read:

> If the enemy have the wind of His Majesty's fleet, and come to fight them, the commanders of His Majesty's ships shall endeavour to put themselves into one line, as close upon a wind as they can lie, according to the order of battle given, until such time as they shall see an opportunity by gaining their wakes to divide the enemy's fleet; and if the van of His Majesty's fleet find that they have the wake of any considerable part of them, they are to tack and stand in, and strive to divide the enemy's body; and that squadron that shall pass first, being got to windward, is to bear down on those ships to leeward of them; and the middle squadron is to keep her wind, and to observe the motion of the enemy's van, which the last squadron is to second; and both of these squadrons are to do their utmost to assist or relieve the first squadron that divided the enemy's fleet.

The distinction here between the Instructions of the Duke of York and those of Lord Dartmouth lies in the point that in the former Article III, all ships were "To keep the wind as close as they could lie until such time, etc.," . . . while in the new Article, they were to ". . . endeavor to put themselves into one line as close upon a wind as they can lie."

In other words, they were first to form a close-hauled line, according to an order of battle previously given, before they endeavored to divide the enemy's fleet. After the column was formed, any ship could apparently take the initiative in endeavoring to weather the enemy if opportunity offered.

Dartmouth's Article IV was the same as Article V of 1673. His Article V was new.

If the admiral should have the wind of the enemy, when other ships of the fleet are in the wind of the admiral, then upon hoisting up a blue flag at the mizen yard or mizen topmast, every such ship is to bear up into his wake or grain upon pain of severe punishment. In this case, whether the line hath been broke or disordered by the shifting of the wind or otherwise, each ship or division are not unreasonably to strive for their proper places in the first line of battle given, but they are to form a line, the best that may be with the admiral, and with all the expedition that can be, not regarding what place or division they fall into or between.

This provides for ships forming column on the admiral without strict regard for the order of battle.

The remainder of the new Article V included VI of 1673, the substance of which has already been quoted (page 177).

In his Article VI, Dartmouth introduced entirely new matter covering the method of approach. Instructions in this Article are as applicable now as in the days of sailing ships, but they were habitually ignored by the English for more than a century, either because they despised the gunnery of their enemies, or took into account the very short effective range of the enemy's guns. On the whole, they suffered much in future war, owing to their failure to observe Dartmouth's instructions.

VI. In case His Majesty's fleet have the wind of the enemy, and that the enemy stands towards them and they towards the enemy, then the van of His Majesty's fleet shall keep the wind, and when they are come at a convenient distance from the enemy's rear, they shall stay until their own whole line is come up within the same distance from the enemy's van; and then the whole line is to tack, every ship in his own place, and to bear down upon them so nigh as they can without endangering the loss of the wind, (note that they are not to bear down all at once, but to observe the working of the admiral and to bring to as often as he thinks fit, the better to bring his fleet to fight in good order; and at last, only to lask away when they come near within shot towards the enemy as much as may be and not bringing their heads to bear against the enemy's broadsides) and to stand along with them the same tacks on board, still keeping the enemy to leeward and not suffering them to tack in their van. And in case the enemy tack in the rear first, he who is in the rear of His Majesty's fleet is to tack first with as many ships or divisions as those of the enemy's and if all the enemy's ships tack, their whole line is to follow, standing along with the same tacks aboard as the enemy doth.

The remainder of Dartmouth's instructions contains no valuable new matter.

During the 15 years which had elapsed since D'Estrées returned in partial disgrace from his service with Rupert against the Dutch, Louis' great Minister Colbert had, according to Clowes,

created a splendid fleet which was numerically equal, if not superior, to the combined fleets of England and Holland, while the officers and men of the French service had gained experience in the best schools of the day, having fought at one time with the Dutch against the English, and at another with the English against the Dutch. . . . At the time of the accession of William and Mary, the young French navy had reached a pitch of development to which it had never previously attained and to which it did not for many years attain again.

With a large fleet at his command, Louis XIV made no effort to prevent William sailing from Holland or landing in England, but after James fled to France, Louis determined to support him with troops, ships, and money in his effort to regain the English throne, through Ireland, his Catholic stronghold.

Convoyed by a small French fleet, James landed at Kinsale on March 12, 1689. In April, as soon as the news reached England, Admiral Herbert sailed with a part of the English fleet from Portsmouth, but did not fall in with the French, who had returned to Brest. At the end of April, however, he sighted a French fleet entering Bantry Bay, carrying stores and ammunition for James' support.

Herbert was in the *Elizabeth* (70). His fleet consisted of 19 third and fourth rates, mounting from 36 to 70 guns each, and 3 fireships. The French admiral, Chateau-Renault, had with him 24 small ships of the line (few mounting more than 60 guns), five frigates, and 10 fireships. He had convoyed troops and store ships from Brest and was engaged in disembarking them.

Herbert entered the bay on the morning of May 1 and found the French at anchor to windward. With the exception of the fireships, which were landing stores, all the French got under way and bore down to the attack in good order—better than that of the English who were trying to work up from leeward.

The action began about 10:30 A.M., and lasted until five in the afternoon, with the French having the advantage Herbert stood out to sea with the double purpose of improving his formation and gaining the wind, but failed in both purposes. Chateau-Renault was unable to pursue him vigorously because of the defection of his two squadron commanders to whom he was much junior in point of years and service. He withdrew late in the afternoon and stood back to the bay. The English did not follow. They were not anxious to renew the battle and sailed for Portsmouth to re-fit.

Chateau-Renault completed landing stores and men and returned to Brest.

Herbert, who had been made a baron for his services in the landing of William and Mary, was created Earl of Torrington after his drawn battle with Chateau-Renault.

England and France soon declared war. Louis XIV was already at war with Austria, Sweden, and Spain. Going to war with England meant also going to war with Holland. It was practically France against the world.

The French navy, at this time, was stronger in numbers, and considerably better than that of the English.

Torrington, in chief command and assisted by a large Dutch squadron under Evertsen, might have proved too strong for the French, but during the summer of 1690 his fleet was divided. A part of it, under Russell, was escorting the young queen of Spain (recently married by proxy), from Holland to her husband Charles II in Spain.

Another squadron, under Sir Cloudsley Shovell, had sailed with King William for Ireland, where he wished to direct in person the operations against his father-in-law, King James.

Bad weather, delays occasioned by the whims of the bride, and the grounding of some of his ships, spread Russell's expedition over 105 days. His instructions were to join with another English squadron to blockade the French in Toulon. He arrived too late. The Toulon contingent had joined that from Brest. The united French fleet was under the already-noted Count de Tourville, who found himself in command of the largest naval force that France, up to that time, had ever sent to sea—72 ships, none of less than 40 guns—and 18 fireships.

Torrington, with Evertsen, mustered 57 vessels with 20 fireships. England was on the defensive in her own waters.

Clowes says that the Allies averaged six more guns per ship than the French and that the total disparity in guns was not great: Allies, 3,696; French, 4,122.

Tourville sailed from Brest June 13 for the Isle of Wight, where he arrived nine days later and anchored his fleet in Freshwater Bay on the southwestern end of the island. Torrington was at anchor on the east side of the island and had no knowledge of the French being out until he learned on the morning of the 23rd that Tourville was but a few miles distant.

Torrington took the defensive, whereas Tourville wished to attack.

On the morning of June 25, after some tactical exercises, Torrington anchored in a fog. When it cleared the French were visible.

Torrington called a council of war, at which it was decided that the Allies were too weak to fight. A despatch to that effect was sent to Queen Mary and the allied fleet began to retreat slowly, followed by Tourville. Both fleets anchored at night.

Queen Mary was ruling alone during her husband's absence. Her Council decided on the offensive and directions to fight were despatched

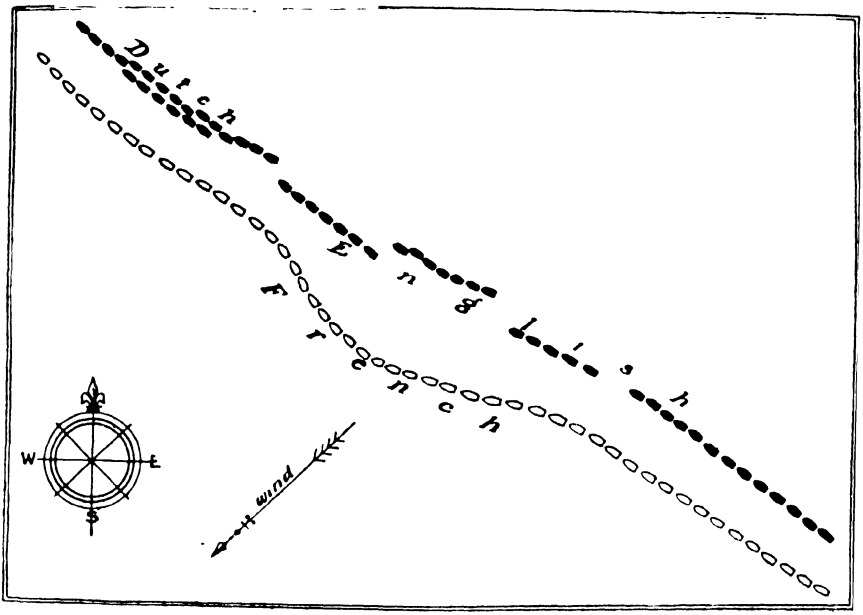


FIG. 26.—Battle of Beachy Head. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

to Torrington. He received them on the evening of June 29. The next morning he was 10 to 12 miles south of Beachy Head (see chart) and had the wind of the French (fresh northeast). He formed his battle line and bore down on the French, who awaited the attack lying-to on the starboard tack, practically dead in the water, their head sails to the mast.

The allied fleet was in the usual three squadrons: van (Dutch), Evertsen; center, Torrington in the *Royal Sovereign* (100); rear, De Lavall in the *Coronation* (80).

Against Evertsen was Chateau-Renault in the *Dauphin Royal* (110),

with 23 ships in all, mounting 1,356 guns and accompanied by 6 fireships. Evertsen, in the *Hollandie* (74), had 22 ships mounting 1,370 guns, with 4 fireships—an equal match in ships and ordnance.

The two centers under Torrington and Tourville, the latter in the *Soleil Royal* (98), were also evenly matched, but De Lavall in the rear was greatly outnumbered by the French rear, under D'Estrées in the *Grand* (80).



FIG. 26a.—Arthur Herbert, Viscount Torrington, Admiral of the Fleet. (From T. Houbraken's engraving after the portrait by Sir G. Kneller.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

FIG. 26b.—Le Maréchal de Tourville. (*From "Histoire du Maréchal de Tourville," Du Maureix*)

Accounts say that the French center sagged to leeward, and that Torrington at first steered to cut off the French rear, but changed course for the center and opened fire at long range, except Evertsen's leading division, which came into closer action and, without support, was badly damaged by the French center which then pushed ahead to double on the Dutch. The latter were overpowered, but not destroyed, but only because a calm ensued before the enemy had completed their envelopment.

Torrington was endeavoring to get between the French center and

the Dutch, when the calm stopped all movement. He anchored, with all sail set, and the ebb drifted the French out of range to the southward and westward.

The Dutch came to action about 9 A.M.; the English rear about 9:30. They fought well. The center came into action later, and only partially. The battle was over about 5 P.M., when Torrington anchored. At nine that night, he got under way with the flood and retreated up Channel, towing his disabled ships.

Tourville did not signal a general chase, but pursued in battle order, close enough to make Torrington destroy his dismasted ships, but not close enough to force him to renew the action.

The Allies' losses in officers and men were much greater than those of the French and they also lost 8 or 9 ships, while the enemy lost none.

Tourville abandoned the pursuit when he reached the Straits of Dover and after some unimportant harrying of the Channel coast, returned to his own.

The English and Dutch, in confusion, kept on into the mouth of the Thames with the idea of saving themselves by entering the river.

England was in a panic until Tourville left the coast. The Dutch had the unusual experience of fleeing into the same river up which, not many years before, they had victoriously chased the English.

Torrington was court-martialed. He was acquitted, but was superseded and never again employed. His reasons for not fighting until ordered are thus given, by himself:

> Whilst we *observe* the French, they cannot make any attempt either upon ships or shore, without running a great hazard, and if we be beaten all is exposed to their mercy.

Even after being ordered to fight, he was cautious.

> Had I fought otherwise, our fleet had been totally lost and the kingdom laid open to an invasion. . . . As it was, most men were in fear that the French would invade, but I was always of another opinion, for I always said that whilst we had a fleet *in being,* they would not dare make an attempt.

Although obeying the letter of his orders, he disobeyed their spirit. He did not do his utmost and his defeat left the French complete masters of the Channel.

The value of a "fleet in being," i.e., one so inferior to the enemy fleet that it must avoid battle, has been stressed and over-stressed.

Colomb, in *Naval Warfare* (1899), misinterprets, we think, the sentence in Torrington's defense which reads:

> This I dare to be bold to say; that if the management of the fleet had been

left to the council of war [his] there would have been no need of the excessive charges the kingdom was put to in keeping up the militia, nor would the French have gone off so much at ease.

He infers that the French would not have been free to do as they pleased if he had been permitted to observe only, and not required to fight. He did not assume that his fleet in the Thames was a "fleet in being."

But Colomb assumes that a frightened fleet up the Thames, with Killigrew's squadron up the Hamoaze for safety, was still a threat sufficient to hamper Tourville's operations. He says:

So that even though the beaten Allied fleet had come "to an anchor at the Nore in great confusion; and expecting that the French might attack them, all the buoys were taken up, and other necessary dispositions made as soon as they got there," yet the strategy of the conditions was such as to leave and keep the great French fleet powerless. If, indeed, the enemy had followed up and beaten the fleet at the Nore absolutely, "all would have been at his mercy." But "a fleet in being" even though it was discredited, inferior, and shut up behind unbuoyed sandbanks, was such a power in observation as to paralyze the action of an apparently victorious fleet either against "sea or shore."

This is the part of the battle of Beachy Head which constitutes its chief interest, but which is hardly touched by the different historians who have related the story. The first attempt of the French to gain the command of the sea with a definite ulterior purpose failed, because, as a fleet, they were not enterprising or persevering enough to secure the preliminary condition. They had beaten our fleet, yet not to the point of annihilation which was necessary if the command of the sea was to be gained.

Torrington's statements support the opposite conclusion—that the French had complete command of the sea. Colomb offers nothing to show that Torrington had any doubt about it. That Tourville failed to take full advantage of his position is beside the point. The way was open.

Throughout his work, Colomb emphasizes his belief in the necessity of having complete command of the sea before undertaking the transport of troops and landing operations on an enemy coast. Perhaps he hoped to inculcate foreign students with the belief that no such command of English seas as would warrant an invasion could ever be attained.

Allen describes the battle of Beachy Head as an inglorious affair, and Colomb says that there is nothing to show that Torrington attempted to use any of his 20 fireships.

After Torrington's failure, the British relied for a time on the old

plan of joint command by appointing Admirals Haddock, Killigrew, and Ashby to that anomalous duty. But though the war continued, there were no battles in 1691, and in December of that year Russell was appointed Admiral of the Fleet.

By the spring of 1692, the Dutch and English ships of the line under Russell numbered about 100, while those of the French, under Tourville varied little from the preceding years.

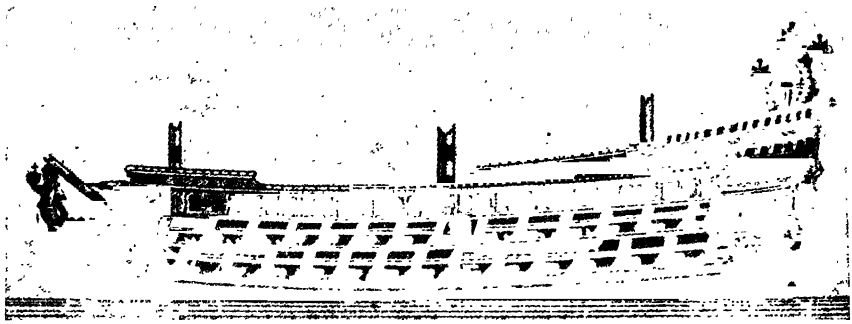


FIG. 27.—Tourville's Flagship, *Le Soleil Royal.* (From the drawing by A. L van Kaldenbach.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Russell at this time, though but 38 years of age, was a naval officer of 20 years' experience. As has been stated, he had carried letters between William and his English supporters and was one of those who signed the invitation to William and Mary to mount the English throne. He was a member of a powerful English family and was influential in the new government. More resolute than Torrington, he was violently opposed to the retreat into the Thames.

It appears that James II's Fighting Instructions of 1673, as modified by Dartmouth, were in force under Torrington. Russell, in anticipation of meeting the French, issued a complete set of Sailing and Fighting Instructions of broader scope than those of earlier dates.

Corbett says Russell's Instructions set the form for all those issued to British fleets until the end of our "War of Independence"; that is, for upwards of 90 years. Though printed, they were never referred to in any publication and all knowledge of their issue was lost until nearly two centuries later, when Clowes discovered a copy in Holland carrying the title:

"Instructions made by the Right Honourable Edward Russell, Admiral in the year

1691, or the Better Ordering of the Fleet in Sailing by Day and Night and in Fighting:"

Corbett says the Instructions included

a completely indexed set of day and night signals; instructions to be observed by younger captains towards their elders; instructions for masters of small craft aiding the fleet (tenders); and for the encouragement of captains and companies of fireships and frigates.

Corbett continues:

The peculiar importance of this set of articles, therefore, is that in them we have the first known example of those stereotyped fighting instructions to which, as all modern writers seem agreed, was due the alleged decadence of naval tactics in the Eighteenth Century.

. . . but when we come to study minutely these orders of Russell and to study them in the light of the last of the Duke of York's and the observations thereon in the "Admiralty Manuscript," as well as the views of the great French admirals of the time, we may well doubt whether the judgment does not require modification. We may doubt, that is, whether Russell's orders, so far from being a caricature of what had gone before, were not rather a sagacious attempt to secure that increase of maneuvering power and squadronal control which had been found essential to any real advance in tactics.

Corbett notes that although Russell provided no special instructions for dividing the enemy's fleet, similar to those of 1673, he did provide signals by which an attempt to divide the enemy's fleet could be carried out if the commander-in-chief desired.

Russell's Fighting Instructions consisted of 30 articles, of which the first two provided for line of battle in column and in line, as follows:

I. When the admiral would have the fleet draw into a line of battle, one ship ahead of another (according to the method given to each captain) he will hoist a union flag and a pennant at the mizen-peak and fire a gun; and every flagship in the fleet is to do the same.

II. When the admiral would have the fleet draw into a line of battle, one ship abreast of another (according to the method given to each captain), he will hoist a union flag and a pennant at the mizen-peak, and fire a gun; and every flagship in the fleet is to do the same.

III provided separate signals for the admiral of the white and (or) the admiral of the blue squadron to tack and endeavor to gain the wind of the enemy.

IV comprised separate signals for the vice admiral of the red, white, and (or) blue to tack with their respective divisions and endeavor to gain the wind of the enemy.

In other words, by instructions III and IV Admiral Russell could

have either squadron or either division of any squadron tack together and endeavor to gain the wind of the enemy, which, according to Corbett, gave him all the flexibility he required to attempt to divide the enemy's fleet, if he saw fit.

V went still further and provided separate signals for the rear admirals of the red, white, and blue.

VI was a signal for forming column by the wind to leeward when the admiral himself was to leeward of his own fleet.

VII was for doing the same when he was to leeward of the enemy with part of his fleet to leeward of himself.

VIII gave signals for forming column on port and starboard tacks.

IX gave signals for tacking by squadrons when the van tacked first. These were different for tacking during an engagement and tacking when not engaged.

X was a signal for tacking, beginning with the rear squadron.

XI was a signal for all flagships to form column with the flagship of the commander-in-chief.

XII gave signals for the separate squadrons to make more sail.

XIII. Red flag—commence firing.

XIV was a signal for the small frigates not in line of battle to come under the stern of the flagship of the commander-in-chief.

XV was a signal for heaving-to, to begin at the rear of the column when ships were close-hauled in line of battle.

XVI was a signal to fill and stand on, hoisted when the fleet was hove to in a line of battle, with head sails to the mast. The Instruction provided that ships in the van should fill first.

XVII directed when to tack and sail parallel to the enemy, when meeting on opposite courses with the English to windward, and gave signals for controlling the speed of the fleet in line of battle by directing the van to make or take in sail, and while fighting, to keep distance of one half cable.

XVIII. "If the admiral and his fleet have the wind of the enemy and they have stretched themselves in a line of battle, the van of the admiral's fleet is to steer with the van of the enemy's. . . ."

XIX is a combination of two former instructions; the first directing that guns be not fired until within *point-blank* range, and second, that no gun should be fired over another ship. The old order was not to fire until within distance to do good execution. Russell introduced the new, and more definite term, point-blank.

XX. No chase by any ship permitted until the enemy's main body is disabled or runs.

XXI was a signal from a ship, which when made required the next ship to come to its relief.

XXII directed that other vessels get into a line between the enemy and a flagship in distress, "having always an eye to defend him."

XXIII. When a ship is forced out of her position to repair damages received in battle, the following ships are to close up. The requirement forbidding other ships to stop and relieve those disabled, which was formerly positive, is in Russell's Instructions only to be inferred.

XXIV authorizes a flag officer to shift to any ship of his squadron or division when his flagship is disabled.

XXV. Signal for general chase.

XXVI. Signal for any particular squadron or division to chase.

XXVII. Signal for giving over the chase.

XXVIII. Signal for taking disabled ships in tow, the ship ahead of the disabled ship to take the other in tow, but the disabled ship is on no account to leave station until the flag officer has been acquainted with the condition of the ship and given instructions. Further, "in case any commander shall be wanting in his duty, his flag, or the next flag officer to him is immediately to send for the said commander from his ship and appoint another in his room."

XXIX. Signals for a squadron or division to cut or slip cables in daytime and endeavor to tack or weather the enemy "as is expressed in the third, fourth, fifth, and sixth articles before going."

XXX. Signals for the red, the white, or the blue squadron to form line ready for battle and signals for the red, white, and blue squadrons to form column ready for battle, also signals for the vice admirals and rear admirals of the red, white, or blue to form their divisions into line of battle, either in line or column.

Russell's Fighting Instructions are, in fact, the first tactical signal book. They are notable, principally, for prescribing signals for a greater variety of movements of squadrons and divisions of the fleet than any other earlier instructions. No important new tactical ideas are disclosed, but the commander-in-chief, by reason of the new signals, had a flexibility of control that enabled him to make attempts against the enemy with all, or any portions of his fleet, which had heretofore been impracticable owing to lack of signals.

Dartmouth's instructions for the "lasking approach" were omitted,

as were the Duke's maxim, "Nothing but beating the body of the enemy's fleet can effectually succor the lame ships," and Rupert's "to endeavour the utmost that may be the destruction of the enemy which is always to be made the chiefest care."

The Duke's instruction modified his own order for succoring "lame ships," and Rupert's modified the Duke's orders, to preserve the order of battle and keep the fleet in one line.

Had Russell included these admonitions, the reproach that British tactics laid more stress on maintaining the line than on injuring the enemy would have been without foundation.

Instructions of 1665 were that ships should endeavor to maintain a distance of half a cable, which could be varied as the state of the weather and "the occasion of succouring our own or assaulting the enemy's ships shall require."

Russell did not include this proviso. His instructions were positive that "whilst they are in fight with the enemy" distance should be half a cable except in bad weather. He anticipated a battle with Tourville and it is possible, either that French distance was half a cable, or else that he expected to concentrate his own compact column against an equal length of enemy column containing fewer ships.

The instructions for forming column and line indicate that the fleet was to be handled as a unit. In the Dutch Wars, whatever may have been the custom during the approach, van, center, and rear were maneuvered separately in the battle. It was squadron rather than fleet fighting.

The battle off Beachy Head showed that squadron fighting was still the custom in 1689.

Corbett thinks that Russell's elaborate articles for handling squadrons and subdivisions independently, may well have had the intention of concentrating on part of the enemy's fleet—particularly by doubling—and that the criticisms made on the rigidity of the prescribed routine of fighting in parallel columns were probably not completely justified, either then, or later.

On May 18, 1692, Russell sailed from Spithead with his combined fleet—Dutch and English—numbering about 100 ships of the line, his flag on the *Britannia* (100). He sought command of the sea in order to protect allied trade, harass the French, and prevent French assistance to James in Ireland.

Tourville, with 70 ships against 100, was now on the defensive, the

disparity of forces being much greater than in 1690, when he was somewhat superior. However, he took the sea and managed to prevent being drawn into battle, while at the same time protecting French commerce, harassing English trade, and enabling French convoys to sail safely to and from Ireland.

His was a real "fleet in being." The British could neither bring it to battle, nor chase it away from the mouth of the Channel. This is said to be the most brilliant strategical handling of an inferior fleet recorded.

The next year, 1692, James returned from Ireland, to prepare, at Cape la Hogue, for the embarkation of an already assembled force to invade England, where he hoped to be well received and supported by the enemies of William and Mary. Mary was again holding the reins of government, her husband being in Holland, fighting the French land forces.

This year, to protect the transports of the army of invasion, Tourville could muster but 44 ships of the line, with 13 frigates and fireships, the whole mounting 3,240 guns, as against the combined Dutch and British fleet of 99 ships of the line and 38 frigates and fireships, mounting in all, 6,796 guns.

The severe campaigns which Louis XIV was prosecuting with his armies had necessarily reduced the naval forces, although Tourville's fleet would have been larger had the Toulon squadron been able to join. He arrived in the Channel with the Brest fleet May 17, determined to fight regardless of odds. Louis XIV, having learned of the numbers of the Allied fleet before it left Spithead, sent two despatches to Tourville advising him to avoid action. Mahan (Clowes) says neither was received.

Russell, with all of his flag officers and captains, had sent an address to Queen Mary, assuring her of their loyalty. He then put to sea and sighted Tourville, off Cape Barfleur east of Cherbourg, on the morning of May 19.

Tourville had the wind and consequently the choice of fighting or escaping an engagement. Whether he realized the overwhelming odds against him is unknown. The supposition is that he did not until too late to avoid engaging. He bore up for the Allies, who awaited him on their own starboard tack, the wind being southwest—line of bearing about southeast by south. Quoting from Mahan:

> When they were within easy range, the French hauled their wind on the same tack, keeping the weather gauge. Tourville, being so inferior in numbers, could not wholly avoid the enemy's line extending to the rear of his own, which was also

necessarily weak from its extreme length; but he avoided Torrington's error at Beachy Head, keeping his van refused, with long intervals between ships to check the enemy's van and engaging closely with his center and rear.

The Allies completed forming what Russell called an "indifferent" battle order in column, about 8 A.M. He ordered Van Almonde, in command of the van (Dutch), to weather the enemy as soon as possible (Instruction III), evidently with the object of *doubling*. But almost immediately after the French had brought by the wind and commenced firing, it fell calm, and the Dutch could do little at the time, except engage with what French were within gun fire.



FIG. 28.—Edward Russell, Earl of Orford, Viscount Barfleur, Admiral of the Fleet. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

The closest fighting was in the center. Tourville's flagship, the *Soleil Royal* (110), had to be towed out of action by 1.00 P.M. About two o'clock, a light breeze came out of the northwest, which enabled some French ships to go to her assistance. About this group, the hottest fighting ensued.

At three o'clock a fog came on, but before this Shovell had doubled with his division on the *Soleil Royal* and the ships with her. The fog forced a cessation of the firing, except for a short interval, until nearly 5 P.M. In this interval the *Soleil Royal* was still to be seen, towing out of action to the northward. The *Britannia,* Russell's flagship, and others attempted to tow after her, but the fog shut in again and when it finally cleared with an easterly wind the French were seen retreating to the westward.

Russell ordered a general chase. Some of the French ships were overtaken and engaged, but fog again at 8 P.M. closed the action for that day, except that, as in the battle of Jutland in 1915, there was a partial

and accidental engagement during the night between a division of the English and the main body of the French.

At eight o'clock on the morning of the 20th the chase was renewed, with the wind at E.N.E., but light. At 11.30 A.M., it shifted, still light, to the southwest, putting the French to windward, and both fleets anchored to hold position against the tide, getting underway again at 10 P.M.

On the 21st, the chase continued, both fleets underway or at anchor, as the tide served. Tourville, his flagship in a perilous position near the shore, transferred to the *Ambitieux* (92).

Soon after the transfer, the *Soleil Royal* stranded near Cherbourg. After this, there were evidently shifting winds, for up to this time the pursuit seems to have been progressing to the westward, but on the evening of that day, the account says, a large French force, 12 ships in all, was seen entering the bay of La Hogue which is south of Barfleur and east of Cherbourg. Why these ships did not continue to the westward and finally escape, as did 20 others, is not explained. There were also 5 French ships which stood east up the Channel and avoided capture.

On the whole, the French appear to have been better sailers than the English or the Dutch.

On the 22nd, De Lavall destroyed the *Soleil Royal* and two other French ships of the line stranded near her.

On the 23rd, Russell sent Rooke in the *Eagle* (70) with armed boats and fireships, into the bay of La Hogue, to destroy the 12 enemy ships of the line that had taken refuge at the head of the bay. Six of them were burned, this being accomplished while the English were under fire from the French forts and ships, supported by troops which had been assembled for the invasion of England. Six more were destroyed the next morning, as well as some troop transports and supply vessels.

James was an unhappy witness of the destruction of his ships and with it his hopes of regaining the English crown.

The French had fought well, although their rate of fire was observed to be much slower than that of the English.

Had they kept together and underway, all might have escaped except the *Soleil Royal* and possibly the two ships that were beached with her. It appears that no ships were lost on either side during the battle, although Allen says four Frenchmen were burned by English fireships during the night of the 19th.

The English had made great preparations for a descent on the French

coast. Their encounter with Tourville was in the nature of a surprise. His defeat ended the campaign of 1692.

Russell, having quarrelled with the Admiralty, was not employed in the following summer, although he became First Lord later in the year.

For a time the British again tried the plan of three joint admirals, but without success, although the command was entrusted to three capable men, Admirals Killigrew, Shovell, and De Lavall. They lived on the same flagship and had a large fleet of English ships and a contingent of Dutch. But Tourville was out with a fleet of 90 and they accomplished nothing against him. On the contrary, in June, he intercepted Sir George Rooke, who with a squadron of 23 of the line—English and Dutch—was convoying 400 Dutch and English merchantmen from the Mediterranean to the Channel.

The merchant fleet dispersed and Rooke, after a fight in which he lost two Dutch ships and one English, stood to sea in the night and escaped. Ninety merchant ships were captured, burnt, or sunk.

In retaliation, Commodore Benbow appeared off St. Malo in November with a squadron of 12 of the line, 4 mortar ships, and 10 brigantines, to bombard the fort and town. After three days' assault from mortars and brigantines at such hours as the tides would allow, Benbow sent in a powder-ship. This was a galliot, loaded with 100 barrels of powder, and above these, "340 carcasses, or chests filled with grenades, cannon balls, iron chains, loaded fire-arms and large pieces of metal wrapped up in tarpaulins and other destructive missiles." The intent was to tie the galliot up to the sea wall before lighting the fuse. A shift of wind put her on a rock some distance from the wall, but the force of the explosion "was sufficient to blow down a part of the town wall and to shake and severely damage every house in the town."

Another cause for the attempt to destroy St. Malo was that its privateers and those of Dunkirk were doing great damage to English and Dutch trade, despite the fact that the allies had, in other respects, unchallenged command of the sea.

The next year, 1694, an attempt was made to destroy Dunkirk by a small allied fleet under Sir Cloudesley Shovell, with Benbow as second in command. Like attacks had been previously made on Dieppe and Brest, but the floating infernal machines designed to destroy French seaports proved ineffective. Seventeen of these were employed in an attack on Dunkirk. They were called "smoak boats" and it was designed by their explosion or burning to envelop the town in noxious fumes and drive out the inhabitants.

Again, in 1695, expeditions were sent against St. Malo and Dunkirk. Benbow distinguished himself in both of them, but was successful only against St. Malo.

These attacks are of tactical interest only in relation to the new means employed by the English to destroy or depopulate French seaports by powder-boats and noxious fumes.

In attacking the forts of St. Malo, Benbow flew a red flag on the *Charles* galley—perhaps the last occasion that a galley was employed in battle by the English.

These were the days of Jean Bart and Duguay Trouin. Their inroads on Dutch and English shipping had much to do with bringing about the peace of Rijswijk in September 1697.

Clowes believes that during this war, which lasted eight years, the English Navy did not add much to the reputation it had acquired under Cromwell and Charles II.

Mahan says that the French fleet was gradually decaying and that the efficiency of the English Navy was low and its administration worse.

CHAPTER X

SHIPS AND GUNS: LATE 17TH CENTURY

WHAT CHANGES had taken place in ships and guns since Elizabeth's time? The broad outlines have been sketched up to the time of the Dutch wars, and references made to James' improvements in material both as Duke of York and as king.

The three flagships of Elizabeth's fleet in 1588—*Ark Royal, Victory,*

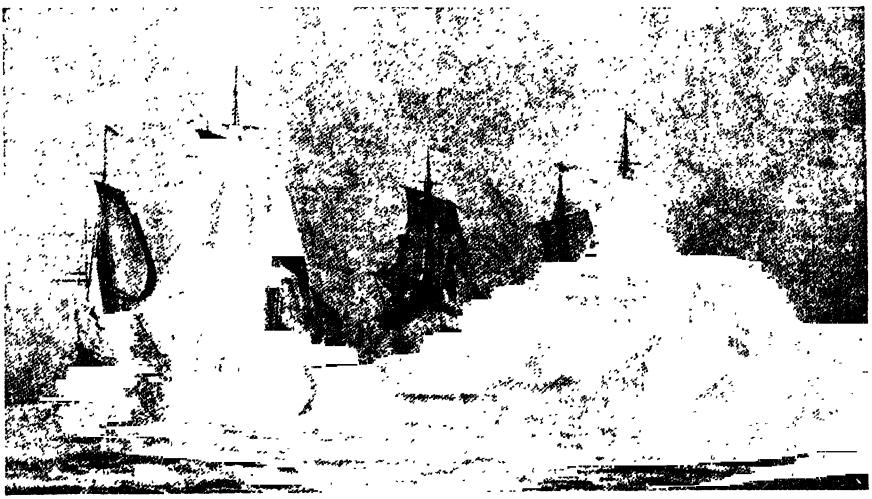


FIG. 29.—Ships of the line in action at the close of the 17th century. (*From Colomb's "Naval Warfare," W. H. Allen & Co., Ltd., London*)

and *Triumph*—though classed as first rates in their day, would have been only fourth rates in 1700 and barely fit to "lie in the line."

Tourville's flagship in 1692, the *Soleil Royal,* mounted 110 guns; Russell's flagship *Britannia* and four other ships of the fleet each mounted 100 guns. Growth in tonnage and in number of guns carried had been steady through the reigns of James I and Charles I and II.

Colomb shows a painting, reproduced here, of "Ships of the Line in Action" at the close of the 17th century, still too high in the poop, but otherwise in masts, yards, sails, and hulls, much as they were when the steam period began.

Ships had improved internally as well as externally. Whether they

were more weatherly is uncertain. Lower topsails lessened leeway; but Hoste, near the end of the century, doubted whether a French fleet could beat to windward in formation. Certainly, however, single ships could lie close to the wind, and make less leeway than a century earlier.

English first rates (100 guns) carried 26 cannon (42 pdrs.), 28 culverins (18 pdrs.), and 44 sakers (4 to 6 and 2 to 3 pdrs.)

Second rates (90 guns) mounted 26 demi-cannon (32 pdrs.), 26 culverins, and 36 sakers.

Third rates (70 guns) mounted 26 demi-cannon, 28 demi-culverins (12 pdrs.), and 14 sakers.

This was the official establishment, but batteries varied much from it, except the lower tier of three deckers—42 pdrs. The large percentage of small guns—sakers—is notable; but it is to be remembered that Paul Jones in the *Ranger* won a battle with 6 pounders alone.

Soon after the end of the century the terms cannon, demi-cannon, culverin, and saker disappeared, and guns were designated by the weight of their shot.

Brass and bronze had again come into favor because of the many failures of cast-iron guns, caused probably by higher powder pressures.

We find no mention of sights for ships' guns, though there is a reference, in Meyer, to several kinds of movable sights in 1689 for artillery.

Bomb ketches of the type used by the English in bombardments of St. Malo and other towns from the sea, were introduced by the French at the siege of Algiers in 1681. They were called "galliotes-à-bombes." Each mounted two mortars and it was said that each of these vessels—seven in all—at the siege of Algiers, fired as many as 40 bombs and carcasses into the city each night. The largest of these mortars were of 14-inch caliber, weight of shell 140 pounds, powder charge 38 pounds, range 3,800 yards.

The "carcasse" was an incendiary projectile intended to be fired from ordinary guns as well as from mortars. It consisted, briefly, of a perforated or laced envelope, containing combustibles which were set on fire by the burning powder. They were considered less effective than explosive shell and—later—hot shot.

The Dey of Algiers, a practical-minded man, offered to burn his city himself, if Louis XIV would pay him half as much as it would cost France to do it.

Bomb ketches soon became a feature of every fleet for bombarding seaports and shore fortifications. They were anchored 2,400 to 3,000

yards off shore, well beyond the useful range of shore batteries, and employed high angle fire, usually 45 degrees; range being varied by varying the powder charge. Some mortars had elevating arcs. Mortar-beds were pivoted and made revolving, so that the mortar could be brought to bear independently of the heading of the ketch.

Some mortars had trunnions about the middle of their length (mortiers). Others had one at the breech (trabbucho). Examples of both are at the U. S. Naval Academy.

Various means were employed to insure that the time fuse of the mortar shell should ignite before leaving the mortar. In some cases, the dangerous method of lighting the fuse by hand just before firing was adopted. This was called by the French "tir à deux feux," as distinguished from "tir à un feu" when the flame from the charge was relied on to ignite the fuse.



FIG. 30.—Trabuccho cast at Seville, July, 1779. Captured at Manila, 1898. (*Courtesy U. S. Naval Academy Museum*)

Some mortars were cast with two vents, both primed —one to fire the charge, the other to light the fuse. Sometimes eccentric shells were cast, with the object of having the heavy side, containing a percussion fuse, strike first and ensure explosion.

A gun firing explosive shot horizontally was called by the French an "obusier." Shell guns, as distinguished from mortars, were used ashore, but not afloat, for well over a century. Shell firing in our navy was almost unknown until 1840.

In 1674, the Dutch general Coehorn mounted several small mortars side by side on a bed which could be directed at will. These could be transported on shore. In the 18th century and later they were sometimes mounted in ships' tops. Coehorns, or coehorn mortars, became a generally used ordnance term.

These were warlike times. All countries were on the alert to secure stores of saltpeter and sulphur and to experiment with different proportions and qualities of the three ingredients of powder.

In 1688 Vauban, the great French military engineer, proposed *rico-*

chet firing for land guns. It was successfully tested in 1697 at the siege of Asth in Belgium. Ricochet firing was later used at sea. It may have been used there earlier than on land.

Until after the end of the 17th century practically all governments purchased their guns from private foundries and proved them under government direction.

Guns were cast hollow, not bored. Castings were imperfect and considerable tolerance in caliber, pits, and scores was permitted.

An Italian author, in the early part of the century, writes that "when a cannon is finished it ought to be viewed by the sovereign" but that he need not assist at the proof. The proof to which he referred was firing three shots, with charges varying from three-quarters to one and one-half times the weight of the shot.

A founder who presented his gun for proof had a right to superintend the loading. He was advised before putting the shot in the gun to make two crosses with it in front of the muzzle, and at the moment of firing to invoke "Jesus Christ, La Vierge, et Sainte Barbe." However, Sarti shows incomplete faith in the efficacy of the prescribed invocation by advising that before firing, everybody should retire behind a wall.

Santa Barbara is, to this day, the patron saint of gunners. The celebrated painting by Palma Vecchio (1420-1528), now in a Venetian church, was executed on a commission from the Venetian Bombardieri, and was at first hung in their barracks.

By 1700, a site at Woolwich on the Thames, known as the King's Warren, had become a storage and proving ground for guns, and in one sense, an experimental station for ordnance and the manufacture of powder. Later, it became a great arsenal for both navy and army and a royal dock-yard, containing a gun foundry and housing England's first artillery school.

Guns and gunnery, at the end of the 17th century, differed little on the whole from what they were at its beginning. Primers had been invented, but not applied to ships' guns. The axis of trunnions continued to be placed tangent to the bottom of the bore, though some illustrations show tops of trunnions tangent to the axis of the bore. It is probable that all guns had notches at the breech and muzzle to show the line of sight.

CHAPTER XI

FRENCH NAVAL TACTICS: PAUL HOSTE, 1697

DURING THE TIMES of which we are now writing there is no reason to believe that tactics in other navies did not keep pace with their evolution in England, even though English development was along largely independent lines from that elsewhere. It is more probable, in fact, that each influenced the others. France had been allied with England, with Spain, and with the Dutch. The English and Dutch were enemies between 1650 and 1673, and allies before and after those dates. Dutch and English officers had been loaned to Sweden.

We have no such records of French, Dutch, or Spanish Fighting Instructions as have been kept in England, but we have equally valuable though unofficial records of French tactical maxims.



FIG. 31.—"Bed of the Wind." (*From Hoste's "L'Art des Armees Navales"*)

In 1697, the year of the Peace of Rijswyjk, Paul Hoste, a Jesuit priest, naval chaplain, and professor of mathematics at the Royal Naval College in Toulon, published his great treatise *L'Art des Armées navales, ou Traité des Evolutions navales*. The U. S. Naval Academy possesses two copies of this famous book. One carries the accession date of 1855, donor not known. The other was presented by the late Lieutenant H. P. McIntosh, U. S. Navy, class of '71, U. S. Naval Academy and bears the inscription, "H. P. McIntosh, Master, U. S. Navy, U.S.S. *Shenandoah,* Montevideo, Uruguay, S.A., April 28th, 1880."

Hoste combined his naval tactics and his theory of ship building in one volume, with a short glossary of marine terms used in both treatises. The preface records that under date of November 7, 1696, King Louis XIV gave Paul Hoste permission to print, this privilege to last 15 consecutive years after the first printing. The first edition came from the press of Anesson and Poseul of Lyons, under date of October 25, 1697.

It is interesting to learn that the Pope gave Hoste religious permission to publish his work, as distinct from the King's civil permission. This was authenticated by the Senior Jesuit (Père Provincial) of the Province of Lyons, who certified that both treatises had been read and approved by three of his profession.

In the preface Hoste addresses the King as follows:

Sire: The work which I have the honor to present to your Majesty consists of two new arts which should be of some utility in your kingdom. One sets forth the principles that have been sought for a long time to render the construction of vessels simple, sure, and infallible. The other reduces to rules equally clear and exact, all movements that can or ought to be made by fleets (armées de mer). These rules, Sire, have been formulated upon those which have already been practiced in your fleets since they have been directed by your instructions and animated by your orders. Your Majesty will find in these rules all the evolutions that are made at sea to maintain ships in good arrangement, notwithstanding the inconstancy of the wind and the irregularities of the waves. Here will be seen how to search for the enemy, force him to combat, overcome and pursue him, and how to carry your arms victoriously to lands, however far removed, and to perform everywhere exploits unknown to past ages. Behold, Sire, all that can be learned of the naval art. Behold also, all that your Majesty has so gloriously done for your Navy.

After several pages of eulogies he proceeds with the body of his work.

The first part is made up of fourteen sections or chapters:

I. Explanation of terms.
II. Assumptions which set forth the principles applying to the entire treatise.
III. Chasing.
IV. Forming ships on a given course.
V. Order of battle.
VI. Detailed explanation of the order of battle.
VII. VIII, IX, X, XI. First, second, third, fourth, and fifth orders of sailing.
XII. Formation for retreat.
XIII. Formation of a fleet guarding a passage.
XIV. Formation for forcing a passage.

Part 2. Instructions for changing from one formation to another.

Part 3. Rules for re-establishing the order of sailing on change of wind.

Part 4. Rules for passing from one order of sailing to another (changing formation).

Part 5. Movements of fleets without reference to formation.
I. Anchoring.
II. Gaining the wind of an enemy.
III. Going about when sailing in three columns.
IV. Avoiding combat.
V. Forcing enemy to combat.
VI. Doubling upon enemy.
VII. Preventing the enemy from doubling.
VIII. Receiving the attack.

IX. Breaking through the enemy's line.
X. Anchoring in port in position to repel an attack.

Part 6.
I. Divisions of the fleet.
II. Stations of fire ships and other auxiliaries.
IV. The naval square.
V. Signals.
VI. A project for a signal code.

Hoste's definition of a battle formation reads:

If vessels are in column close-hauled, they are said to be *en ligne de combat,* and thus there is the *ligne de combat babord* (port line of battle) and *ligne de combat stribord* (starboard line of battle).

Hoste then says that he will give the reasons why fleets are thus arranged for fighting, and why the *ligne* (column) arose as the order of fighting, and hence the name ship of the line, which he designates as a ship strong enough to fight in formation. He thinks small ships, far from strengthening a formation by their numbers, weaken it. He considers the smallest ship fit to lie in the line is one carrying not less than 50 guns—18-pounders or over (equivalent to a good English 4th rate).

In battle, he describes fleets as forming themselves in two parallel columns on one of the two close-hauled lines. Every ship is close-hauled on the course on which the fleet is formed, and at a distance of one cable. Fire-ships and supply ships keep half a league from the fleet to which they belong, on the side away from the enemy.

Having taken this formation, the fleet which is to leeward should, on the approach of the enemy to give battle, run free for a short time, in order to give opportunity to insure its correct alignment. Intervals between divisions should be left to secure some freedom of action. But even more important, each division commander should endeavor to keep himself abeam of the enemy ships that his commander-in-chief has allocated to him, making or shortening sail, or *countermarching*—if absolutely necessary—to maintain the enemy position.

Briefly, Hoste advocates intervals between divisions, to give more flexibility to their movements and to permit each division to be kept abeam of the particular enemy division assigned to it.

Here we have two tactical maxims, neither of which, as far as we can learn, had ever been enunciated by the English. Hoste says he reflects Tourville's ideas.

The emphasis he placed on the definition of "par le travers" leads

to the belief that what he really meant by his second maxim was to keep the enemy ships abeam, instead of keeping abeam of them. This assumption is strengthened by his statement to the effect that fleets ought to sail close-hauled in column, in order that each vessel may present its broadside to the enemy. "Fleets that fail to do this, do not make the best presentation of their batteries."

This maxim, to keep the enemy at right angles to your own formation, was next voiced by Commander James H. Ward, U.S.N., in his *Naval Tactics,* 1859, 162 years later. Again it appeared in the Naval Institute *Proceedings* in the early years of the present century, as a conception of the writer who next proposed it. He had apparently forgotten that Ward's *Naval Tactics* had been a text-book in his Naval Academy days.

In 1859, there was one copy of Hoste in the U. S. Naval Academy library with the accession date of 1855. Ward was the first commandant of midshipmen. He was detached for sea duty in 1847 and is reputed to have written his tactics while on the coast of Africa.

The Naval Academy has two copies of an English translation of Hoste, made in 1834. One of these (No. 43) may have been received as early as 1848. The other copy was obtained from the U. S. Military Academy in 1904.

Ward was a thinker as well as a writer, and this important tactical maxim may well have been self-evolved. It is now universally accepted. Modernized, it should read: "Keep the enemy in your arc of maximum offensive power."

The remainder of Hoste's treatise is too important to be ignored and too long to be more than summarized. His simple rule for chasing is still of value: "When a vessel A. desires to chase vessel B. and overtake him by the shortest route, vessel B. must be kept on a constant bearing."

Referring to a subject still of some importance, the windward position which every sailing admiral endeavored to gain, Hoste said it was necessary to consider the advantages and disadvantages of both positions—windward and leeward. Some of his points are pertinent now.

For instance. The fleet to windward can approach the enemy, when, and as much as, it will. And he cites the battle of the Texel as an example of the English having the wind. Thus the windward fleet regulates the hour and the range of the engagement in the manner most advantageous to itself.

If it is more numerous than the enemy, it can detach some ships

which can attack the enemy's rear and infallibly create disorder there. He illustrates this by diagrams of ships from the rear of the windward fleet, bearing up, passing around the stern of the enemy's rear ships, raking them, and passing and engaging them to leeward, while they are still engaged to windward. He believed that the rear ships of the enemy's fleet could not long sustain such an attack, would be forced to haul out of battle, and that then the ships next ahead could be treated in the same manner.

Another advantage of the windward position was that the fireships could be more easily sent to destroy disabled enemy vessels, no matter in what part of the enemy fleet gaps were made by the withdrawal of the disabled ships.

The fleet holding the windward position was freed from the effect of its own smoke, which was added to the other disadvantages of the leeward fleet, encompassing its ships, stifling the gunners, sometimes setting the sails afire from sparks and obscuring the ships to windward.

On the other hand, he considered that although the disadvantages of being to leeward were recognized, they were not as great as might be thought and that some naval officers believed it was as advantageous to be to leeward as to windward. He felt, however, that if the subject were carefully considered, the advocates of this idea would find themselves unable to subscribe to it and that the advantages of having the wind was the greatest of all advantages, were the windward fleet stronger or weaker than the enemy, save under one condition; if the wind were strong and the sea rough.

He also made exception of a duel between ships, or when there were but a few vessels on each side.

He then enumerated the advantages of the lee gauge, as enabling ships to use their lower tiers in bad weather without fear of having their decks flooded through the gun ports, which, with a strong wind, he considered undoubtedly a great advantage. Another, an indirect one, was that the leeward fleet could protect its disabled ships more easily, while those of the windward fleet, if not near its rear, would drift among the ships to leeward and could be more easily destroyed.

His last reason—and one which seems to have been a maxim raised to a higher degree than it deserved by the French, in later years—was that the fleet to leeward could more easily withdraw from the engagement if it felt constrained to do so. This the windward fleet could not do.

He recognized, of course, that a fleet which fled before the wind was in a dangerous position if its foe desired to chase. Yet there were cir-

cumstances when it could do so without fear of further punishment, such as the approach of darkness, freshening of the wind, rough sea, or if the other fleet were embarrassed with a convoy, while the fleet to windward could not withdraw from an action even if it so desired without passing through the leeward fleet. If it attempted this, it brought on what he called "la mêlée." He says:

> I know well that the vessels of the fleet which are not in column close-hauled can, nevertheless, sail close-hauled, but I find two inconveniences in this: first, that the fleet which is not in a close-hauled column, seems to flee, when those ships haul by the wind, and that each ship has much greater difficulty in keeping itself in position because the ships are "en échiquier" (checkered).

A definition of sailing "en échiquier" is sailing close-hauled, or running free, on a line of bearing different from the course. On the new tack, the line of bearing is not the same as the course. Then—as now—and more especially, *then,* this was a difficult formation to maintain.

If the fleet to windward is not close-hauled, it loses the advantage of being able to approach the enemy, without being approached by him.

Another reason for the windward fleet being close-hauled was that a disabled ship might withdraw from action by going about and running free on the opposite course with what sail she could still carry, until clear of the rear. This she could not do if the fleet had the wind abeam, since a ship going about would also have the wind abeam and would sag towards the enemy's fleet.

Summing up: if the windward fleet does not maintain its close-hauled position, it sacrifices a very great advantage; that of being able to approach the enemy, when the enemy cannot approach it, which is not the case if neither is close-hauled.

Ships ought to be a cable length from each other (100 toises). A fleet should be concentrated as much as possible, but not so close that ships are in danger of fouling each other. Therefore, 600 feet (cent toises) he considered the best distance.

The size of vessels contributes more to the strength of the fleet than their number, for two reasons. First; larger ships have more and heavier guns. Second; a fleet of large ships is better than a closer (plus serré) column of smaller vessels, since it can bring to bear on the enemy more and larger guns in an equal length of column.

This maxim continued to be valid until fire control of modern rifled guns brought such an increase of effective battle range that preponderance of "guns per mile," so strongly advocated in the early part of this century, lost much of its importance as a factor in battle.

Generalizing again, Hoste voices an important truth when he says:

. . . large ships are stronger, consequently less penetrable than small ones, so that not only is a fleet composed of larger vessels more powerful offensively, but also defensively, against a greater number of smaller and more penetrable ships in the same length of column.

Hoste describes five orders of sailing which are not pertinent here. His fleet organization is practically the same as those of the Spanish, Dutch, and English of the period, patterned to some extent on army organization. A fleet is divided into three squadrons as an army is divided into three corps, of which the first is the advance guard; the second, main body (corps de battaille); and the third, the rear guard. Each squadron has its commander. The commander of the first squadron, entitled an admiral, carries his flag at the mainmast. The commander of the second squadron—a vice admiral—carries his flag at the foremast, and the commander of the third—a rear admiral—carries his flag at the mizzenmast. In a large fleet, each squadron is divided into three divisions, each squadron with an admiral in command of the squadron and of one division and a vice admiral and rear admiral for the other two divisions, respectively.

Important reasons may oblige the commander-in-chief to change the relative positions of squadrons and divisions. It does not appear a matter of great consequence, and Hoste agrees that it is the least important part of evolutions, but such changes are, nevertheless, necessary on occasions, and a commander-in-chief will find himself in trouble if he has not easy and definite ways of changing the relative positions of the divisions of his fleet. This makes it obligatory to treat of the matter and to give rules for the most exact and shortest way whereby all changes desired can be made. He then proceeds to give rules and diagrams, mathematically correct, for effecting all desirable and necessary interchanges of positions of fleet units.

The fifth part of his work Hoste regards as the most difficult of all in the art of naval tactics. He entitles it, "Movements of Fleets without reference to Orders." He says:

I have not the necessary information to formulate rules in a matter of such importance and moreover, one is not well advised to formulate precepts for commanders-in-chief. He should be content with setting forth only some examples, because in matters so vast as these, nothing can be determined purely by theory. It is great genius, combined with great experience, which makes a great commander-in-chief. I only wish to set down in a few words some general reflections, and some examples which I consider of much greater worth than my reflections. One will find ways which I have not investigated. I merely offer reasons for, and against, divers methods of action that can be employed. There are many things which cannot be determined except by knowing all the circumstances of the case. Among them, what should an admiral do, when he is obliged to fight with a fleet much inferior to that

of the enemy? This is such a perilous undertaking that we find no rules by which his action can be pre-determined. Actions at sea are not like actions on shore. An army on shore, when it is inferior, entrenches itself, occupies advantageous positions, and supplements by the use of woods, rivers, and defiles, what it lacks in men; but at sea there is no other advantage except the wind, and that can scarcely be counted upon because of its inconstancy, and an inferior fleet should be judged as one must judge an inferior army which has been surprised in an open wood, where neither time nor terrain permit entrenching. In such circumstances, I think it would be very difficult to take a good part if much inferior to the enemy.

Under the title "Eviter le Combat" (to avoid fighting), Part IV, Hoste cites Tourville in 1691 as an example. Tourville, as is well known, was much admired. He was praised for his ability to prevent engagements, more than for his determination in bringing them about.

Hoste says a fleet which is to windward cannot be forced to engage, because it can always take the tack which carries it away from the enemy, but he adds that wise admirals understand the uncertainty of the winds, and when they do not wish to fight, avoid as much as possible remaining near the enemy, especially if the enemy's fleet is the stronger.

Of Tourville's campaign, he says:

The Allies had nearly 20 vessels more than the French, and it seemed the duty of the latter to remain in port, but the King wished Tourville to take the sea that there might be nothing to reflect on the glory of the French arms.

Nevertheless, Tourville did not wish to fight at a disadvantage. It required all the skill of a great admiral to succeed in such delicate circumstances. Tourville first cruised 15 days at the entrance of the Channel, stopping all merchant traffic in either direction. Having learned that the Smyrna fleet had joined the Allies on the coast of Ireland, he maintained such a position as would not excite the Allies' suspicion and at length fell in with the outward bound Jamaica fleet, capturing the two men-of-war that convoyed them, together with several merchant ships, while the others escaped up the Channel in the fog.

The mortification of the Allies on hearing this news caused them to seek out Tourville, with the expectation of either defeating him or compelling him to return to his own ports and leave the sea free for their merchant trade, but Tourville kept them at bay, disputing the wind with them for fifty days, without being forced to a decisive action, at the end of which time, he returned to Brest, finishing a happy campaign, which caused those who know, to admire his genius and tactical skill.

Hoste records his belief that the first five parts of his *Treatise* contain all that is necessary to know in connection with naval evolutions. It is a historical fact that those who knew their Hoste were acquainted with all that was known of naval evolutions until the end of the days of sail.

In the sixth part of his *Treatise* he gives the formation of a fleet, describing the rank and station of the different flag officers, the color of their flags, and where they are hoisted.

As a general rule, he considers that flag officers should be in the center of their commands, except the senior admirals, who sail at the head of their squadrons.

He repeats his rules for the stations of fireships and small craft and goes on to describe a means by which each ship of the line can properly determine its position in a fleet formation. This was by the use of a "naval square" (carré navale), which he says should be inscribed on the deck of every ship, between the main and mizzen-masts, with the two sides of the square equally distant from the keel line. The square should have a fore and aft line drawn amidships, dividing it into two equal parallelograms, and a diagonal line from each forward outboard corner to the opposite after corner. He states that the keel line represents the ship's course; the athwartship lines, the beam lines. When the ship is close-hauled, one of the diagonal lines will be the ship's course when she goes about, being twelve points from the previous course; and the other, the beam line to the new course.

He intimates that such squares were inscribed on French quarter-decks and were very useful for keeping position and that it was very easy for the officer on watch, while walking the deck, to see at a glance whether his ship was in correct position.

He goes into elaborate details as to the use of the naval square to determine a ship's position in all the various orders of sailing.

Naval squares were marked on the decks of some ships of our navy as late as 1895. (Tactical signal book.)

Hoste's book begins with an explanation which we have considered more suitable to introduce at the end of this survey. He writes:

> Formations are the different ways to arrange the vessels in a fleet. The formation tells—or should tell—two things: (1) the position of each ship with relation to the wind which is blowing, and (2) the situation of each ship with reference to the other ships which compose the same fleet. You cannot change either of these without changing the formation, and the formation lasts as long as neither of them is changed.
>
> The different circumstances in which a fleet finds itself and the different objects which the admiral desires to achieve, produce different formations. If a fleet is engaged it is formed differently than if it is en route. A fleet which is underway in sight of an enemy is differently disposed from one which is well removed from the chance of an encounter. A fleet which runs before the wind has its own particular formation. Likewise one which pursues an enemy, or retreats, or guards a passage, or forces a passage, or which is anchored in a port or roadstead, or which is underway to insult the enemy, all these different objects require different formations.
>
> Three things enable one to judge whether a formation is good. Does the formation arrange the fleet to accomplish its object? Does the formation contribute to increasing the speed of the fleet? Does the formation for retreat put the fleet in the best condition to oppose its pursuers? Does the formation spread the fleet or bring it

together? Because a fleet closely formed is less easily separated, mutual assistance is more easily rendered, and there can be more communication between admirals and their juniors. Can the formation be changed quickly, simply, and easily to the order of battle? Because the principal aim of fleets being to fight advantageously, every formation is to be subordinate to the order of battle. [This continues to be an important tactical maxim.]

Hoste's work being purely tactical, he referred to gunnery only incidentally, but since he was very clear in his statement that every formation is subordinate to the line of battle, and took occasion to emphasize the great advantages of more and larger guns, in the same length of battle line, his omission of one of the great gunnery advantages of the weather gauge, in his day, is noticeable. That is, vessels to leeward could be—and frequently were—hulled below their normal water line, while the lee side of the windward ships had the normal load water line well submerged, so that a ship hulled between wind and water on her lee side, could bring the shot holes well clear of the water on the other tack, and also when running free or before the wind.

Hoste says nothing about standing orders relative to the distance at which to engage, or the danger of firing over one's own ships, which figured prominently in English fighting instructions, but this does not signify that the French did not have such orders. He goes into much greater detail about breaking through the line and doubling than any English fighting instructions before or after his time. In tactics—in theory at least—and probably in signals, he shows the French to have been superior to the English in 1697.

Though it is clear that some English naval officers studied and were familiar with Hoste in the original, no complete English translation appeared until 1834. Parts I and V had been translated by Lieutenant Christopher O'Brien, R.N., in 1762. The translation of 1834 by Captain J. D. Boswall, R.N., and Lieutenant William Chambers, R.N., improved the illustrations by substituting for some of Hoste's drawings of ships, engravings of the best sailing ship models of 1834. For others—to make the meaning clearer—Boswall substituted diagrams. Boswall said of his translation that it filled the great need of a book of instruction on naval tactics, of which there was none. His translation was from the first edition of Hoste's work, published in 1697; the 1727 edition contained corrections to the original 1697 edition and added new matter. Both Naval Academy copies are of the 1727 edition. Hoste was born in 1652. He sailed as chaplain with Tourville and later served as professor of mathematics at the Toulon Naval Academy, where he died in 1700.

CHAPTER XII

THE WAR OF THE SPANISH SUCCESSION

FOR NEARLY five years after 1697 England enjoyed the blessings of peace. William III ruled alone for over seven years after the death of Queen Mary in 1694. On his death, March 8, 1702, he was succeeded by Anne, also a daughter of James II. Admiral Sir George Rooke, who was appointed to chief command of the navy in 1697, held office during these years of peace.

On Anne's succession, she appointed her husband, Prince George of Denmark, Lord High Admiral. He was the first to fill the post since the Duke of York. Rooke was continued in office as commander-in-chief of the fleet. He had been a naval officer for more than a third of a century. He had fought in the battles of Beachy Head under Torrington and La Hogue under Russell and had escaped Tourville in 1693.



FIG. 32.—Admiral of the Fleet, Sir George Rooke, Kt. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

It would seem that he should have been better qualified for commander-in-chief than Russell, but is described as being dilatory and much given to calling councils of war on occasions when he should have taken the initiative.

About two months after Anne's accession, she declared war on France—still under Louis XIV—to prevent the seating of Louis' grandson on the throne of Spain. The conflict that followed is known as "The War of the Spanish Succession." Again it was Louis XIV almost against the world.

Spain was on the side of France, but without resources except a rather inefficient navy. England and Holland furnished the sea power for the Grand Alliance (England, Holland, Portugal, and parts of the Empire of Charles V).

Prince George as Lord High Admiral issued the "Articles of War." Rooke, as commander-in-chief, issued the fighting instructions, under the title, "Instructions for the Directing and Governing of Her Majesty's Fleet in Sailing and Fighting, by the Right Honourable Sir George Rooke, Vice Admiral of England and Admiral and Commander-in-Chief of Her Majesty's fleet in 1703."

Rooke's Instructions, like Russell's, appear to have been lost. Clowes found several copies which he presented to the R.U.S.I.

Subsequent admirals issued "Additional Instructions," but not to contravene those issued by Rooke. His became known as the "Permanent Instructions." They were in force, with little change, for nearly a century.

Rooke may have helped to draw up Russell's Instructions. He evidently believed in them for he contented himself with very slight modifications. Except for some changes in signals, the first 16 articles were repetitions of Russell's.

Rooke inserted a new Article 17 on when to tack to parallel an enemy when meeting him on the opposite tack, the English fleet having the wind.

In another Article (24), he emphasized the order against any captain leaving his station, on any pretence whatever, without permission from his own, or the nearest flag officer. ". . . but in case he does so, the next ships are to close up the line."

"If any commander shall be wanting in his duty, his own, or the flag officer nearest him, is to send for him and appoint another." (This seems to contemplate a change of captains during action.)

Rooke had a new Article (31) for forming line of battle in column, running free, and another Article (32) which provided for repeating ships:

> When the fleet is in line of battle, the signals that are made by the Admiral for any squadron or particular division are to be repeated by all the flagships that are between the Admiral and that squadron or division to whom the signal is made.

The fleets Rooke commanded were as large as those in the Dutch Wars. He recognized the importance of being able to obtain quick transmission of signals.

Early in the war, Benbow—now a vice admiral—operating with a

small squadron against the French in the West Indies, had an unfortunate battle with a French squadron which cost him his life. Benbow in the *Breda* (70) overtook and brought to action part of a French squadron under Admiral Ducasse. Allen thus describes the fight, which took place Aug. 24, 1702, after partial engagements on the 19th and 20th:

At 2 A.M., on the 24th, owing to a change of wind, the *Breda* was enabled to pass within hail of the stern-most French ship, and a smart action ensued. Benbow, in person, boarded the French ship three times, in performing which he received a severe wound in the face and another in the arm, and shortly afterwards the gallant admiral had his right leg shattered by a chain-shot and was carried below; but he insisted on being again taken upon deck, where he remained, and while lying in his cradle, continued to give directions respecting the action.

The *Breda's* immediate opponent was in a short time reduced to a wreck, having lost her fore-topmast, main-yard, and mizzen-mast, and her hull was completely riddled with shot; but soon after daylight Benbow observed the French ships bearing down to her assistance. At the same time he had the mortification to witness the *Windsor, Pendennis, Greenwich,* and *Defiance,* actually bearing up and running away to leeward, in despite of his signal then flying for close action. The French, observing the dastardly conduct of Benbow's captains, steered for the *Breda,* upon which ship they opened a fire that shot away her main-topsail-yard and otherwise damaged her considerably. Then they sent fresh hands on board the *Breda's* late opponent and taking her in tow, made sail away without any attempt on the part of the ships before mentioned to prevent it.



FIG. 33.—Vice-Admiral John Benbow. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Admiral Benbow, determined still to follow the enemy, communicated with his captains and ordered them to keep their stations in the line, and behave like men; upon which Captain Kirkby of the *Defiance,* came on board and told the admiral "that he had better desist; that the French were very strong and that from what was passed he might guess he could make nothing of it." On sending for the captains of the other ships, to his inconceivably great surprise and chagrin, they coincided in opinion with Kirkby; and although, at that time, the English squadron possessed advantages in strength and position, the gallant Benbow found himself obliged to give over the pursuit and to proceed with the squadron to Jamaica, where he died of his wounds on the 4th of November.

Shortly before his death, Benbow received the following laconic epistle from Admiral Ducasse:

Carthagena, August 22nd, 1702.

Sir,—I had little hopes on Monday last but to have supped in your cabin, but it pleased God to order it otherwise; I am thankful for it. As for those cowardly captains who deserted you, hang them up, for by ——— they deserve it. Yours

Ducasse

After trial, Captain Wade of the *Greenwich* and Captain Kirkby of the *Defiance* were shot. Captain Constable of the *Windsor* was cashiered. Captain Hudson of the *Pendennis* died before the trial.

Admiral Benbow was but forty-nine at the time of his death. England does well to preserve in her battleships the name of John Benbow.

While Benbow was in the West Indies, Rooke, with a fleet of 150 sail of all types, English and Dutch, and carrying 15,000 troops, had been sent to capture Cadiz. He met with but little success. It may be surmised that his attention was concentrated on signals, because one of his lookouts learned that the galleons Benbow had been sent to detain had arrived at Vigo under the charge of Ducasse, but lack of a signal code to transmit the information, combined with a three day gale, delayed Rooke's receipt of the news.

However, he lost no time in arriving off Vigo, some 400 miles to the northward, with his entire force. He found the galleons and the French inside the port, protected by a boom and by five ships of the line moored so as to cover the boom with their batteries.

It was decided that not more than 25 of the allied vessels—15 English and 10 Dutch, with the fire-ships and bomb ketches, could be employed in the attack. However, all the senior admirals, including Rooke himself and the Dutch admiral Callemberg, decided to embark on the attacking squadron, as Allen says to give greater éclat to the attack.

While the ships were thus engaged, troops were landed to attack the fort. The only hope of breaking the boom was to charge it, with the inertia of a large ship under way.

On the morning of Oct. 12 a fair breeze favored the attacking party until near the harbor mouth, when a calm forced them to anchor just within gunshot of the batteries. However, a strong, fair breeze succeeded.

Vice Admiral Hopson in the *Torbay* hit the boom under such way that it broke. Other ships followed the *Torbay* and out-gunned the French.

Three Spanish and seven French men-of-war were destroyed and ten

French ships were captured. The landing force was successful also.

Of 15 galleons, 9 were taken and 4 sunk. The Spaniards had been unable to remove 14 million out of 20 million pieces of eight which freighted the galleons. The 14 millions and much of the galleon cargo were captured or sunk. The gold and silver were recovered.

It was after his return from this expedition that Admiral Rooke issued his "Fighting Instructions."

The year 1703 produced only minor engagements.

In July, 1704, Rooke, still in command, with a Dutch squadron in his fleet, attacked Gibraltar with 15 English ships of the line under Rear Admiral George Byng in the *Ranelagh* (80), and 6 Dutch under Rear Admiral Paulus van der Dussen.

After a bombardment of over three days, and attacks by a small landing force under the Prince of Hessen, the garrison capitulated July 24. This now great fortress has since remained in English hands. Rooke's fleet at this time consisted of 45 English ships of the line, 12 Dutch of the same rating, 6 frigates, 7 fire-ships, and some smaller craft, mounting 3,700 guns and manned by 23,000 men.

It was a considerably smaller fleet than that under Russell in 1692, which may be said to have been the strongest sailing fleet ever assembled under one command—99 of the line, mounting 7,000 guns and manned by 40,000 men. But Rooke's fleet measured up in guns and men—if not in number of ships—to the fleets in the Dutch wars.

On August 9, while returning to Gibraltar from Tetuan on the African coast, where he had watered his fleet, Rooke sighted a French fleet about equal to his own, in numbers, guns, and men. He called a council of war which decided to engage.

In the meantime, the French under the Comte de Toulouse, then a young man of 26—a son of King Louis XIV and Louise de la Vallière—apparently withdrew to the eastward. Rooke followed, and four days later overtook the enemy off Malaga, about 60 miles to the east and north of Gibraltar.

Having the wind, Rooke bore down to engage the waiting French, who lay to until the Allies were close aboard, when they commenced firing. Then they filled and edged away, but not before some of the allied ships were close enough to try boarding. Others came to the wind and played at what the English called "long bowls." In some parts of the two fleets the action lasted from morning till darkness. The French made off to leeward during the night and were well to windward in the morning when the wind shifted.

The Comte had it in his power to renew the battle, but did not choose to do so. His object was to assist the Spaniards at Gibraltar, but he arrived too late.

No ships were lost by either side. Casualties, killed and wounded, suffered by the Allies were about 12 per cent of the total force, i.e., somewhat under 3,000. The French losses were somewhat smaller, but the Allies remained on the scene of action, while the French went to Toulon and did not come out again that year.

Allen surmises that Rooke intended to break through the French line and engage closely to leeward, on account of his ammunition shortage, 15,000 shot having been fired at Gibraltar.

The greater losses of the English may have been due to the fact that they had chosen a head on, instead of a lasking approach. They could then be raked by the French, and the latter could edge away, while the English were rounding-to, only to find the French in column again but out of range and awaiting the English approach.

This was one of the advantages of the lee gauge, which on the whole, despite Hoste's summation, the French preferred.

Clowes speaks of the Franco-Spanish fleet as having a large number of galleys, 21 of which he names. Each carried from 500 to 700 men and mounted 4 to 6 heavy guns in their bows. All were fitted for ramming and were fully manned for boarding. Allen makes no mention of boarding by galleys, and says nothing of attempts at ramming, but mentions a ship of 70 guns which made three attempts to board the *Monk*, without success.

Each commander-in-chief had a chief of staff, apparently other than the captain of the flagship, and not a flag captain as was later the English custom.

Comte d'Estrées, who commanded the French contingent as an ally of England in the Third Dutch War, was chief of staff to the Comte de Toulouse. Rear Admiral Sir James Wishart was chief of staff under Rooke.

In his report of the battle Rooke said:

> We steered down on them until ten o'clock, or half an hour past, when being a little more than a musket shot distance, I was forced to make the signal to begin the battle the enemy setting their sails and seeming to intend to crowd ahead of our van. The fight was maintained on both sides with great fury for three hours. . . . It was the sharpest day's service I ever saw . . . most of the masts and yards were wounded to an irreparable degree . . . we lay by all night repairing our defects.

During the battle Rooke was hard pressed by a strong enemy center. It was on this occasion that Sir Cloudesley Shovell achieved the feat

of throwing his squadron's sails aback and steering astern to the aid of his chief.

In Paris a *Te Deum* was sung in honor of a French triumph, but never again during the war, which lasted nine more years, did the French risk a fleet engagement.

Mahan says:

> The battle of Malaga possesses indeed no military interest, except that it is the first in which we find fully developed that wholly unscientific method of attack by the English which Clerk criticized, and which prevailed throughout the century. . . . In it was realized that primitive mode of fighting which Macaulay has sung, and which remained for many years the ideal of the English navy:
>
> Then on both sides the leaders
> Gave signal for the charge;
> And on both sides the footmen
> Strode forth with lance and targe:
> And on both sides the horsemen
> Struck their spurs deep in gore,
> And *front to front* the armies
> Met with a mighty roar.
>
> Human movement is not always advance; and there are traces of a somewhat similar ideal in the naval periodical literature of our own day.



FIG. 34.—Sir Cloudesley Shovell. (*From "Secret Memoirs of the Life of the Honourable Sr. Cloudesley Shovell, Kt., Admiral of Great Britain"*)

It is fair to state that on the whole Mahan devoted more thought to strategy than to tactics. He apparently disapproved of the naval writers of his own time, who believed with Hoste that every thrust has its riposte, and therefore that *pitched* battles between skilful admirals would inevitably tend to become more formal and less Nelsonian.

In 1707, Admiral Sir Cloudesley Shovell, while commander-in-chief in the Mediterranean, issued some additional instructions relative to armed boats and chasing. Returning to England that year after cooperating with the Dutch in an unsuccessful attack on Toulon, Admiral Shovell's flagship, the *Association,* was wrecked on the Scillies in a gale with the loss of all hands, including the Admiral. Three other ships of

his fleet were lost in the same gale (October 23, 1707). The flagship is said to have gone down four minutes after striking, with the loss of 800 men. England thus lost her most capable and vigorous admiral of that time at the age of 57.

The war continued six years, until the peace of Utrecht in 1713, with terms much to England's advantage.

Allen sums up the naval losses during the eleven years as: England, 38 ships mounting 1,596 guns; France, 56 ships mounting 3,094 guns. Territorially, England retained Gibraltar, Minorca, the Hudson Bay area, Nova Scotia, and Newfoundland; and for a time at least, England had the respect of the Barbary States.

CHAPTER XIII

ADDITIONS TO THE PERMANENT FIGHTING INSTRUCTIONS, 1744-1763

THE FIRST "Additional Instructions" of tactical importance were issued in 1743 by Admiral Edward Vernon, an officer better known for introducing "grog" in the English Navy than for his tactical orders. He was a popular member of Parliament as well as a naval officer.

In 1704, at the age of 20, he was presented with 200 guineas by Queen Anne for his gallantry at the taking of Gibraltar. After considerable further naval service, he sat in Parliament for about 12 years, not always in accord with the party in power.

In fact, in 1739, he accused the Ministry of fearing Spain, and volunteered to capture Porto Bello on the Isthmus of Panama. His challenge was accepted, and he was sent to the West Indies with the rank of Vice Admiral, to redeem his promise. He did so, with six ships, after an attack lasting two days, and with a loss of but seven men. The next year his birthday was celebrated in London by public illuminations, and medals were struck in his honor.

However, before the end of 1740, he was unsuccessful in a combined attack of sea and land forces on Cartagena, and in 1741 a similar attack on Santiago de Cuba also failed, but apparently without diminishing his prestige. He attributed his defeat to divided command.

It was on this cruise, from which he returned early in 1743, that he introduced the grog ration for his men and took other steps to preserve their health.

An unknown author, writing of the courts-martial resulting from Matthews' defeat off Toulon in 1744, says of Vernon:

> Mr. V—— that provident, great admiral who never suffered any precaution to escape him, concerted some signals for so good a purpose, wisely foreseeing their use and necessity, giving them to the captains of the squadron under his command. And lest his vigilance should be some time or other surprised by an enemy, or the exigencies of his master's service should require him to attack or repulse by night, he appointed signals for the line of battle, engaging, chasing, leaving off chase, with many others, altogether new, excellent and serviceable which show his judgment, abilities and zeal.
>
> The author takes the liberty to print them for the improvement of his brethren, who if they take the pains to peruse them, will receive benefit and instruction.

Vernon's first Additional Instruction to be added to the Fighting Instructions, read:

> In case of meeting any squadron of the enemy's ships whose number may be less than those of the squadron of his majesty's ships under my command, and that I would have any of the smaller ships quit the line, I will in such case make the signal . . . upon which the said ships are to quit the line and the next ships are to close the line, for having our ships of greatest force to form a line just equal to the enemy's . . . it is therefore strictly enjoined and required of such captain or captains, who shall have their signal or signals made to withdraw out of the line, to demean themselves as a *corps de reserve* to the main squadron, and to place themselves in the best situation for giving relief to any ship of the squadron that may be disabled or hardest pressed by the enemy, having in the first place regard to the ship I shall have my flag on board, as where the honour of his majesty's flag is principally concerned. And as it is morally impossible to fix any general rule to occurrences that must be regulated from the weather and the enemy's disposition, this is left to the respective captain's judgment that shall be ordered out of the line to govern himself by as becomes an officer of prudence, and as he will answer the contrary at his peril.

The use of the smaller ships of the line as a reserve to be employed as circumstances might dictate, was distinctly a new order, and contrary to previous custom, which kept only frigates, fire and supply ships out of the line of battle.

Vernon's second Additional Instruction provided a signal for the fleet "to come to a closer engagement with the enemy, than at the distance we first began to engage." Distance was to be taken from the center. If it was desired to direct a particular ship to engage closer, her captain's number was added to the signal. This instruction also directed that during battle, "every ship is to appoint a proper person to keep an eye upon the admiral and to observe signals."

Vernon's signal for "closer engagement" lasted as long as sailing men-of-war. His instruction for equalizing the line, though followed by many others, did not outlive the century. But the idea of a reserve in battle at sea persisted until the first decade of the 20th century, though no conclusive reasons for one were advanced.

France and England were at peace with each other from 1713 to 1744. Formal declarations of war were issued by both countries in March, 1744, but actual hostilities began earlier. The first fleet action preceded the declaration of war by some 40 days.

France allied herself with Spain, and in preparation for war despatched a French fleet from Brest to join a combined French and Spanish force at Toulon. The French from Brest reached Toulon early in February without being intercepted, and the allied fleet of 28, with its

frigates and fire-ships, put to sea February 9. They were sighted by the English from their anchorage in Hyères Bay.

Admiral Matthews, in the *Namur* (90), had under his command 28 ships of 60 guns or over; 9 of 50 guns and 12 of 40 guns or less, including frigates and fire-ships. He did not include his 50-gun ships in his battle line.

The two fleets were not unevenly matched. Any preponderance favored the English. Matthews was 66 years of age and an officer of established reputation. The French admiral in command, De Court, was about 80 years old. His associate in command of the Spanish squadron was Admiral Don Jose Navarro.

Matthews resolved to attack, but was baffled by light variable winds for two days. On the morning of February 11, he found himself to windward, but with his rear well separated from his center.



FIG. 35.—Admiral Thomas Matthews. (From T. Faber's engraving after the portrait by Arnulphi, 1743.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

The Allies were also in poor order. Both fleets were on the port tack, heading south; the Allies leading, the English slowly overtaking them.

Matthews hoisted the signal to engage at 11:30, but did not bear up to reach battle range until two hours later, by which time the *Barfleur,* flagship of his van under Admiral Rowley, was slightly in advance of the *Terrible,* flagship of the allied center, under De Court.

Matthews bore a little ahead of the *Réal Felipe* (104), flagship of the allied rear, under Navarro. The English rear under Vice Admiral Lestock was well out of range.

Following the signal to engage, the English flagships of the van and center bore up until within pistol shot and began a furious attack.

Rowley was supported only by his first and second astern. Others astern of the flag engaged at long range without effect.

The ships of the van ahead of the flag did not attack, claiming that the allied van, being unopposed, showed signs of tacking, to double, which they desired to prevent.

Matthews was well seconded by the ships next ahead and astern of

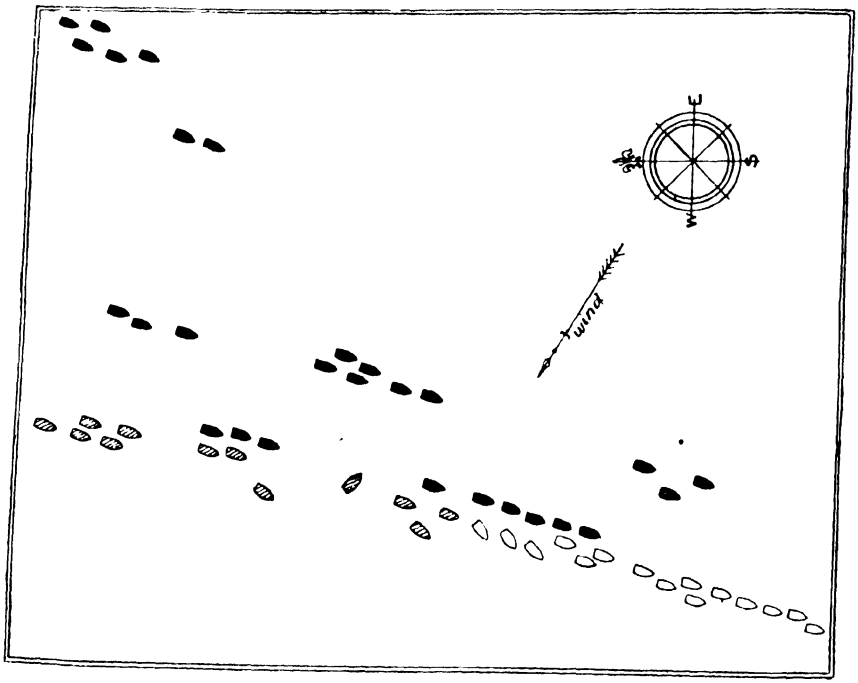


FIG. 36.—Matthews' Action Off Toulon, February 11th, 1744. British, black; French white; Spanish, shaded. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

the *Namur*. The other ships of the center, ahead and astern of the flag, did not engage.

Lestock never came into action and made no apparent attempt to do so.

The heaviest part of the fight was around the flagships of Matthews and Navarro. De Court went about to the aid of the Spaniard, followed by Rowley, with part of the English van.

At 5.30, after somewhat over three hours of indecisive fighting,

Matthews hauled down his battle and chasing signals and made signal for the line on the opposite tack. Some firing took place as the Spaniards were passed, but darkness soon came on and the fleets separated.

The next two days Matthews chased ineffectually, but the Allies, who had not intended to fight at any time, eluded their none too vigorous pursuers.

The result of this battle off Toulon caused great disgust with their naval forces in England, France, and Spain. Matthews suspended Lestock from his command and ordered him to England. Some months later he was himself relieved by Rowley. De Court was superseded.

More than a year after the event, the conduct of the battle was investigated by the House of Commons and a number of courts-martial resulted.

Considering juniors first: the lieutenants of one ship were tried for having advised their captain not to bear down on the enemy. They were acquitted. The captain (Burrish, *Dorsetshire,* 80) was tried and found guilty of lying inactive for half an hour, when he might have assisted the *Marlborough* (90); of not being in line with the admiral when he first brought to; of not giving proper assistance to the *Marlborough* until after receiving a message from the Admiral; and of not doing his utmost to burn, sink, or destroy the enemy. He was dismissed.

Three other captains of the center were convicted, but were recommended to mercy. A fourth absconded before trial.

Lestock brought charges against five of his captains. A sixth died. Lestock himself was not tried until May, 1746. He was acquitted on what appeared to be purely technical grounds. His defense was that "he could not have engaged without breaking the line, and he was not authorized to do this, because, though the signal for engaging had been made, the signal for the line of battle was still flying."

To this Allen adds that a part of Lestock's defense was that the calm and baffling light airs precluded him from taking his share in the action.

While Clowes vigorously condemns Lestock, Mahan passes over his conduct with the brief comment that "The course of the rear admiral (Lestock) has been usually attributed to ill will towards Matthews."

There could have been no pretense that Lestock did his utmost to burn, sink, or destroy the enemy, for failure to do which, the captain of the *Dorsetshire* was cashiered.

Clowes quotes an earlier letter from Lestock to a subordinate, which shows that he (Lestock)was thoroughly familiar with his duty and that

the claim that he could not bear up to engage because the signal for line of battle was still flying was not made in good faith. In this letter Lestock wrote:

> . . . is it your duty to see two-thirds of the squadron sacrificed to the enemy, when you could, but did not, join in the battle? Such an account would tell but ill to our country after the loss of a battle . . . the punishment inflicted on a breach of the 12th Article of the Statute of Charles the Second upon those who withdraw, or keep back, or do not come into the fight to engage would be what must follow in such a case. . . .
>
> The 13th Article of the Fighting Instructions leans that way also. . . .
>
> I am sir, your most humble servant
>
> Richard Lestock, *Neptune*, at Sea.
> April 16, 1742.

The principal one of Vernon's signals of 1740, to bring ships to closer engagement, had not been adopted by the Admiralty.

Matthews had an additional instruction which read, in effect:

> Every ship is to observe and keep the same distance those ships do which are next the admiral, always taking it from the center.

If obeyed, this instruction would have brought Lestock into action.

Matthews' court-martial followed soon after Lestock's. The charges were made by Lestock. The court sat from June 16 to October 22, 1746. Matthews was found guilty of disobedience of the 14th Article of an Act of Charles II. He was sentenced to be cashiered and the sentence was carried out. Clowes remarks that from a purely legal point of view, Matthews deserved his punishment, but that Lestock's actions were contemptible. Mahan says that the moment of attack seems to have been judiciously chosen, though he does not specifically approve Matthews' procedure.

The captain of the *Centurion,* Lord Anson, returned from his adventurous voyage around the world in 1744. He was about to leave the service because the Admiralty declined to confirm a captain's commission which he had issued. However, in 1745 he was induced to accept flag rank and to become a member of the Admiralty Board. There he served for nearly 17 years, 10 of them as First Lord.

In 1747, while a member of the Board, he took command of a fleet of 12 of the line, 4 smaller ships, and 1 fire-ship, to checkmate the movements of a French squadron of 2 of the line and 12 frigates, with a convoy bound for America to recapture Cape Breton.

While cruising off Cape Finisterre, waiting for M. de la Jonquière and his convoy, Anson kept his fleet continually exercising ". . . in forming line and in maneuvers of battle, then absolutely unknown."

Corbett believes that drilling his fleet in line of bearing evolutions was one of Anson's previously unknown maneuvers. In a signal of 1756 he found the following, which he attributes to Anson.

. . . whereas it may often be necessary for ships in line of battle to regulate themselves by bearing on some particular line of the compass from each other, without having any regard to their bearing abreast or ahead of each other, you are therefore required and directed to strictly observe the following instructions:

When the signal is made for the squadron to draw into line of battle at any particular distance, and I would have them keep north and south of each other, I will hoist a red flag with a white cross in the mizen topmast shrouds, to show the quarter of the compass, and for the intermediate points, I will hoist on the flag staff, at the mizen topmast head . . . certain pennants [which he names].



FIG. 37.—Lord Anson. (*From Anson's "The Life of Admiral Lord Anson," published by John Murray, London*)

Corbett does not point out that this order is of limited application. For ships in column, close-hauled, the line of bearing is six points from the wind. It is very simple to bring the line of bearing closer to the wind, by each ship bearing up until the new line is nearly reached, and then come to the wind on the new bearing.

On the other hand, to change the line of bearing away from the wind would require every ship, except the leader, to tack and beat up to the new bearing—a long and probably not practical proceeding. Or the van ship would have to bear up until the rear ship bore on the reverse of the new line and then resume course. Intermdiate ships would thereupon adjust themselves on the leader.

To change course without changing line of bearing is simple, though the resultant formation may not be simple to maintain. To change line of bearing without changing course is less simple.

Anson had a signal for forming a scouting line with his entire fleet which Corbett believed to be new.

The quest for La Jonquière's fleet was successful, and having a greatly superior force, Anson captured practically all of the French men-of-war and 6 of the convoy, after a running fight which lasted

three hours. For this action he was made Baron of Soberton and a medal struck to commemorate his victory. This was the second medal which had been struck in his honor; the first having been received for his circumnavigation of the world in the *Centurion.*

Born in 1697, Anson reached the highest rank, as Admiral of the Fleet, in 1761, and died in 1762.

In October, 1747, a few months after Anson's successful action, Rear Admiral Edward Hawke won an equally decisive victory in the same area over a French squadron of 9 of the line and some frigates, convoying 250 merchantmen bound for the West Indies.



FIG. 38.—Rear Admiral Edward Hawke. (*Courtesy Naval War College*)

Hawke, with 12 of the line, two 50-gun ships, and some frigates, was much more than a match for Commodore de l'Etenduère, and, in the words of a French author, the Commodore "gave himself to be crushed to save his convoy." This is still a duty of convoy commanders.

It was a fierce engagement. The English were so badly cut up that the convoy escaped. The French loss exceeded 800 killed and wounded and the English loss was almost as great.

Hawke captured 6 of the French line. Two others, one of which was the French flagship *Tonnant* (80), escaped to Brest. The *Tonnant's* escape caused the court-martial of Thomas Fox, captain of the *Kent* (64), who was signaled to chase her and bring her to close action. His first lieutenant and sailing master mistook the signal for one to proceed to the assistance of the Admiral, which was done. The court, however, found him guilty of backing his mizzen topsail and leaving the *Tonnant* contrary to the X and XI Articles of War. He was acquitted of cowardice, but was sentenced to be dismissed from his command, ". . . because he paid too much regard to the advice of his officers, contrary to his own better judgment."

Both Anson and Hawke formed their lines in the two actions just described, but before encountering, they changed to the signal for a general chase. Mahan says:

> Hawke showed in his attack the judgment and dash which always distinguished that remarkable officer. It may be claimed for Commodore l'Etenduère that fortune, in assigning him the glorious disadvantage of numbers, gave him also the leading part in the drama, and that he failed nobly.

Hawke, as captain of the *Berwick* (70), was almost the only commanding officer who had distinguished himself in the battle off Toulon.

In the action just described, one of his captains, in the *Eagle* (60) was George Bridges Rodney. Hawke was then 42; Rodney 29. To mark the national appreciation of Hawke's services in this encounter he was made a Knight of the Bath.

On October 1 of the next year, Rear Admiral Charles Knowles, cruising the West Indies with a squadron of 6 of the line and one 60-gun ship, engaged off Havana a Spanish squadron of equal force under Vice Admiral Reggio, in the *Africa* (74). Knowles' flag was on the *Cornwall* (80).

The British had the wind and sighted the Spaniards early in the morning, but Knowles approached so gradually that it was two o'clock before the action opened and then at a distance too great for much damage to be done. Two of Knowles' ships were well astern of their stations. The Spanish were in good order, well closed up.

The battle continued for nearly two hours before the two British ships joined. The two flagships fought at pistol range with the advantage on the side of the Spanish admiral and Knowles was obliged to quit the line. While repairing damages, a Spanish 64, the *Conquistador,* out of control, drifted near him and he attacked her with *shell* from eight coehorn mortars. The *Conquistador* soon lost her captain, but his successor fought until the *Cornwall's shells* had set his ship on fire three times.

About 8 P.M., the Spaniards drew off towards Havana. They were closely pursued, but all escaped except the *Conquistador.* The *Africa* was unable to escape and was burned to prevent her capture.

In December, 1749, Knowles was court-martialed on the complaint of some of his captains. It was shown that by different dispositions he might have attacked earlier in the day, and simultaneously, with all 6 ships. The court was also of the opinion that he should have shifted his flag to another vessel after the *Cornwall* was disabled. But, as there was no question of his personal courage, he was found guilty of negli-

gence only, and was sentenced to be reprimanded for the reasons given above.

The action is notable principally for the decisive effects of shell fire from such small mortars as coehorns, which did not form part of the *Cornwall's* regular battery but were on board for use in landing operations.

Coehorns—used in tops—were employed to some extent as late as our war with Mexico in 1846.

Some account has been given of four battles since the turn of the century which convey no lessons in tactics, except to illustrate poor approaches. They have been cited to show how failure to obey signals, or to make timely signals, or to have at hand suitable signals to convey the admiral's wishes, resulted in partial victories and in courts-martial, which brought to light disaffection in some cases, and inefficiency in others, displayed by both admirals and captains.

Rodney, who first appears in naval history with Hawke at Cape Finisterre, aspersed his captains some 40 years or more afterwards, not as cowards, but as stupid and ignorant. This, however, was an overstatement, resulting from chagrin at his failure to properly employ his own signal book.

The victories of Anson and Hawke reduced the French navy to a negligible quantity.

Peace was concluded at Aix la Chapelle in October, 1748. In four and one half years of war France and Spain, on the one side, had lost over 3,000 merchant ships. The English loss was about as great, but while English trade still flourished that of France was almost ruined and her navy practically destroyed.

Immediately after peace was signed, France, according to Clowes, laid down large numbers of ships in her own building yards and let contracts for others to Sweden and other countries.

The first British 74s had been laid down during this war—about 1745. The largest gun of a 74 was a 32-pounder; the complement about 600 men; the tonnage nearly equal to that of earlier 90-gun ships.

Lists of French ships show 74s earlier than 1745. A Spanish 74, the *Réal San Felipe,* was the flagship of Vice Admiral Castaneta when he fought the English under Sir George Byng, off Cape Passaro in 1718. Before many years, 74s became almost the standard ships of the line in the French and English navies.

The Peace of Aix la Chapelle was only in home waters. France and England supported their respective East India Companies in their

continuing war in the Far East, while rival aims in America and the West Indies kept both countries on the alert.

In 1755, Louis XV despatched Admiral De la Motte with a fleet to protect French colonies in America. Believing that the French had designs against English colonies on the mainland, a fleet under Vice Admiral Boscawen was sent out with orders to attack the French wherever found.

Louis XV was notified of Boscawen's orders. He replied that "any shot fired on the sea in a hostile manner, should be held equivalent to a declaration of war."

On June 6 Boscawen obeyed his orders by attacking, near the entrance to the Gulf of St. Lawrence, 4 French ships of the line which had been separated from Admiral De la Motte's fleet in a gale. Two were captured and two escaped.

This opened what we call "The French and Indian War," entitled by French and English historians "The Seven Years War."

In July, Braddock made his ill-starred attack on Fort Duquesne. In November, Admiral John Byng captured and destroyed by fire a French 74 in the English Channel.

That winter the usual French threat of invasion produced the usual panic in England. To guard against this possibility, England kept most of her ships in home waters.

France seized the opportunity to land an army on the island of Minorca and lay siege to Port Mahon, the principal harbor in the Balearic Islands, which was poorly garrisoned and without fleet protection. Admiral John Byng was sent with a small fleet and some troops to reinforce Gibraltar and relieve Minorca. He arrived in Gibraltar May 2, 1756, and sailed six days later for Minorca, arriving off the island at daybreak, May 19.

While concerting measures for the relief of Port Mahon, he unexpectedly sighted a French fleet under Admiral de la Galissonnière, consisting of 10 of the line, two 50-gun ships, and 5 frigates.

Byng had under his command 11 of the line, two 50-gun ships, 2 frigates, and 3 sloops.

It is claimed that his ships were under-manned. He had in the fleet a regiment of troops for the relief of Port Mahon, but no *marines*. Those brought from England were left in Gibraltar to make room for officers and soldiers of the landing force. Those from the ships already in the Mediterranean were on shore in Port Mahon.

Up to the time Byng sailed from England, neither country had de-

clared war, but it had been actively going on for nearly a year. England made her formal declaration on May 17; France on June 16.

Admiral Byng, on sighting the French, hastened to strengthen his weakest manned ships from the crews of the smallest vessels and attempted to convert one of the latter into a fire-ship. At some time during the day of May 1 he signalled for a general chase, and by 2 P.M.

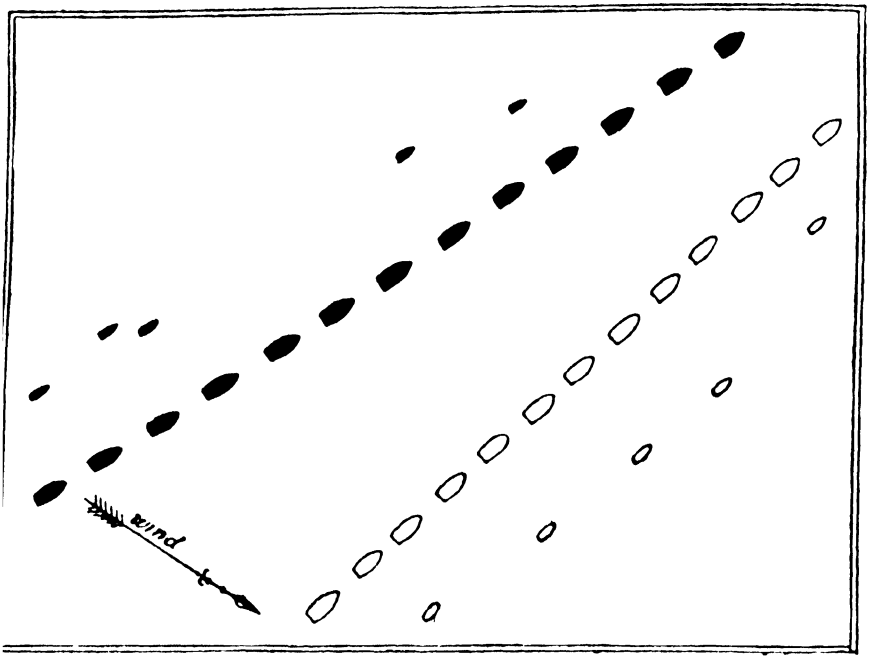


FIG. 39.—Byng's action, May 20th, 1756. I. At 2 P.M. British, black; French, white. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co, Ltd., London*)

had closed the French enough to warrant forming his line; but the wind fell before it was completed.

Towards evening, before reaching fighting range, the French tacked with the object of gaining the weather gauge. Byng did likewise, to hold the windward position in the light airs which prevailed.

Both fleets worked to windward during the night. Byng so far succeeded that the French were out of sight in the morning. Their location to leeward between Byng and Minorca was learned from a captured craft. Light airs still prevailed, and it was afternoon before Byng was again close enough to form his battle line.

Byng's fleet was in two divisions or squadrons: the leading division under Rear Admiral Temple West, in the *Buckingham* (68); the second division under Byng in the *Ramillies* (90).

Observing that the French had 12 ships in their line, Byng, in preparing to engage and just before bearing down, directed one of his 50-gun ships, the *Deptford* ". . . to quit the line that ours might become

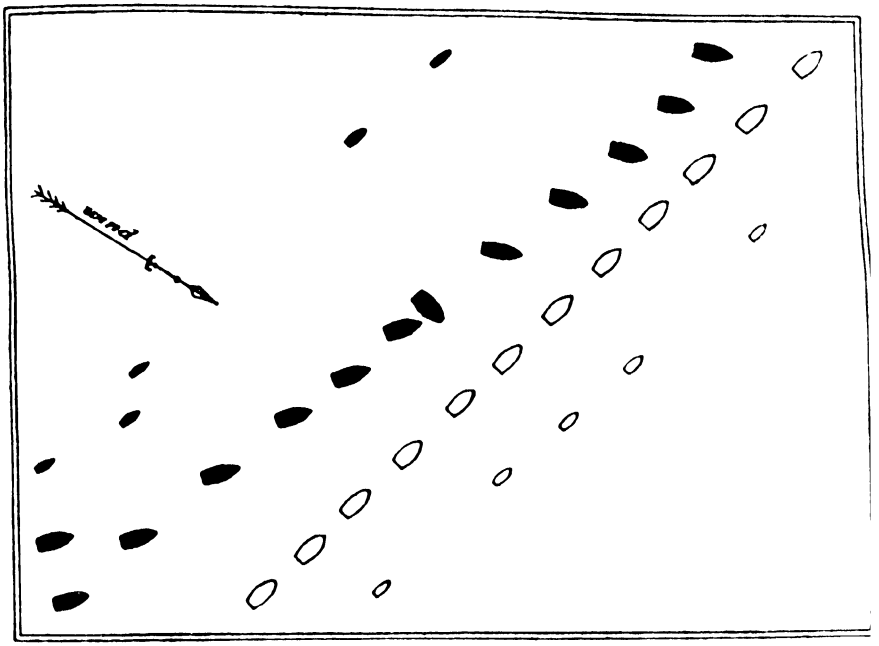


FIG. 39a.—Byng's action, May 20th, 1756. II. At 2:30 P.M. British, black; French, white. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

equal to theirs . . . ," thus following Vernon's plan. According to Byng:

I tacked toward the enemy and formed the line ahead. . . .

The French were awaiting the attack. Byng continues:

. . . as soon as I judged the rear of our fleet the length of their van [Byng's division was leading] we tacked all together and immediately made the signal for the ships that led, to lead large [West's division] and for the *Deptford* to quit the line. . . .

At two, I made the signal to engage. I found it was the surest method of ordering every ship to bear down on the one that fell to their lot. [Two fleets when on opposite tacks are four points from being parallel to each other.]

When Byng, *leading*, went about, West's division was farther from the French than his own. For that reason, no doubt, he ordered "the ships that led to lead large," to parallel the two fleets. Whether the fleets were parallel, or whether West's division had come to the wind before Byng signaled to engage, is not clear. It seems probable that

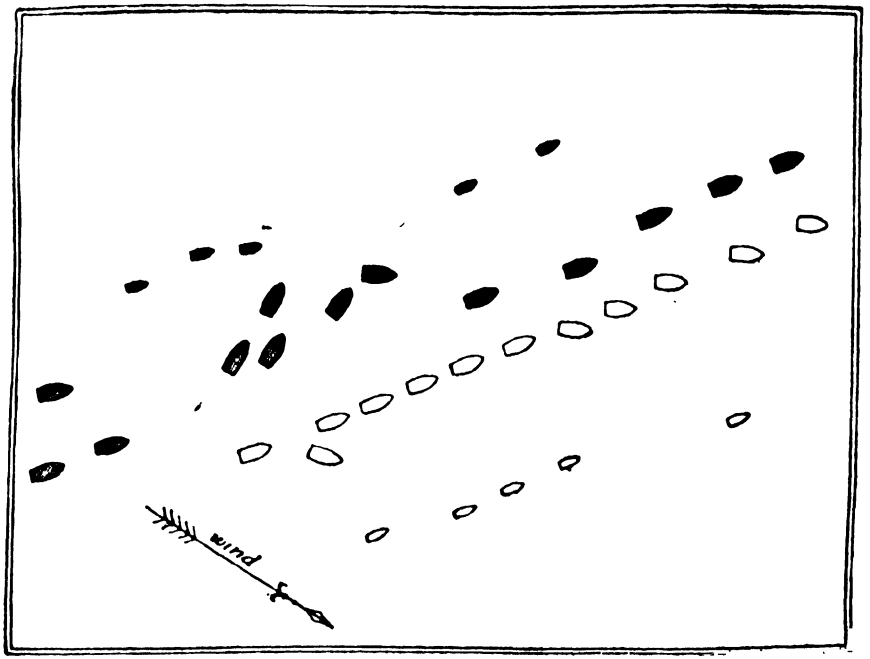


FIG. 39b.—Byng's action, May 20, 1756. III. 3 P.M. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

West's division was still off the wind, which would account for its getting into action first. Mahan says,

> When the signal was made, the van ships kept away in obedience to it, and ran down for the French so nearly head on, as to sacrifice their artillery fire in great measure. They received three raking broadsides and were seriously dismantled aloft.

This would indicate that Byng had waited too long to permit a lasking approach on an enemy lying-to with just steerage way. Also, ships on the wind—Byng's division—would tend to overlap, to windward, those ahead and off the wind. In any case, overlapping took place to some extent.

The *Intrepid,* the last ship in West's division, lost her foretopmast, her fore tack and head braces (shot away); she flew up into the wind, lost her way, and drifted astern and to leeward (toward the French).

The *Revenge,* leading Byng's division, threw herself into the wind to avoid the *Intrepid.* Her first and second astern did likewise and all three drifted toward the *Ramillies,* which instead of running off toward the enemy, also backed her topsails.

Byng's flag captain suggested that he disregard the ships ahead and go into action with the *Ramillies* and the ships astern (the *Culloden* (74) and the *Kingston* (64)). But—quoting Mahan:

> Byng replied "You would have me as Admiral of the fleet run down as if I was going to engage a single ship? It was Mr. Matthews misfortune to be prejudiced by not carrying down his force together, which I shall endeavour to avoid."

So Byng tried to reform his division and carry it into action as a body. He signaled the *Deptford* to take the *Intrepid's* place and

> . . . I sent and called to the ships ahead of me to make sail and go down on the enemy. . . . I found the enemy edged away constantly and as they went three feet to our one, they would never permit our closing with them, but took advantage of destroying our rigging.

As it turned out, no ship of Byng's division, except the *Princess Louisa,* had a man killed or wounded, while all of West's division suffered losses, including the *Intrepid,* whose casualties were only exceeded by those of the *Defiance,* the leading ship of West's division.

The material losses of the English were *aloft,* which disabled them, and it may be that the *Ramillies* and the rest of Byng's division suffered in that respect.

While Byng was attempting to re-form, the French withdrew and the next day were not in sight. A council of war decided that it was not practicable to relieve Minorca and Byng returned to Gibraltar. Port Mahon held out until June 29.

Allen claims that Admiral de la Galissonnière had much the stronger fleet and should have captured every English ship. But the French admiral's object was to prevent the relief of Minorca, in which he succeeded.

Near the end of Byng's despatch, it is shown that he understood the French tactics of evasion:

> . . . If I have any re-enforcement, will not lose a moment of time to seek the enemy again, and once more give them battle, though they have the advantage of being in clean ships that go three feet to our one, and therefore have their choice how

they will engage us, or if they will at all; and will never let us close them, as their sole view is the disabling of our ships in which they have but too well succeeded, though we obliged them to bear up.

This is a definite indication of what became a policy of the French when to leeward.

Byng was relieved by Hawke before he was ready to return to Minorca. On his arrival in England in July, he was placed under arrest. His trial began on December 27 and lasted one month. The court found that the British fleet, when about abeam of the enemy's line on the opposite course, should have tacked together, and at once

> borne right down on the enemy, his van steering for the enemy's van, his rear for its rear, each ship making for the one opposite to her in the enemy's line, under such sail as would have enabled the worst sailer to preserve her station in the line of battle.



FIG. 40.—Admiral the Hon. John Byng. (From R. Houston's engraving after the portrait by Hudson.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

The court also found that Byng should not have waited for the *Trident* and *Princess Louisa* to have regained their stations, but should have steered for the enemy with the rest of his squadron with as much expedition as possible, and that after the battle he should not have returned to Gibraltar. He was found guilty under the XII Article of War, which carried with it a sentence of death, but the court unanimously recommended him to clemency, because of his personal courage and coolness during the action. This recommendation was disregarded. He was shot on the quarter-deck of the *Monarch,* March 14, 1757. He was then 53 years of age.

In his defense, Byng referred to the "First Article of the Additional Fighting Instructions, as given to the fleet by me, at the beginning of the expedition." This shows that other Additional Fighting Instructions, as well as those for equalizing the line, and for line of bearing, had been formulated since 1747.

Byng had served as a member of the court which tried Lestock, who though not joining action was acquitted. He was also a member of the court which tried Matthews, who was cashiered for not bringing his fleet into action together. Whether this confused him in his duty to do his utmost to destroy the enemy, is not quite clear.

Admiral Hawke, while in the Mediterranean, added an article to the Additional Instructions which recognized Byng's and the court's affirmation of the duty of every captain to steer for his opposite in the enemy line. Hawke's order read:

> In room of Articles V. and VI. of the "Additional Fighting Instructions by Day" it is in my discretion that this be observed, viz.
>
> When sailing in a line of battle, one ship ahead of another, and I would have the ship that leads with either the starboard or larboard tacks aboard, to alter her course in order to lead down to the enemy, I will hoist a Dutch jack under my flag at the mizen topmast-head and fire two guns. Then every ship of the squadron is to steer for the ship of the enemy that from the disposition of the two squadrons must be her lot to engage, notwithstanding I shall keep the signal for the line ahead flying, making or shortening sail in such proportion as to preserve the distance assigned by the signal for the line, in order that the whole squadron, as soon as possible may come to action at the same time.
>
> Signed,
> Ed. Hawke.

Corbett thinks that Hawke may have issued this Article after relieving Byng at Gibraltar, remarking, ". . . it seems designed to prevent a recurrence of the error that lost the battle of Minorca. . . ." But it appears more directly applicable to the failure of Matthews off Toulon, where Hawke so greatly distinguished himself, and was intended to remove any excuse for such a defection as Lestock's.

The earliest complete set of Additional Fighting Instructions which has been found is dated April 27, 1759. They were issued by Admiral Edward Boscawen.

Admiral Boscawen was an officer of wide experience. He had served under Vernon in the West Indies and under Anson in the action with M. de la Jonquière. He had commanded a squadron in the East Indies, in 1748; had been a member of Parliament and also one of the Lords of the Admiralty; commanded a squadron on the coast of North America, in 1755, to protect the American Colonies and to support the military operations of General Braddock; commanded the fleet blockading Brest in 1756; was again on the American coast in 1757; on the French coast under Hawke in 1758; and commanded in the same year the expedition against Louisburg which resulted in its capture. In 1759, at the time he issued his Additional Instructions, he was commander-in-chief of the

British naval forces in the Mediterranean. He died in 1761, at the age of 50.

His Additional Instructions consisted of 20 Articles, of which the first was for "equalizing the line." Boscawen went into more detail than Vernon. He directed that when a ship was signalled to quit the line, the next ships were to close up. Ships taken out were to hold themselves in readiness to assist any ship in the line that might be disabled or hard pressed, "or to take her station if she is obliged to go out of the line, in which case the strongest ship that is withdrawn from the line, is strictly enjoined to supply her place and fill up the vacancy." Had this order been in existence in Byng's time, his signal to the *Deptford* to replace the *Intrepid* would have been unnecessary.



FIG. 41.—Admiral the Hon. Edward Boscawen. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Some other articles from Boscawen's Additional Fighting Instructions are of interest:

II. . . . and in case of meeting with any squadron or ships of war of the enemy, that have merchantmen under their convoy, though the signal for the line of battle should be out, if I would have any of the frigates that are out of the line, or any ship of the line fall upon the convoy, whilst the others are engaged, I will put abroad the pennant for speaking with the captain of such ship or ships, and hoist the flag above mentioned for quitting the line, with a pennant under it; upon which signal, such ship or ships are to use their utmost endeavours to take or destroy the enemy.

III. [repeating Vernon's signal for closer engagement.] . . . Then every ship is to engage the enemy at the same distance the admiral does; and if the admiral would have any particular ship to do so, he will make the same signal and the signal for speaking with the captain.

IV. [a new one] When I would have the two divisions of the fleet form themselves into a separate line of battle, one ship ahead of another at the distance of a cable's length asunder, and each division to be abreast of the other, [double column], when formed at the distance of one cable's length and a half, I will hoist a flag, chequered blue and yellow on the flagstaff at the mizen peak and fire a gun, and then every ship is to get into her station accordingly.

The next three Articles are developments of Anson's: V. To open

fleet in line to distance of one mile. VI. To open fleet in column to distance of one mile. VII. To increase distance to two miles in line or column.

The eighth Article modified Article XXIV of the Permanent Fighting Instructions, which forbade any ship in the fleet to leave its station, on any pretense whatever, without orders. It read in substance:

> . . . when meeting an inferior enemy's squadron the overlapping ships, when ahead or astern, shall quit the column without signal and rake the van and rear enemy's ships.

Article IX provided a signal for "forming line of battle with part of the fleet to engage and detain the enemy until the remainder could come up."

X. When the above signal was hoisted, ships were to form column without regard to seniority, but according to their distance from the enemy. The headmost and nearest ship to the enemy to lead, and the other ships to take station as fast as they could come up, without regard to the regular order of battle.

Articles XI, XII, and XIII, gave signals for keeping ships in position. Any ship could hoist the position pennant on her next ahead from the center, (flag) or next astern from the center.

Article XIV fixed distance at half a cable, whenever the signal for battle was made, unless otherwise ordered.

Articles XV and XVI gave signals for changing course in column—the hoisting of a flag and one discharge of a gun for each point the course was to be altered. A striped white and blue flag hoisted at the foretopmast-head meant change course to starboard. A striped white and blue flag at the mizzentopmast-head meant change course to port.

Article XVII was a signal for priming the fire-ships.

Article XVIII altered the Permanent Fighting Instructions, to the effect that

> when engaged with an equal number of the enemy's ships and the ship opposed to any of His Majesty's ships is forced out of the line, you are hereby required and directed to pursue and overtake her and endeavour to take and destroy her.

Under the same Article is a memorandum, reading:

> When the squadron is in a line of battle ahead, and the signal is made for the headmost and weathermost to tack, the ship that leads on the former tack is to continue to lead after tacking.

XIX referred to tacking.

XX (the last) gave the signal for all lieutenants to repair on board

in order to acquaint the admiral with the state and condition of the ships.

"Given under my hand on board his majesty's ship *Namur* in Gibraltar Bay, this 27 April 1759."

E. Boscawen.

To Captain Medows
of his majesty's ship *Shannon.*
By command of the admiral
Alex. MacPherson.

Boscawen did not include Anson's "line of bearing" signals, nor Hawke's instruction that each ship is to steer independently for her opposite, when bearing down to engage, even though the signal for "the line ahead" was kept flying.

The Additional Instructions issued by Vernon, Anson, Hawke, and Boscawen antedated knowledge, or at least general knowledge, in the British navy, of Hoste's *Treatise.*

In addition to Boscawen's Mediterranean force, England had two other fleets at sea in the summer of 1759. Hawke with 23 of the line, 4 50-gun ships and 6 frigates kept watch in the Channel. Vice Admiral Charles Saunders sailed for the attack on Quebec with 22 of the line, 2 50s, 13 frigates, and a number of fire ships and mortar vessels. Saunders' fleet was the largest English fleet ever assembled on the American coast.

Boscawen, on his arrival at Gibraltar to take command of the Mediterranean station, issued his instructions to the fleet, and in May sailed to blockade the French in Toulon.

In August, while repairing and provisioning at Gibraltar, one of his frigates arrived with the news that the French had put to sea—12 of the line and 3 frigates, under Admiral de la Clue.

Boscawen's state of readiness is evidenced by the fact that, receiving this intelligence at 7:30 P.M., his fleet was out of the bay at 10 P.M. At seven the next morning, August 18, he sighted 7 sail to the westward, standing toward him.

According to Allen, the ships sighted were 7 of the line, with De la Clue in the *Ocean* (80). The remainder of his fleet had become separated during the night.

Boscawen, in the *Namur* (90), had with him 6 of the line and one 50-gun ship. The remainder of his fleet had likewise been separated during the night.

De la Clue at first mistook the English for his missing ships, but finding his signals unanswered after coming within signal distance, made all sail to escape, but ran into light airs.

Boscawen made the signal for a general chase and was favored with a fair easterly breeze until almost up with the French. His leading ships were able to open fire on the French rear by 1:30 P.M., but losing the wind, no effective fire could be maintained until after another hour, and Boscawen did not get abreast the *Ocean* until 4 P.M.

The *Namur* suffered so much aloft that she fell astern and Boscawen shifted his flag to the *Newark* (80).

Admiral de la Clue's squadron continued its flight, except for the *Centaur* (74), which was disabled and struck her colors.

The chase lasted through the night until nine in the morning of the 19th, when the *Ocean* ran ashore. De la Clue, though mortally wounded, was landed before the English could reach her. Suffren, her captain, was taken prisoner.

Three other French ships anchored under the Portuguese batteries in the bay of Lagos about 180 miles outside of the Strait. Of these, two were captured and burned. Ten—including the frigates—reached Cadiz.

Boscawen accused the captain of the *Intrepid* of not engaging close enough, and of firing over other ships. This was a violation of the Permanent Fighting Instructions, and under the Duke of York, in 1673, was punishable with death.

The destruction and dispersion of the Toulon fleet prevented junction with the fleet in Brest and relieved the English (for that summer) of their fear of an invasion.

How often the French yearned for a ship canal from the Gulf of Lyons to the Gironde!

Hawke, with a fleet of 23 of the line, blockaded Admiral de Conflans in Brest through the summer of 1759 and until the early part of November, when he was driven into Torbay by stress of weather.

His absence enabled De Conflans to get to sea without a fight. He came out November 14 and made sail for Quiberon Bay, intending to drive off the small English squadron under Commodore Duff, release the troop transports that had been collected there, and convoy them to Ireland.

Hawke sailed from Torbay to resume the blockade, the day that De Conflans came out of Brest.

The news quickly reached England that the French were at sea.

Excitement that amounted to a panic ensued. Hawke became so unpopular that at the very time he was consummating his great victory at Quiberon, he was being burned in effigy in the streets of London.

He had learned that the French were out, soon after leaving port, and foreseeing their movements, steered at once for Quiberon Bay. He was driven to the westward by southerly winds, which, however, also served to retard M. de Conflans and to save the British blockading force of two 50s and 6 frigates which on receipt of the intelligence that the French were approaching, cut their cables in the night and attempted to get to sea around the north end of Belle Isle. One ship succeeded. The others escaped to the southward and later joined Hawke, who had sighted the French to the eastward about 8:30 on the morning of November 20.

He knew he was close to Belle Isle and sent a ship to make the land.

The weather cleared and showed the French crowding sail to the eastward. He at once signaled to the seven of his ships nearest the enemy, to form column (Article IX of his Additional Fighting Instructions):

> . . . and if I should chase with the whole squadron, and would have a certain number of the ships that are nearest the enemy draw into a line of battle ahead of me in order to engage till the rest of the ships of the squadron can come up with them, I will hoist a white flag with a red cross, on the flagstaff at the main topmast head and fire the number of guns as follows:
>
> When I would have seven ships draw into a line of battle, I will fire three guns.

By this means, Hawke hoped to hold the French until he could bring up his entire fleet of 23 of the line, 4 50-gun ships under Commodore Duff, and 6 frigates.

Quiberon Bay is about 30 miles N.E. from the south side of Belle Isle, and there are intervening islands.

The wind was westerly and increasing in strength. The French apparently started to form their line of battle, but altering their plans, made off before the wind. Although Hawke had the stronger fleet, De Conflans had 20 of the line and 3 frigates and should have been able to put up a strong fight. It is possible that his orders may have required him to avoid a battle until after he had landed the French army in Ireland.

By afternoon the wind had shifted to the northwest and blew heavily. Both fleets crowded sail; the flying quarry and the pursuing hounds. As usual the fastest of the pursuers overtook the slowest of the pursued. At 2 P.M. the French began to fire at the leading British ships, and in

little more than a half hour the latter were within range and Hawke made the signal to engage.

The first French ship to be overwhelmed was the *Formidable* (80), which struck about four o'clock, with a loss of over 200 killed and wounded, including Rear Admiral Du Verger.

The second was the *Thésée* (74), which was engaged by Howe in the *Magnainime,* and after he was disabled, by Keppel in the *Torbay.* The French ship soon capsized, because of her captain's insistence upon fighting his lower deck guns. Keppel closed his ports in time and saved his ship. Soon after this, the French *Superbe* foundered.

Howe, although partially disabled, engaged the French *Heros* (74) and obliged her to strike, but could not take possession and her captain ran her ashore.

The rest of the French fleet disappeared in the early winter darkness. Hawke signaled his own ships to anchor, coming-to himself, in 15 fathoms to the eastward of the Cardinals. His signal was neither seen nor heard by many of his fleet, and his movements were not followed except by those in sight.

In the morning the British *Resolution* was seen to be ashore, and De Conflans in the *Soleil Royal* found himself anchored in the midst of Hawke's ships. The *Soleil Royal* immediately slipped her cable and ran ashore near the town of Le Croisic. The *Essex,* which pursued her, also went ashore and was wrecked.

The French ships, other than those mentioned, escaped into the Charente or Vilaine, except the *Juste* which was wrecked.

Some of the ships which entered the Vilaine on the flood, were never gotten out again.

For this overwhelming victory, Hawke received the thanks of the House of Commons and a pension of 2,000 pounds a year. Two of his captains, Howe and Keppel, were made colonels of marines. For his victory over De La Clue, Boscawen was made a general of marines and a member of the Privy Council. Saunders, for capturing Quebec, was made a lieutenant-general of marines.

The recognition bestowed on the commanders of the three fleets did not extend to the rank and file, as is shown by an old ditty sung by the tars of Hawke's fleet while the honors were being distributed:

Ere Hawke did bang, Mounseer Conflang
You sent us beef and beer.
Now mounseer's beat, we've naught to eat
Since you have naught to fear.

Boscawen relieved Hawke for the remainder of the winter and part of the summer, and was in turn relieved by Hawke. Both maintained a close blockade of the French Channel coast and of the remainder of De Conflans' fleet.

Hawke's battle off Quiberon was the last important naval engagement of the war. Peace was concluded at Paris in February, 1763. Spain, which joined France late in the war, lost Manila and Havana to combined naval and military expeditions, but by the peace terms both were returned. France lost Canada.

During the war, the French lost, from all causes, 35 of the line, the Spanish 13, and the English 14.

At the end of the war, England had 147 ships of 60 guns or above. Of these 37 were 74s. Parliament voted 70,000 seamen for each of the last three years of the war, 1760-61-62.

CHAPTER XIV

FRENCH WRITERS ON TACTICS: MOROGUES, 1763; VILLEHUET, 1765

AT THIS TIME, France had three nautical schools, each corresponding in some respects to our Naval Academy. One of these was at Toulon, one at Rochefort, and one at Brest. Hoste was a professor of mathematics at the Toulon school, when he published his *Naval Tactics*.

The school at Brest is said to have been established under the direction of Captain Sebastien François Bigot, Vicomte de Morogues. Morogues was captain of the *Magnifique* (74), under Admiral de Conflans, at the battle of Quiberon Bay. He escaped with his ship and carried her into the Charente, south of Rochefort, over 100 miles from the scene of battle.

In 1763, the year of the peace, he published a treatise on Evolutions and Signals, of which Corbett said: "It can still hold its own, as perhaps the most scientific book on naval tactics ever written." Morogues' work is arranged very much like that of Hoste, but his illustrations are clearer.

Hoste made drawings of individual ships, singly or in formation, to illustrate his text. The true and relative headings of his ships are often difficult to determine. His English translator, Boswall, used diagrammatic forms like those of the present day for the majority of his illustrations, but as with Hoste, his winds are blowing from any direction of the page and with the added peculiarity of having his arrows flying, not with the wind, but in the direction from which the wind blows—"the bed of the wind."

Morogue's arrows fly with the wind. He simplified his problems by having the wind always blowing from the top to the bottom of the page. He dedicated his work to the Duc de Choiseul, instead of King Louis XV. His introduction was shorter and less fulsome than that of Hoste.

Three members of the Royal Academy of Sciences were appointed to examine and report on Morogues' work. Their report comprised a statement to the effect that the work of this class composed by Hoste had become rare, and that, though excellent in several particulars, it included many useless maneuvers. They believed that Morogues had

omitted no evolution the execution of which was practiced, and also that he had described different methods of performing the same evolution, so that the most suitable one for any given occasion could be used.

The first part of Morogues' work is divided into 13 chapters, modeled, generally, after Hoste, and containing little new matter. The second part—and the major part—is a tactical signal book, containing signals for all possible evolutions, with instructions for performing each.

Morogues said that the text of his *Tactics* had been in use for ten years at the Brest Naval Academy in the instruction of midshipmen, and that it had been copied by a large number of officers. He did not, by any means, pretend to complete originality, but said he collected his materials wherever he could find them. He hoped careful reading would show the value of his signal book.

In his tactics, he is decidedly less definite than Hoste relative to the conduct of the divisions of a fleet in battle. He says that the windward fleet should maneuver to maintain the leading ship of the van, the last ship of the rear, and the flagships of admirals who lead their divisions, abeam of the ships they desire to engage. When the fleets are paralleled, this maxim ensures that an enemy is on the beam of each important ship.

Like Dartmouth (1688), he counsels a gradual (lasking), instead of a head-on approach.

While keeping abreast of the enemy's van, a fleet must be extended enough to keep its rear abreast of the enemy's rear, to prevent the latter from wearing short around and getting to windward. This advice is much the same as that prescribed by English commanders-in-chief and by Hoste; viz., that a fleet inferior in numbers should increase the distance between ships in its battle line and maintain the "van and rear ships of the enemy divisions abeam of the heaviest ships of the inferior fleet."

He emphasizes one maxim of universal application, "The order of sailing chosen should be one from which the battle line can be formed with facility and expedition."

He advocates an impossibly close order, saying, ". . . ships of a fleet in order of battle (ligne de combat) should sail close-hauled in each other's wake (column) and ought to be at a distance of one third of a cable, if the weather permits."

Fire-ships should be stationed abreast the van, the center, and the rear, a short cannon shot from the battle line, on the side opposite the enemy. Hospital ships, supply ships, and galliots (train) should be in column outboard of fire-ships. Some frigates were to be stationed next

to the fire-ships to repeat signals; others ahead and astern of the train.

Like Hoste, Morogues considered "breaking the line" as an extremely difficult evolution, not to be undertaken deliberately except by a very skillful admiral in command of a well drilled fleet. It could best be done by a fleet to leeward.

The fleet attempting it should come about on the opposite tack, make all sail, and break through without endeavoring to engage; or at most, not to fire more than one broadside at short range, tacking again to the old course immediately, to prevent the enemy from tacking.

This repeats Hoste, and contemplates breaking through the enemy's line at all points, as was done by Howe in 1794. Morogues did not consider a lee fleet breaking through a windward fleet in column, when meeting on opposite tacks.

Like Hoste, he preferred large ships, with more and heavier guns, to a greater number of small ships.

So much for the first part of Morogues' work. The second part—and the major part—is a tactical signal book of 390 pages—the first of its kind. It contains signals for all possible evolutions, with instructions for performing each.

At the time he wrote, Morogues said that the French had no orders, or signals, except those issued by admirals to their fleets at the commencement of a campaign. He considered that the signals of Tourville (Hoste's mentor) offered the best model, although in his opinion they lacked general application, having been issued to cover the circumstances of a particular campaign in prospect.

He believed that it would be useful to the navy and for the instruction of midshipmen to have a work which contained all serviceable and necessary evolutions for every circumstance, including signals which would permit them to be executed. It was on this basis that he submitted his ideas for approval.

As a governing principle, he thought that evolutions in the face of the enemy should be reduced to a minimum, because they always broke up the existing formation to create another, and during the elapsed time a vigilant enemy might profit by attacking before the new formation could be taken up. This maxim was a wise one in the days of sailing ships, and there might be occasions when it would still be useful.

Morogues strongly favored tactical drills and advocated close formations:

> It is not sufficient that a captain know how to handle his ship . . . but it is

necessary in a fleet that vessels be able to sail well closed up, without fear of fouling each other . . . a captain must also know how to regulate the speed of his ship.

He thought that conditions would rarely permit boarding in a fleet action, but only in fights between single ships. In battle order, a captain's

. . . principal attention must be to keep his ship well closed up, to the end that the ships may mutually succour each other, and so become more capable of resisting enemy forces, even apparently greater; but which are really inferior, if they are not united.

He was apparently the first to prescribe preparatory signals for fleet movements:

Day signals are always preceded by a warning flag [preparatory] whose only object is to inform the fleet or squadron that a movement is to be made which is to commence the instant that the following signal is hoisted. It is in this that my project differs from its predecessors. Thus, the fleet would have time to prepare itself for the execution of an order. I have given the same consideration to night and fog signals as to day signals. Obedience to the first two [night and fog] is always more difficult. It is on this account that my preparatory signals for them are always made in two parts.

As in modern signal books, Morogues left blanks for an admiral to fill in as it pleased him.

During war, he emphasizes his conviction that ". . . the order of sailing should be one from which the battle line can be formed with facility and expedition." That is, easily and quickly—a wise tactical maxim for all time.

With relation to fire control, he says, in effect, that ships should not fire until they find themselves within effective distance; that they "ought principally to level well their guns, without that hurry and confusion, too often practiced in firing broadsides from which so little advantage is derived to answer the end proposed—that of defeating the enemy. . . ."

He thought this might be sooner accomplished by a regular fire from individual guns, without intervals. He apparently failed to take into account the interference between adjacent guns (horizontally and vertically) when fired singly instead of simultaneously, as in broadside.

The text of the second part, supplemented by the iliustrations, made a fairly comprehensive General Battle and Signal Book and Fleet Tactical Regulations.

Morogues followed the custom of the time in employing single flag hoists only. The meaning of the same flag varied with the location of the hoist. He made some use of numeral flags. His signal book was cross-

indexed for greater convenience and was, if not the first, certainly the most ambitious of its time.

An English translation of Morogues' work by an unidentified "Sea Officer" appeared in 1767. A copy of this is in the U. S. Naval Academy Library, presented in 1917. A copy of the original is also there, of which the accession date is about 1860. It was probably a gift from Admiral (then Captain) Du Pont.

The English translation includes some observations on sea engagements written by an anonymous English naval officer to his son. Corbett thought these letters ante-dated Morogues' book.

One of the letters discusses "An Admiral's Post in Action," a discussion which has continued throughout the years.The anonymous officer wrote:

> . . . the captain-general of a fleet must be always in the heat of action (or at least custom has established it so) though attended with no small inconveniences; such as his thoughts being disturbed from their proper attention, by the continual noise of cannon, clouds of smoke, &c. as well as being often interrupted from seeing his line throughout as distinct as he could wish; therefore some are of opinion, as the admiral's courage cannot be doubted, that he should be in one of ships of reserve, though his flag might still continue flying on board his proper ship in the line. But, in my opinion, he cannot see from his corps de reserve, both lines distinct enough to form a right judgment of the condition of each line, which he should as much as possible. . . .
>
> All that can be said, however, upon the whole, is that the adversary admiral is in the same situation aboard of his ship in his line; the only difference is that the weather admiral is sooner clear of smoke, by the addition of both smokes on the lee-line.
>
> This is a point that has been often discussed in conversation among officers; and however plausible as well as prudent, (for the good of the whole) such conduct may appear to be, yet many are of opinion that the introduction of such an innovation (as it would be probably called) might be too ungenerously interpreted by numbers, who judge only by the event of things in general, as a pretence for an admiral to keep himself out of danger; nay, even were it introduced, and supported by all the popularity, (so justly merited,) of an Hawke, a Keppel, or an Howe, a Saunders, or a Peacock, &c. however distinguished for their former bravery, good conduct and resolution.
>
> We cannot help transcribing here, the judicious remark of an officer, who was in the engagement off Toulon, in admiral M--s's fleet, (as it makes so much in favor of the reasons already advanced in this essay) where he says, in his account of the action, viz. "There seems to be an absolute necessity, that a commander in chief at sea, like a general posted on some eminence, should not be taken up (so triflingly) in fighting so small a share of the fleet, as that of his own ship, where his person is not only hazarded, in which all the plan of operation is centered; but in the heat of action and smoke, being in the line of battle, he cannot possibly see or judge how to make proper signals for the destruction of the enemy, and to teach all inferiors, where he would have them aid or repulse. Why was not therefore the admiral placed in a frigate at some distance off from the center, where

he could best distinguish, with a boat, and an officer from each ship, to wait his immediate commands, and to fly to put them in execution? In this manner the Great Peter, Czar of Muscovy, fought, who was as good an admiral, as he was allowed to be soldier."

The anonymous officer uses the expression "corps de reserve," which would indicate that he wrote subsequent to Vernon's instructions for "equalizing the line." Also he mentions Howe and Keppel, both of whom first showed their ability during the Seven Years War, at the close of which Morogues' book was published. These two references point to a conclusion that the English naval officer of rank wrote at some date between 1763 and the year the translation was published, 1767.

Before passing to another author, it is of some interest to note that the French, at this time, did not use red in their flag emblems of command. The flag of a senior admiral was white, of the vice admiral white and blue, and of the rear admiral, blue. The flag of an admiral was hoisted at the mainmast head, of a vice admiral at the foremast head, and of a rear admiral at the mizzenmast head. All flags of the center were white, those of the van, white and blue, and of the rear, blue, the flags being hoisted at the main, fore, and mizzenmast heads in the order of command, as in the white squadron.

In a fleet of 63 ships of the line, each squadron consisted of three divisions of seven ships each, every ship of a squadron carrying a pennant of the same color, or colors, as the flag of the admiral in command of that squadron. The ships of the first division carried this pennant on the foremast, of the second on the mainmast, of the third on the mizzenmast.

In addition to the division pennant, each ship carried a double vane (*girouettes doubles*) at the mainmast head, if commanded by the admiral of the squadron, on the foremast head if commanded by the vice admiral, on the mizzenmast head if commanded by the rear admiral. An exception was made of the fourth ship in each division which seems to have been designated as the flagship and carried the double vane only, without a pennant, the admiral's flag taking the place of the pennant.

The double vane was the same color as the admiral's flag, except in the van, where it was red and the admiral's flag was white and blue.

When the red displaced the blue and white in the admiral's flag, as it eventually did, the colors in the flag emblems of command in the French fleet became the same as those of the English.

In 1765 another French naval captain, M. Bourde de Villehuet, pub-

lished a book entitled *The Manoeuvrier,* or an *Essay on the Theory and Practice of the Movements of Ships and on Naval Evolutions.* Like Morogues, Villehuet dedicated his book to Choiseul, and its merits were reported upon favorably by members of the Royal Academy of Science.

Villehuet took cognizance of the works of Hoste and Morogues and of two other French authors, P. Fournier, who apparently ante-dated Hoste, and M. Bouguer, who wrote later than Hoste but prior to Morogues.

While according praise to the works of these authors, Villehuet finds deficiencies in all of them and remarks of M. Bouguer's book that it was too mathematical. In referring to Hoste, he states that his book had become rare, and that evolutions as well as tactics had been much improved since the time it was published. Speaking of himself, he says he wrote from his own experience, as well as from the study of the authors he named. His book carries very few illustrations. He copies Hoste in using drawings of ships of the line, rather than diagrammatic representations. In some respects, he goes further into detail than either Hoste or Morogues.

On tactics, in general, he offers no new principles, but considering the approach, he says:

> If the fleet to leeward remains close-hauled and accepts battle, the windward fleet extends its battle order until the two fleets are abeam (par son travers). Then the windward ships will all bear up together sufficiently to maintain their opposites in the lee line on a steady bearing, just as if they were chasing, in order that they can quickly reach a position to engage (que l'on fera bientôt a portée de combattre) by presenting their bows (cheeks) to the enemy in an order of sailing which can be easily changed to the order of battle. Then come to the wind together at the instant which precedes the commencement of the action.

This fixes approach tactics more definitely than had been done by any other author, French or English, up to this time.

According to Villehuet, as the fleet to leeward could keep close-hauled, it was necessary that the windward fleet be abeam of it, on a parallel line, before bearing up for the approach.

His discussion of doubling on a superior enemy to leeward, doubling on the enemy when he is to windward, and breaking through the line adds nothing of value to what had been already written by Hoste and Morogues.

One of his conclusions, however, seems to be totally at variance with French practice, then or later. He says:

Boarding has always been a most advantageous manner of fighting for the French. When fleets are equal and the attack is made from windward, approach within pistol shot, and in such a manner as not to be raked. Then the admiral should make the signal to board at the same time that he commences the action, if the enemy has not fired first. Then each ship under the shelter of a rapid and well sustained fire, will maneuver to board his adversary in the enemy's line without taking in his spritsail, so that no warning of his purpose will be given. Such a bold and unexpected movement executed together by each ship of the fleet or squadron cannot fail to be advantageous to the aggressors if every ship does not succeed in boarding. . . . If inferior to the enemy, this is still the only way in which he can be taken, because the sole resource of the feeble is audacity, and this is the only glorious maneuver by which a decision can be reached.

Villehuet had served as an officer in the ships of the East India Company and was a great admirer of La Bourdonnais, whom he credits with having devised a system of numeral flags and signals which was eventually employed by all nations.

Villehuet's work, a volume of 400 pages, octavo, was not translated until 1788. The translator was the Chevalier Sanseuil, Member of the English Society of Arts, assisted, according to him, "by a British naval officer of experience and capacity." He gave the translation the title of *The Manoeuvrier or Skilful Seaman.*

The Duc de Choiseul, to whom Morogues and Villehuet dedicated their naval tactics, was in charge of French foreign affairs during the Seven Years War, and until 1770. He initiated the upbuilding of the French navy after the peace with England in 1763.

In 1765, Choiseul issued battle orders which show that captains of French ships of the line were at least as rigidly governed by their Permanent Instructions as were the English. Captain W. M. James, R.N., confirms this by giving some quotations from French fighting instructions in his *British Navy in Adversity:*

If a Captain considers that he can take the ship with which he is in action, by boarding, he will attempt it, informing the Admiral by signal at the time.

No captain should for any reason whatsoever, unless the ship is extremely endangered, disabled, and in no condition for fighting, leave his position in the line under pain of Court Martial.

A captain may not either, during the action, leave the line in order to succour a vessel in distress, unless the Admiral signals to him to do so.

His Majesty orders Captains of ships to pay more attention to the defense of their own flagship than to the safety of the ships under their command. His Majesty requiring that these should allow themselves to be sunk rather than that they should abandon the flagship.

Choiseul's successor realized that something more than providing ships was necessary to build up the French navy, and that "training at sea was essential for efficiency." For this purpose, an Evolutionary

Squadron was formed in 1772, under the command of the Sieur d'Orvilliers. It consisted of 3 ships of the line, 6 frigates, and 3 corvettes. His orders read:

> His Majesty's intention is that Sieur d'Orvilliers should proceed out of harbor and into the open sea outside the Gulf, in order to exercise the squadrons in different warlike maneuvers and naval evolutions.

D'Orvilliers cruised for nearly seven months. Among his reports on his captains, was one on de Grasse, which read in part. "His collisions seem to show that there is something lacking in his judgment by eye."

Louis XVI, when he succeeded his grandfather, followed his policy of naval training. He formed a squadron of evolution, in 1775, under de Guichen, but it consisted of frigates and corvettes only. With de Guichen was du Pavillon, subsequently d'Orvilliers' Chief of Staff. De Guichen tested some of du Pavillon's tactical ideas.

A plan for a larger squadron was later submitted by Morogues' son-in-law, Captain Périer de Salvert. He proposed among other exercises, "heavy gun-fire at a hulk, squadrons maneuvering against one another, scouting, search operations, and landing operations." He wrote:

> In each ship should be embarked a table five feet square, on which compass cards should be drawn for the moving of little models of ships made for the purpose, so that young officers can learn tactical maneuvers.

De Salvert's recommendations were not followed.

The next mention made of a tactical game-board, is of one contrived by Lieutenant David Porter of the *Philadelphia,* while in his Tripolitan prison, in 1803-4.

In 1776, the French formed another evolutionary squadron which attempted simple maneuvers only. D'Orvilliers and De Guichen became masters of the art of maneuvering under sail. Suffren commanded a ship in one of the evolutionary squadrons and was highly complimented by his superiors for his skill in handling her.

Captain James says that the teachings of Morogues, the King's Battle Orders, and the work of the evolutionary squadrons, inculcated a defensive spirit in the French navy.

Hoste and Morogues showed that every thrust has its riposte. France preferred the parry rather than the attack.

Reference to tactical exercises by Torrington in the Channel, in 1690, has been made, and to others carried out by Lord Anson in 1747, but there appear to have been no English evolutionary squadrons for tactical training and tactical drills—if any, they were not the rule.

Although neither England nor Holland produced such authors as Hoste, Morogues, and Villehuet, it is not to be assumed that the tactics of sailing men of-war were not as thoroughly understood and practiced by the English and Dutch as by the French, or that the two first-named did not employ them aggressively.

Corbett ascribes the evolution of the battle tactics of Nelson to such seamen and admirals as Kempenfeldt (1718-1782), Rodney (1718-1792), Howe (1726-1799), Hood (1724-1816), McArthur (1755-1840), and Knowles. He does not distinguish between the two admirals Knowles; both named Charles Henry, both tacticians, and the younger a writer on tactical subjects. The elder Knowles lived from 1704 to 1777, the younger from 1754 to 1831.

McArthur was secretary to several noted admirals and a compiler--probably originator—of signal codes.

To Corbett's list should be added the two admirals Graves, cousins and sons of rear admirals. The elder's dates are 1725-1802 and the younger's 1747-1814.

All of these, except possibly McArthur and the younger Knowles, were in service during the time of our Revolutionary War, and from them came whatever changes were made in the Permanent and Additional Fighting Instructions after the end of the Seven Years War.

Howe and Kempenfeldt worked for years, both independently and in collaboration, to improve British tactics and signals.

Hood's and Rodney's contributions were made during their West Indian campaign and appear in the additional fighting instructions issued to their commands.

The Graves, McArthur, and the Knowles, though not as well known, were men of ability, with tactics and signals as their professional hobbies. They did much of the detailed work of writing or compiling instructions and signal codes, and perhaps, to a lesser extent, helped in originating them.

CHAPTER XV

HOWE'S TACTICAL INSTRUCTIONS

Issued by Admiral Richard Howe, R.N., North American Station, 1776-1778

ALLEN, IN HIS diligent search for actions unnoticed by other historians, found nothing to record in the twelve years between 1763 and 1775. During these years, France was building and training a navy, and



FIG. 42.—Earl Howe. (*Courtesy Naval War College. From Macpherson Collection.*)
Count D'Estaing. (*From "Histoire de la Marine," L'Illustration, Paris.*)

when England came to open war with the American Colonies in 1775, her old enemy was again strong on the sea.

The formation of the first American squadron (of 6 ships); the appointment of our first naval commander-in-chief; the expedition to Nassau; Arnold's battle on Lake Champlain; and subsequent sea and lake warfare waged during the long struggle, are matters of great historical interest to us.

Instead of interspersing accounts of these chronologically, with un-

related fleet actions, it has seemed better to reserve for Chapter XXII a summary of the most important events covering the years from 1775 to 1783.

Two brothers, Admiral Richard and General William Howe, arrived in America about the time of our Declaration of Independence, to take command of England's land and sea forces. The brothers were both distinguished members of a distinguished family. An older brother, General George Augustin Howe, had fought in America and was killed at Fort Ticonderoga in 1758 during the French and Indian (or Seven Years) War.

It is with Admiral Howe that we are particularly concerned, but it is well to chronicle that the brothers had a political duty assigned to them:—they were commissioned by the English government to offer a conciliatory arrangement with the Colonies. However, the Howes' arrival in New York was untimely—it occurred July 12, only eight days after the Declaration of Independence. They soon found that negotiations were useless and that no terms they were empowered to offer would be accepted.

Nevertheless, in September, a meeting was arranged between the brothers and a Committee of the Continental Congress. It was without result. It is on record that service on our coast against his former countrymen was always distasteful to Admiral Howe, and Mahan states that he was much esteemed in the Colonies for his attitude toward them, as well as for his personal qualities.

His interest in tactics and signals has been referred to. In 1756, during the Seven Years War, he had command of a squadron of eight small ships stationed for the protection of the Channel Islands. While on this duty, he issued a set of day, night, and fog signals. Among his day signals was one for equalizing the line, and another for forming a temporary battle line during a chase. Ships were to join and fight as they came up, without regard to their regular stations.

After two years' experience with this command, he re-issued his signals with some modifications, in a form for ready reference, under the title of "Additional signals and instructions for the ships of war."

In 1759, Howe reverted to a captain's command and distinguished himself under Hawke in the *Magnanime* (74) at the battle of Quiberon. After the Peace of 1763, he was a member of the Admiralty Board for two years, followed by duty as Treasurer of the Navy for five years.

He either carried with him to the North American station, in 1776, or received there, copies of the permanent printed Fighting Instructions,

supplied to all men-of-war, and probably such "Additional Instructions," *e.g.,* Boscawen's, as were then extant.

Soon after his arrival on the station, he issued from his flagship, the *Eagle* (64) at New York, a set of "Instructions and standing orders for the discipline of Ships," dated July 12, 1776, and later a new signal book, of which only a manuscript copy now exists. He supplemented the new book with a set of "Additional Fighting Instructions" to be used with it. These are dated July 1, 1777. Later, 1778, following his procedure in 1756-58, he issued a complete new set of Sailing and Fighting Instructions and a new signal book to go with them.

The signal book was arranged so that the signals to be made with each flag were consecutive and numbered—a somewhat different arrangement from that of 1756. Up to that time, and for some years after, signal flags were used which would now be considered unwieldy, a hoist of five yards and a fly of nine yards not being uncommon. The meaning of a signal depended both on the description of flag and where it was hoisted.

An admiral could not alter the printed "Fighting Instructions" issued by the Admiralty, but he could issue additional instructions which did not contravene them. Admiral Vernon seems to have been the first to do this.

Howe's additional instructions and his signal book were to be used only within his own command. He wrote:

> All signals contained in the general printed signal book which are likely to be needed on the present occasion, being provided in this signal book, the signals in the general printed Signal Book will only be made in conformity to the practice of some senior officer, [Senior to Howe]

The new book contained "Explanatory Instructions," divided according to custom into sections on Sailing, Fighting, Fog, and Night Signals and Instructions. The sailing instructions were in 6 articles; battle, in 21; fog, in 3; sailing by night, in 10; fighting by night, in 11.

The 21 Articles of "Instructions respecting the order of battle and conduct of the fleet preparative to, and in action with the enemy" contain little new matter.

Articles 6, 7, 10, 13, 18 and 21 are of some interest.

Article 6. Lines of bearing, their signification, and wherein to be observed on change of course.

> By the starboard or larboard line of bearing is meant that line or point of the compass upon which the fleet would be formed, and the ships bear from each other

in line of battle ahead, steering with the full sail, or about *one point* from the wind, as it may at any time happen to be, on either tack.

This is the first statement that the close-hauled line was then considered to be 7 points, instead of 6 points from the wind.

Such relative bearing of the ships from each other is to be henceforth preserved through every change of course made, as often as an alteration therefor *together* shall be by signal directed, and the same is to be understood of the bearing indicated, though the Admiral should shape his course from the wind originally, when the signal for forming in order of battle upon either line of bearing is made. The ships will thereby become ranged immediately in line of battle ahead, in readiness for coming into action with the enemy, whenever it shall be requisite to haul to the wind, after having edged away to join them with that intent.

When, on the contrary, the signals to alter the course in succession have been put abroad, the relative bearing of the ships from each other will then be consequently changed, and any alteration of the course subsequently directed to be made by ships together will thereafter have reference to the relative bearing last established. The same distinction will take place so often as the alteration of the course in succession, as aforesaid, shall in future recur.

This is involved, but understandable. Whether it was written by Howe in person is not known, but Corbett speaks of his style as hopelessly involved.

Article 7 directed that the *leading* ship should be the guide except when before the wind, when "the bearing for keeping their stations in that position is to be taken from the ships appointed to lead the line upon the starboard tack."

In Article 10, provision is made for ships quitting the line to equalize numbers, as had been the custom in the Additional Instructions since Admiral Vernon's time.

Howe also provided, when in the presence of an enemy equal or superior in number of ships, "that an Admiral or Commander of a division of the fleet might make signal and change station, so as to bring flagships opposite each other in the battle line."

Howe was conservative. He favored the old rule of battle between equals, but instead of flagship steering for flagship, regardless of relative bearing, he made provision for bringing them together opposite each other in the battle line.

Article 13 directed captains not to fire over, or near, any ships of the fleet likely to be injured. Firing was prohibited "when in order of battle, until the proper signal is made, and that the ships are properly placed in respect to situation and distance, though the signal may have been before put abroad."

Article 18 provided for forming the fleet "in two separate and parallel lines of battle ahead [double column]."

Interval between columns was two cables; distance between ships in column, one cable. Howe's signal book provided for "Open order," one and one-half cables; and for "Close order," half a cable. There is no English order extant for a battle distance of one-third of a cable, as proposed by Morogues.

Article 21 provided that "Flag officers or commanders of divisions are, on all occasions, to repeat generally, as well as with reference to their respective divisions, the signals from the Admiral. . . ." Divisions were not to execute signals until repeated by their commanders.

Howe issued some "Additional Instructions," dated July 1, 1777. Whether these preceded or followed those just quoted, is not now of importance, because there was no fleet resistance on the North American coast until after our alliance with France in 1778, and all Howe's "Fighting Instructions" were in force before D'Estaing's fleet appeared in our waters.

Article 1 of the "Additional Instructions"—in involved terms—freed captains to some extent from what is often described as the extreme rigidity of the battle line, which was said to have prevented decisive engagements. Other Articles gave the procedure to be followed when to windward of the enemy, but on the opposite tack; when to windward, and overtaking the enemy on the same tack; overtaking the enemy with the intention of attacking his rear (a new maneuver, or the revival of an old one of the sixteenth century).

Portions of the Articles referred to are quoted below. Article 1 gave captains some freedom of movement:

> The chief purpose of a regular disposition of the ships, limited to place and distance, in the stated order of battle, being that they may be, as little as possible, exposed, on their approach, to the fire of more than the particular ship corresponding in station, in the enemy's line, or be subject to receive any injury from each other; and as a strict adherence thereto, on many occasions may be found prejudicial to the service, by restraining the captains from taking advantage of the favourable incidents which may occur in the progress of a general action; it is the object of these instructions to facilitate the means of improving such opportunity by an authorized deviation from these restrictive appointments.

Art. 2. "The fleet to be extended the length of the enemy's van, and the same of their rear, though they consist of a greater number of ships." This was the usual plan to prevent doubling. It included instructions for captains of the numerically inferior fleet to disregard the

weaker and slower enemy ships, and to apply themselves to destroying the stronger and faster, if opportunity permitted.

Enemy ships, not engaged at the time, would of course also have an opportunity to seek an antagonist by forging ahead, or dropping astern to assist a friend, and if Hoste's liberal ideas governed, might even go about twice, to double on one of the opposing fleet astern, and already engaged. But there is no evidence that at this time Howe was acquainted with the tactical maxims set forth by either Hoste, Morogues, or Villehuet.

The procedure outlined by Howe for bringing on an engagement, when meeting or overtaking on different tacks, or the same tack, to windward or leeward, was more explicit than in the "Printed Fighting Instructions" and deserves mention. Article 4:

> . . . when coming up with the enemy and having the wind of them on the same tack, . . . and they are observed to be lying to, or waiting under easy sail by the wind, in line of battle ahead, but at such distance to leeward that the fleet is not liable to be materially injured by their fire, the Admiral will then most probably choose to continue on the same course until the van of the fleet appears to be advanced within sufficient distance of the enemy's van. He may thereupon be expected to make signal for shaping a course to join the enemy and come to action with them on bringing up—each ship of the fleet opposed to that of the enemy corresponding in situations respectively as before expressed.

The fleet awaiting an attack under easy sail, or lying to, had an advantage which the French fully appreciated. They preferred to *be* attacked from windward, rather than to attack from that position, however much French authors stressed its advantages for other reasons.

The fleet to leeward had the choice of lying to, standing on under easy sail, or making any other disposition of sails considered safe to carry in battle.

English Instructions showed fear of being doubled, or allowing the enemy's van to gain the wind, by prescribing that their own van should be well abreast of the enemy before bearing up. This, when the enemy was lying to, forced a right-angled approach and put the enemy ships in a raking position, until the approaching fleet rounded to, while if the lee fleet made sail and shot ahead, it left the approaching fleet trailing.

To close quickly, before the lee fleet could reap the full advantage of its position, was always the English object. But the French often fired a broadside and then bore up, just as the English rounded to.

Article 5 prescribes a new method of attack:

> . . . when coming up with the enemy as before . . . but if the Admiral should

think proper under the same circumstances in respect to the enemy to attempt upon their rear, previous to the pursuit of a general action, and makes the signal 4 or 5, page 11th in the Signal book delivered, [the date and usually the place of delivery of the Signal book to a ship was attested by Admiral Howe in each book] the leading ship of the van is to open to a convenient distance, and upon coming up with the enemy to give their sternmost ships her fire upon the quarter, then tack or veer and fall into the rear of the line according to the purport of the respective signals.

This method of attack is to be continued in succession by the ships of the fleet, or any particular division, so appointed until further signal, care being always taken to leave room as requisite from each other in the execution of this service.

The foregoing Instructions were issued by Howe in 1777 and 1778, yet Corbett, who quotes them as of that date, gives the credit for this new method of attack to Kempenfeldt, who when Chief of Staff in the Grand Fleet under Admiral Hardy, in 1779, caused the issue of orders of the same tenor. Hardy's order read:

(1) A division of the fleet to attack the enemy's rear in succession by ranging up the length of some ship, then tacking or wearing as they are to windward or leeward of the enemy and form again in the rear of their division, continuing this manner of attack until they find it expedient to cease, or are called off by signal.

The enemy's obvious answer to this attack on his rear was to make more sail, so that new antagonists could not overtake him, take a retreat formation—in whole or in part, or go about and engage on the opposite tack. This last course was taken, almost coincidentally with the final issue of Howe's Instructions, by D'Orvilliers, on July 27, 1778, when a shift of wind put Keppel in a position to overtake him and endanger his rear. He tacked his whole fleet and passed along the entire length of Keppel's straggling column (Battle of Ushant).

Corbett says: "This form of concentration on the rear was entirely new. It does not appear in the French books and was probably Kempenfeldt's own idea." He considers it a revival of the Instructions of Queen Elizabeth's time. See Raleigh, 1617, and Wimbledon, 1625: "discharge and fall off."

About 90 years later, Colomb proposed, as an effective method of meeting a "charge" of rams in line, a column formation to meet the flank of the "charging" fleet, fire, and turn away in succession.

Howe's Instructions continue:

When from any movement of the enemy, it is thought improper long to continue the manner of attack specified in the preceding article and that the Admiral would have the next succeeding ships take their stations for the purpose of bringing on a general action, he will most probably make the signal (3), page 11, to invert the line in succession . . . then the headmost ship of the British line is thereupon to be placed upon the sternmost ship, not being disabled in the enemy's line.

The ship her second next astern is to pass without her, to attack the second ship of the enemy . . . and so on.

Article 6 went on to explain that this was in lieu of the van ship passing along the enemy's column under fire, until she reached the enemy's van.

Article 7, on "equalizing the line," reads:

On meeting with a fleet of the enemy inferior in number of ships to that under the Admiral's command, or if by the early desertion of their posts in battle the British fleet should become superior to them in the line, the ships of the van or rear in either circumstances over and above the number of the enemy so drawn up are to quit their stations in the line without waiting for farther signals and instructions to that effect. The captains thereof are to endeavour to distress and annoy any of the nearest ships of the enemy in conjunction with the ships of the fleet particularly opposed to them; or otherwise to assist or relieve any disabled ships thereof, as they can be employed with most advantage.

This cannot be said to be an improvement on either Vernon's or Boscawen's of the same tenor. Of the three, Boscawen's seems preferable.

Article 8 contained instructions which, if they had existed in Matthews' time, would have absolved him for leaving his column ("breaking the line") and would have deprived Lestock of any excuse for not vigorously seconding him. They would also have enabled Byng, off Minorca, to leave his column, in order to set an example to other ships of his fleet. And if kept in force by Howe's successors, it would have required some initiative from Hood, off the Chesapeake, and possibly have changed the course of history.

. . . it may be necessary on some occasions to set the ships of the fleet at liberty to steer for those opposed to them respectively in the enemy's line, independent of that necessary regard to the uniformity in distance, course and movements to be at other times observed.

When the signal 8, page 23, is made for that purpose it will be incumbent on the captains of the fleet to keep those ships of the enemy to which they are then separately directed upon the same *constant* bearing [consciously, or unconsciously, like Morogues] if possible, as they advance towards them.

Captains, however, were enjoined to effect "the intended junction as near as may be with all convenient despatch."

Still more liberal was Howe's continuation of Article 8 in its permission to captains to bring up to windward or *leeward* of their opponents, as they saw fit, with the object of closing, or boarding to advantage, but they were warned not to be drawn so far away as to be beyond the assistance of their own fleet.

Howe's tactical instructions and the corresponding signals gave flexibility to the movements of individual ships in action, but he did not

follow Hoste to the extent of increasing the authority of squadron or division commanders. That waited for Nelson.

Some of the General Orders which Howe issued after his arrival on the station appear to have been innovations. They throw some light on the interior organization of English men-at-war at that time:—

(1). Every ship is to be provided with a *publick orderly* book wherein is to be entered all orders and directions issued for the current daily services; likewise, such parts of all general orders, given from time to time and extracts of these instructions as may be necessary for the information of the inferior officers and ships' companies in the duties required of them, for which purpose the officers summoned by signal on board the Admiral or Commander of any division whereof they make a part, are to attend with the orderly book of the ships to which they belong, to transcribe from that of the Admiral or other commanding officer's ship such orders and directions as are to be given out.

The orderly book is to be kept on the quarter deck, subject to the inspection of every person belonging to the ship.

Such a "publick orderly book" would be considered an innovation at the present day.

(2). This order provided for organizing ships' companies into divisions, "two or three divisions according to the complement and classes of the ship" under the lieutenants. Each division to be sub-divided into squads, with a midshipman for each squad. Lieutenants and midshipmen "to be responsible for the good order and discipline of the men entrusted to their care."

Gun divisions appear not to have been considered, except, ". . . in forming these divisions and sub-divisions regard is to be had to make them as convenient as may be to the men's stations in the quarter and watch bills and to their berths."

Provision was made for morning and evening muster at hours appointed by the captain. Division officers were to be informed when men had leave of absence.

Other paragraphs of the orders regulated the duties of marines in port and at sea; recommended for ships' companies a watch in three, when possible, instead of watch and watch; outlined a general cleaning bill for ships and directed fumigation and continual use of windsails in fair weather; established regulations regarding men's clothing and its inspection, lucky bag, etc.

The standing orders, just quoted, appear to have been in advance of the time, if what Kempenfeldt wrote about ship organization, in 1779, can be taken as portraying the general practice.

For two years after taking command, Howe's operations were con-

fined to protecting troop and supply convoys from attacks of privateers and such Continental ships as could get to sea, and in harassing the coast in co-operation with the English land forces. He based on New York after its capture in September, 1776.

In the summer of 1777, he transferred General Howe's army of 14,000, with artillery, supplies, and equipment, from New York to the head of the Chesapeake, for the attack on Philadelphia, then the capital. Men-of-war, transports, and supply ships totaled 280. The army was landed near Elkton, Maryland.

Howe then sent part of his fleet into the Delaware to clear that river and keep it open, as the supply route for the army. This was not completely achieved until November, about the time the armies were going into winter quarters.

The destruction of our shipping in the Delaware, especially of the new 32-gun frigates being built there, the *Washington, Delaware,* and *Effingham,* was a great blow. The English also suffered some losses of men and material. Late in October, a new English 64, the *Augusta,* on retreating down the river after an unsuccessful attack on Forts Mifflin and Mercer, ran aground, took fire, and blew up. A smaller ship, the *Merlin* (18), was set on fire and abandoned.

This was the winter of 1777-78, when Washington's army suffered so greatly at Valley Forge. The Delaware was a very poor supply route in a cold winter.

The news of the French alliance, concluded in February, 1778, and the prospective arrival of a French fleet on our coast reached Howe in time to enable him to clear the Delaware of his ships and to take refuge in New York.

General Howe's successor, Clinton, abandoned Philadelphia on June 18 and retreated across New Jersey, harassed by Washington's men and forced into fighting a battle at Monmouth, on June 28.

The English army reached New York by land, about a year after it had departed by water.

Admiral Howe entered New York harbor with his fleet on the same day the battle of Monmouth was fought. He at once began to obstruct the harbor entrance.

Ten days later, Admiral D'Estaing anchored in Delaware Bay with a heavy squadron of 12 of the line—one 90, one 80, six 74s, three 64s, one 50, and some frigates.

At this time all that Howe could muster was six 64s, three 50s, and six frigates, but where he lay, inside Sandy Hook, he could be ap-

proached only through a narrow channel which his broadsides covered.

D'Estaing arrived off New York July 11, before Howe's dispositions for the defense of the entrance were completed. The French anchored off the mouth of the Shrewsbury river, a few miles south of Sandy Hook, to water and concert plans with Washington's representatives, Hamilton and Laurens, for the best method of attacking the English squadron.

However, when D'Estaing learned that his heaviest ships could not cross the bar except at spring tides, he refused to make the attempt and sailed east for Newport to assist in its recapture. The commodious anchorage in Narragansett Bay would have afforded him a good base from which to operate. He had 4,000 soldiers in his fleet, and with these to supplement our forces, the prospects of success were excellent.

But the number of Howe's ships having been increased by two 50s, one 64, and one 74, he determined to put to sea, to embarrass French operations, while avoiding a general engagement. With this object, he arrived off Point Judith, at the entrance to Newport harbor, August 9, 1778.

Before sailing from New York, he issued his final fighting instructions and signal book which has already, in part, been quoted.

His arrival so disturbed D'Estaing that, without adequate cause, he abandoned his nearly completed plans for capturing the English force at Newport and got his fleet under way, intending to engage Howe before undertaking any further combined operations.

Howe hauled off shore when D'Estaing came out, and the latter pursued. On August 11, the antagonists were in sight of each other all day, Howe endeavoring without success to gain the wind, so as to be free to fight or not, as circumstances might dictate. In order to better judge the relative positions of the two fleets, and direct the movements of his own, he shifted his flag from the *Eagle* (64) to the frigate *Apollo* (32), and took station between the opposing columns.

The wind freshened during the day. Towards sunset, D'Estaing showed signs of taking the lee position voluntarily, apparently that he might be able to use his "lower tier" in the fresh breeze that was blowing and the sea that was rising fast. The wind was about E.N.E. Both fleets were on the starboard tack, heading nearly north.

D'Estaing, instead of taking the lee gauge, placed his heaviest ships in the van and bore up for Howe's rear. Howe shifted his 74, the *Cornwall,* to the rear and closed his fleet in the center to await the French attack.

Rain squalls came on. The wind and sea continued to rise. The hour

was late. It was necessary to make preparations to ride out the fast approaching gale. Instead of attacking, the French wore and stood to the southward. By sunset the English were under close-reefed topsails.

The storm lasted two days. Both fleets were dispersed. Howe was unable to return to the *Eagle*. The *Apollo* lost her foremast and sprung her mainmast. Other English ships were crippled.

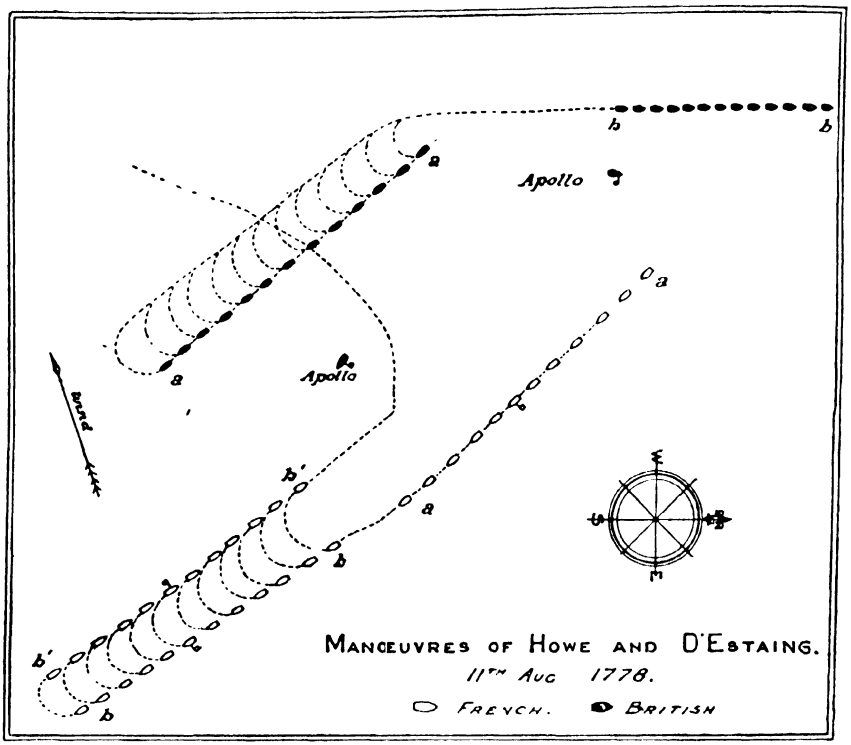


FIG. 43.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

D'Estaing's flagship, the *Languedoc* (90), was dismasted and six days later, while still helpless and without a jury rig, was attacked by the *Renown* (50). Seas were still running high and the attack was not effective. Other minor actions took place between individual ships, but none were lost or captured by either side. The English finally reached New York and the French, Boston.

The gale was said to have been the heaviest in fifty years. None of Howe's battle plans were tested. He shifted his flag twice before reach-

ing Sandy Hook, August 17. His only 74, the *Cornwall,* was one of thirteen of the line, under Admiral Byron, despatched by the Admiralty to follow D'Estaing to America. In an earlier gale in July, Byron's fleet had been dispersed, the *Cornwall* reaching New York, some of his ships making Halifax, and others Jamaica.

What steps Howe would have taken to counter the attack on his rear, other than shifting the station of the *Cornwall,* can only be conjectured. Nor do we know what his intentions were as to his own station in the battle which seemed imminent. Did he intend to conduct it from the *Apollo,* or from his regular flagship, the *Eagle*?

Fogs, as well as summer gales, spoiled many well laid plans on our New England coast in the days of sail. Fogs have still to be reckoned with.

Allen lists Captain Henry Duncan as first captain of the *Eagle.* Howe called Duncan "Adjutant to the Commander-in-Chief." He served with Howe again in the same capacity in 1782.

The second captain of the *Eagle,* Roger Curtis, became a close friend of Howe's and served him fifteen years later as chief of staff.

Neither Duncan nor Curtis is credited by Corbett as being in any way connected with compiling the New Signal book and Fighting Instructions of the date we are now dealing with (1776-78). Both are credited to Howe, himself.

Howe's orders—so far quoted—and orders and instructions from other admirals which will be quoted, were not known to exist until after 1905, when what is known as the "Graves Collection"—papers relating to tactics—was discovered in a chest stowed on the premises of the R.U.S.I. Examination of the papers brought to light an almost complete series of signals and instructions issued to the English fleets between 1776 and 1794.

If Mahan, who wrote the chapter of Clowes' *History* covering major operations of the English navy from 1762 to 1783, had seen the Graves Collection, his opinion on some actions would doubtless have been modified.

Early in the summer of 1778, Howe, feeling that he had not been properly supported by the Admiralty in the matter of ships, had asked permission to relinquish his command. This was granted. He returned to England before the end of the year, refused further service under Lord Sandwich, then head of the Admiralty, and was not again employed until a new Ministry came into power in 1782.

CHAPTER XVI

WAR OF THE AMERICAN REVOLUTION

FIFTEEN DAYS previous to the abortive efforts of D'Estaing and Howe to reach a decision off Newport, two much larger fleets were battling for command of the English Channel. Admiral Count D'Orvilliers was at sea with 32 of the line. He was instructed to observe and embarrass the English, but to avoid action.

Mahan quotes D'Orvilliers, who was widely known as a brave and skillful seaman, as writing to the French Ministry:

> Since you leave me free to continue my course, I will not bring the fleet back to Brest unless by positive orders, until I have fulfilled the month at sea, mentioned in my instructions and known to all captains. Till then, I will not fly before Admiral Keppel, whatever his strength. Only if I know him to be superior, I will avoid a disproportionate action as well as I can; but if the enemy seeks to force it, it will be very hard to shun.



FIG. 44.—Admiral Augustus, Viscount Keppel. (From Ridley's engraving, after the portrait by G. Romney.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

D'Orvilliers was, in many respects, a second Tourville, but he agreed with Morogues that it is difficult to avoid an enemy resolved to fight and still remain in his vicinity.

Until the second week in July, the English Home (or Grand) Fleet, under Admiral Augustus Keppel, felt itself too weak to oppose the French. However, with his force increased to 30 of the line, 6 frigates, and 2 fire-ships, Keppel considered he was equal to fighting D'Orvilliers, whose fleet consisted of 32 of the line and 13 frigates.

The flagship of the French commander-in-chief was the *Bretagne*

(110). Keppel was in the *Victory* (100), and this was the first battle of this ship which is still world famous.

Rear Admiral John Campbell was chief of staff; Jonathan Faulkner, flag captain.

In the English line were fifteen 74s; in the French, thirteen. On the whole, the English line was heavier. It included six 90s and one 80 to the French one 90 and three 80s.

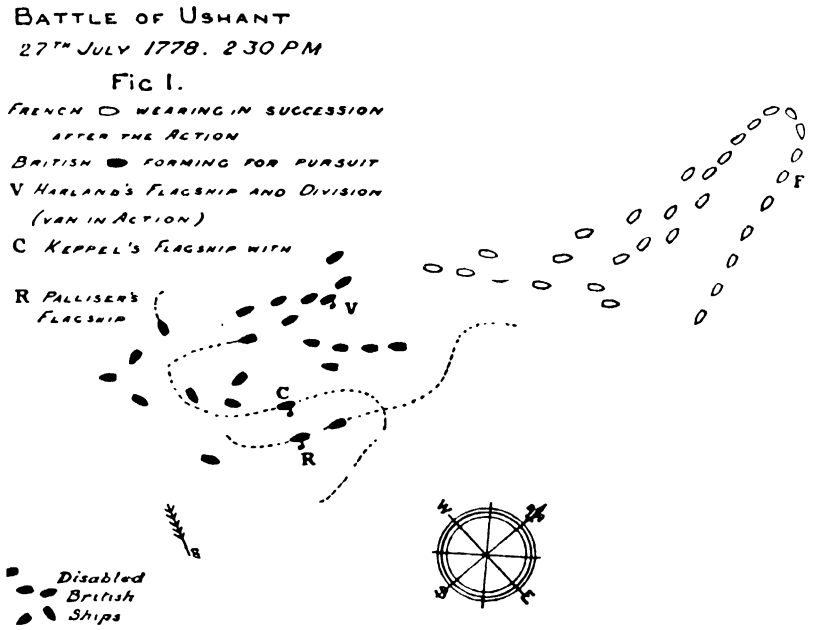


FIG. 45.—(*From Clowes' "The Royal Navy" published by Sampson Low, Marston & Co., Ltd., London*)

Keppel sailed from Spithead July 11, in search of the French. He sighted D'Orvilliers to leeward on July 23, but the latter managed to get to windward and avoided action for four days. He was brought to bay only by an unforeseen shift of wind.

Finding himself so situated on the starboard tack that while still to windward Keppel could close and attack his rear, D'Orvilliers, seeing the English somewhat in disorder, went about and clearing several of the English van, bore up, and engaged to windward on the port tack.

Somewhat of a mêlée ensued. Mahan says the action resembled "a charge through, or by, and a re-formation afterwards."

There were shifts of wind during the battle and rain preceded it while the French were tacking. After passing, D'Orvilliers wore, and came to on the starboard tack to leeward of Keppel, and awaited a renewal of the action.

But the English admiral was not in condition to re-engage until he had re-formed his fleet. As usual, the English had lost more in material; the French in personnel. Keppel signaled to re-form, but some of his ships were too cut up to obey. Vice Admiral Palliser, in command of the rear, could not—or would not—obey his chief's signals and kept the ships of his squadron near the *Formidable* (90), his flagship, whose losses were largest of any English vessel, although she was not disabled.

Keppel delayed too long before signaling Palliser's ships, individually, to join him.

On the French side, D'Orvilliers expected to capture some of the disabled Englishmen as they drifted to leeward, but his signals were misunderstood. Darkness came on and the fleets separated.

The effect was a French victory. Keppel arrived in Plymouth July 31. Both he and Palliser were tried by court-martial, early in 1779. Keppel's acquittal was celebrated with bonfires and illuminations in London.

Palilser's conduct was found reprehensible in some respects. "A mob smashed the windows of Palliser's friends, wrecked Palliser's own house, and came near killing Palliser himself."

Palliser was a member of Parliament and of the party in power. Keppel was also a member of Parliament, but of the Opposition. He was not detached from command until March, 1779, and then at his own request.

The difficulty experienced by English admirals of that time and by the authors of signal books in writing clear English, is well illustrated in an order issued by Keppel, before sailing from Plymouth after his re-fit, consequent to the fight with D'Orvilliers: "In future the line is always to be taken from the center." Obscure, but probably meaning that ships must pass disabled vessels, and those which do not, or cannot, must keep station and close up on the commander-in-chief.

Byron's fleet of 14, scattered by the July storm en route to America, re-assembled in the West Indies and was increased in 1779 to 21 of the line, 11 of which were 74s.

D'Estaing, after the August gale, assembled his fleet in Boston, where

he re-fitted and reached the West Indies ahead of Byron. His command was also re-enforced to a strength of 25 of the line, of which 12 were 74s. No fleet actions took place, however, till midsummer, because Byron's orders required him to employ part of his fleet to convoy merchantmen to and from West Indian ports. Consequently a divided English force left D'Estaing free to carry out the French government's plans and his own.

Instead of endeavoring to clear the Caribbean of English trade and keep Byron on the defensive—in fine, to obtain command of the sea—he undertook the re-capture of St. Lucia, in which he failed, although successful in the capture of two other islands—St. Vincent and Grenada.

By July, Byron felt himself strong enough to seek battle. On July 3 he sailed from Port Castries in St. Lucia, for Grenada, of whose capture he had learned, and also of the capture of 30 richly laden merchant ships lying under the lee of the islands, off St. George's its capital. St. George's is the port to and from which Paul Jones (then John Paul) used to sail regularly. This harbor, or roadstead, being on the southwest end of the island is sheltered from the trades.

D'Estaing was at anchor in the roadstead with his newly taken prizes, when in the early morning of July 6 he sighted the English approaching. Byron came from the northward, before the northeast trade wind, running free, with his port tacks aboard, hoping to catch the French at anchor. Perceiving they were getting under way, he ordered a general chase; ships to engage and form as they came up.

Mahan says that Byron attacked precipitately, when his fleet was neither closed up nor in its regular order. By the time Byron's leading ships reached gun range, the French were sufficiently formed up on the starboard tack to meet them on more than equal terms.

Encountering on opposite tacks—as in other such cases—somewhat of a mêlée ensued, from which D'Estaing withdrew in better order than Byron. The leading English ships approached at such an angle that the French were across their bows. These ships had to sustain the first French fire without much support, and without being able to bring their broadsides to bear. This condition changed as they put their helms up to parallel their enemies, but they were badly cut up.

After passing, those that could do so went about, to continue the battle on the same tack as the French.

Byron had embarked troops for the recapture of the island. These were convoyed by Admiral Rowley in the *Suffolk* (74), with two others of his squadron. When signaled to leave the convoy, he steered straight

for the French van with his three ships, and rounded to on the starboard tack.

A ship of the English rear, the *Monmouth* (64), Captain Robert Fanshawe, wore, and these four ships closely engaged the French van, ahead of the other English ships which wore after passing. Mahan characterizes Rowley's and Fanshawe's acts as "brilliant."

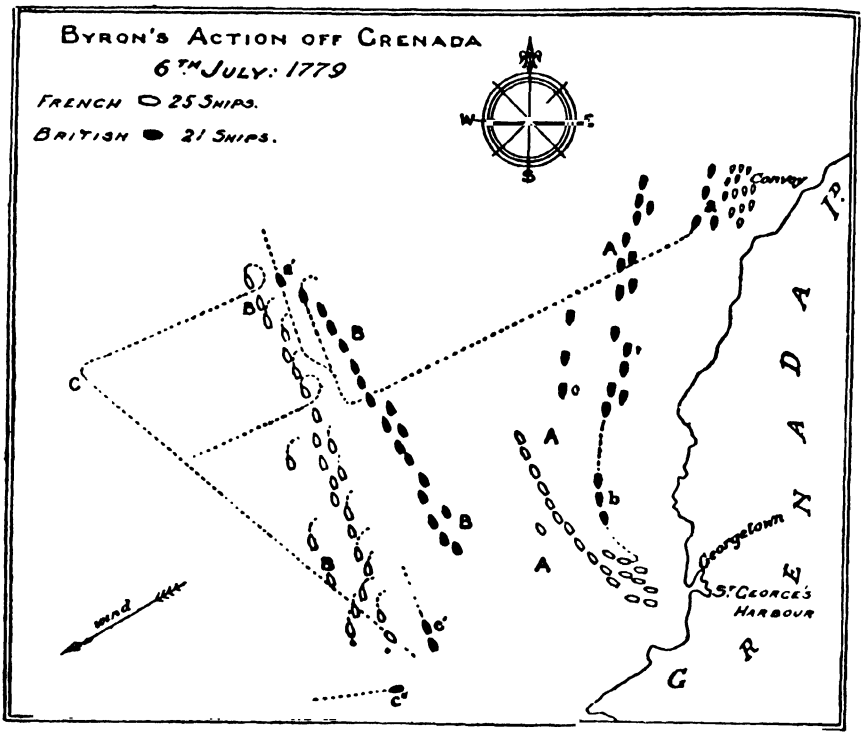


FIG. 46.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

The breeze was light. Firing began at seven o'clock and ceased about one. Four English ships were disabled and two others badly crippled.

About noon the French bore up, but Byron did not follow until nearly three o'clock, when seeing the enemy tacking to come within range of his disabled ships, he made sail to prevent them. D'Estaing, however, contented himself by firing into the disabled Englishmen as he passed, and re-formed again on the starboard tack. He could have taken five—and probably six—of the English cripples, including the



FIG. 47.—Rear Admiral Richard Kempenfeldt. Admiral Sir Charles Hardy (2), Kt. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Monmouth, but he was too cautious to attempt it. He was a soldier by profession, and not a seaman.

Byron, taking his cripples in tow, was neither molested nor pursued. Instead,

> D'Estaing returned quietly to his conquest, Grenada. Byron went to St. Kitts to re-fit, but repairs were most difficult, owing to the dearth of stores. . . . With all the skill of the seamen of that day in making good damages, the ships remained long unserviceable, causing great apprehension in the other islands. This state of things, D'Estaing left unimproved, as he had his advantage of the battle. He did, indeed, parade his superior force before Byron's fleet, as the latter lay at anchor; but beyond the humiliation naturally felt by a navy which prided itself on ruling the seas, no further injury was done.

This quotation is from Mahan, who said, "Byron's action off Grenada was the most disastrous, reviewed as an isolated event, that the British had encountered since Beachy Head, in 1690."

The English also had to suffer some further humiliation in the Channel. After Keppel hauled down his flag, in March, 1779, the only admiral found willing to command the Home fleet was Sir Charles Hardy, a former Governor of New York. Hardy had been on the admirals' list 23 years, but had served mostly on shore. He hoisted his

flag in the *Victory,* with Captain Richard Kempenfeldt as his chief-of-staff.

Kempenfeldt, then 61, was considered to be the most highly educated officer, professionally, in the English Navy. The improvement of signals and tactics was as great a hobby with him as with Howe, whom he sincerely admired.

Kempenfeldt had been on the captains' list for 22 years, failing to be promoted through no fault of his own. He had had previous experience in command, and as chief of staff, in the East Indies under Admiral Pocock. He was present at the capture of Manila in 1761 and was offered the governorship of Cavite, but declined. After further service, he was placed on half pay in 1764, and like many other English officers in similar condition, found it easier to live abroad. He was not again employed until 1770, when after a cruise as captain of the *Buckingham,* he was again on half pay until 1778.

While abroad, he studied Hoste, Morogues, and Villehuet and did some writing of hymns and poems which were published under the pen name of Philotheorus.

In 1778 he was captain of the *Alexander* (74), and in 1779 he sat as a member of the court which tried Vice Admiral Palliser for his conduct in the action with D'Orvilliers. After listening to the testimony, he wrote to his friend, Captain Middleton:

> The course of this court-martial has given me a clearer idea of the action between our fleets last summer [Keppel and D'Orvilliers] than I had before conceived; and the different state the two fleets were in after the action confirms most strongly what I have always thought; that is, that the disabling of your enemy in his masts and rigging should have no small share of your attention and your fire. In this skirmish between the two fleets there was at least as many shots sent from us to them, as they sent to us; I should think many more, as several of their ships could not open their lower ports and ours could. . . .
>
> 'Tis plain to me that our fleet, after that action, for all the first part of the afternoon were at the mercy of the French. . . . Why the French did not profit from this advantage they had I can't conceive.

He went on to advocate the use of "langridge" against sails and rigging, in place of grape.

On May 7, not long after the court adjourned, he received his orders to the *Victory.*

Spain declared war against England in June, and a Spanish fleet of 30 of the line was sent to join the French, whose Channel fleet numbered 36. As opposed to these, the Admiralty could muster only 40 English vessels for service in home waters.

Hardy found himself on the defensive in the Channel, but felt forced to keep at sea if possible.

It was a time of great alarm in England. An invasion from France was projected, to be supported by the Allied fleet. D'Orvilliers sailed from Brest June 4 and was joined by the Spaniards on June 23.

Hardy had sailed from Spithead June 16, with 35 of the line, to cruise south of the Scilly Islands. He did not know when, nor where, the enemy junction took place, nor that owing to failure to supply the Spaniards with French signals, a long delay was caused before the combined fleets could act together.

Kempenfeldt lacked confidence in Hardy's ability. What Hardy thought of Kempenfeldt is not recorded. They were nearly equal in age; Hardy, only two years older than his Chief of Staff, but in poor health. Neither had been at sea for a number of years, but Kempenfeldt had been an active student of tactics and signals while Hardy had not.

Kempenfeldt's letters during this critical period are both interesting and illuminating. On July 2, at sea he wrote to Middleton,

> . . . my situation is extremely disagreeable. I would give the little I am worth to be out of it. Do the people at home think the nation is in no danger? Where is Lord Howe at this alarming period? I can't say more. You can divine the rest. . . . All seems to depend upon the abilities with which this fleet is conducted. Let that be well considered.

Again at sea, July 27, Kempenfeldt wrote his opinion of how an inferior fleet "in being" should be handled.

> Much, I say almost all, depends upon the fleet; 'tis an inferior against a superior fleet; therefore the greatest skill and address is requisite to counter-act the designs of the enemy, to watch and seize the favorable opportunity for action and to catch the advantage of making the effort at some or other feeble part of the line; or if such opportunities don't offer, to hover near the enemy, keep him at bay, and prevent his attempting to execute anything but at risk and hazard; to command their attention and oblige them to think of nothing but being on guard against your attack. Have the ministry sought for a head capable of such management and dexterity, or, do they think that ships are sufficient of themselves, without wisdom to direct and order their operation?
>
> August 6th, . . . A perpetual hurry prevails here which from the natural consequence of hurry produces nothing to the purpose. In confidence I must inform you that the confused conduct here is such that I tremble for the event. . . . An odd obstinacy and way of negativing everything proposed make all advice useless. [Kempenfeldt wanted to excercise the fleet in battle tactics.] There is a fund of good nature in the man, but not one grain of the commander-in-chief. I hear it often said that the salvation of England depends upon this fleet. I never hear this expression but I turn pale and sink. My God, what have your people done by such an appointment?

Kempenfeldt informed Middleton that he had neither written nor spoken in this vein to any one else.

> Aug. 9. . . . It is with the greatest difficulty I can ever prevail upon him to maneuver the fleet; he is always impatient and in a hurry to get to the westward, to the northward or to the southward, that he won't lose time to form a line. . . . He gives his directions to the *captain* of the ship, to the lieutenants, without their ever passing through me.
>
> Aug. 14. . . . That we have no regular system of tactics you know; also that tactics are as necessary for fleets as armies. . . .
>
> Of two fleets, if one acts by a regular system of tactics, when the other has none, I needn't say where the advantage must lay. Our enemies have theory, we were superior in practice. . ."

At this time D'Orvilliers was already in the Channel with the combined fleets, although the Grand Fleet appears not to have known it. On August 16 he appeared before Plymouth and the next day captured the *Ardent* (64). The alarm in England was very great. Mahan says:

> . . . it was justly felt that such a state of things as a vastly superior hostile fleet in the Channel should not have been. . . . The French had placed a force of 50,000 men at Le Hâvre and St. Malo and collected a fleet of 400 vessels for their transport . . . the crisis on its face was very serious. Not their own preparations, but the inefficiency of their enemies in counsel and preparation saved the British Islands from invasion.

D'Orvilliers did his part. He furnished 16 of the line under Admiral Cordova to convoy the invading army across the Channel and 50 ships of the line to contain Hardy's fleet, which at its peak reached only 40 of the line.

Unfortunately for D'Orvilliers, the French Ministry changed the point of landing from the Isle of Wight to a point near Falmouth where there was no fleet anchorage. Before D'Orvilliers could make representations to his government and restore the original plan, a heavy easterly gale drove him out of the Channel. Mahan says:

> On the 25th of August, word was received that the British fleet was near the Scillies. A council of war was then held, which decided that in view of the terrible increase of disease in the shipping and of the shortness of provisions, it was not expedient to re-enter the Channel; but to seek the enemy and bring him to battle. This was done. On the 29th Hardy was sighted being then on his return up Channel. With the disparity of forces he could not but avoid action, and the others were unable to compel it. On the 3rd of September he reached Spithead.

The combined fleet anchored in Brest, September 14.

There was much criticism of the Admiralty. It was justly claimed that Hardy should have been off Brest before D'Orvilliers sailed to join Cordova. Failing that, D'Orvilliers should have been attacked on

the Spanish coast while waiting for Cordova to join him—a period of six weeks.

Hardy may have considered that the number of his frigates was too limited for scouting and failed to use properly those he had, or feared that enemy frigates might trail his and discover his whereabouts.

Two days after the fleet arrived at Spithead, Kempenfeldt wrote to Middleton. His letter covered many subjects—frigates, fire-ships, copper bottoms, etc., but makes no mention of his experiences while being chased by D'Orvilliers. Whether his ideas embodied the general opinion of the time, or are solely is his own, is unknown, but they are worth quoting, in part.

> Fire-ships, if judiciously employed, are a great additional force, if you have the wind of the enemy. In that case I think you may be sure to break their line at whatever part you please to make the attack, if you have a number of them. I really don't see the necessity of waiting till a ship is disabled before you apply the fire-ship. I think the best time to use them is in the very beginning of the action; the smoke covers them as well as afterwards; and is it not best to do the greatest injury to your enemy as soon as you can, to hasten his defeat?

In this last sentence, Kempenfeldt put a major maxim in the form of a query. Its validity, under all circumstances, was not thoroughly considered for more than a century—at least in print—until Chase and Fiske developed it mathematically.

Kempenfeldt continued:

> . . . and I think in the line, the fire-ship has as much chance to succeed when the masts are standing, as when they are gone, without the ship she points for bears away; and then the line is broke and an opening made for their defeat. The very appearance of a fire-ship coming to board, causes a confusion you must profit from. But fire-ships should sail well, or they retard a fleet too much; and yet very little attention has been paid to that quality in them, most of ours sailing very bad. . . . I think when the enemy's fleet was off Plymouth, fire-ships in the night, disguised in the dress of their [the enemy's] tenders. . . might have been applied with success.

Fire-ships, instead of increasing in importance, were as a matter of fact decreasing, both in numbers and, at least in the minds of the admirals of all nations, in value. Only one or two were attached to each fleet, or to a squadron when it was acting singly. Kempenfeldt continues:

> We don't seem to have considered sufficiently a certain fact, that the comparative force of two fleets depends much upon their sailing. The fleet that sails the fastest has much the advantage, as they can engage or not, as they please, and so have it in their power to choose the favorable opportunity to attack. I think I may safely hazard an opinion that twenty-five sail of the line, coppered, would be sufficient to hazard and tease this great, unwieldy, combined armada, so as to

prevent their effecting anything; hanging continually upon them, ready to catch at any opportunity of a separation from night, gale or fog; to dart upon the separated, to cut off any convoys of provisions coming to them; and if they attempted an invasion, to oblige their whole fleet to escort the transports, and even then it would be impossible to protect them from so active and nimble a fleet.

At this time, only part of the English and French ships were coppered, and of the Spaniards, few, if any.

. . . When so much depends upon this fleet, 'tis matter of great astonishment that so little care was taken in the choice of the conductor.

He wrote again on the 19th of September, with lessened fears:

. . . If the combined fleet are in port they'll not appear in a body before spring, I should think. . . . When ships are not fitting for sea, they should be at sea; then order and discipline gain ground, and the men keep their health better in short cruises than in port. . . but to save the masts and ships from injury as much as possible, when it comes to blow hard westerly, they should bear up for Torbay or some port.

Hardy, with his fleet, went to Torbay about this time, and Corbett says that between September 15 and November 4, Kempenfeldt, as chief of staff, issued various tactical orders, mostly borrowed from the French. They included an organization of the fleet for sailing in two squadrons: three divisions of nine ships each in the first squadron; two divisions of nine each in the second, with an extra ship (the commander-in-chief's) in the third division of the first squadron.

In all, this provided for a fleet of 46 ships of the line—an increase of 16 over the number in July, and double the number in April. This shows what great efforts were being made by the Admiralty.

The divisions of the first squadron were commanded by Admiral Hardy, Rear Admirals Graves and Digby, respectively; divisions of the second squadron by Vice Admiral Darby and Rear Admiral Ross.

Frigates were to keep to windward and abreast of the admiral of their division; fire-ships to keep to windward of the fleet; cutters to keep near, and upon the weather quarter, of their admirals.

The order of sailing of divisions in each squadron was prescribed, as were the methods of forming for battle for the whole squadron and for each division of each squadron, and it was ordered that

the ships of the second squadron are to take their motions from, and to be governed by the signals of the second in command. . . . Signals [from the Commander-in-Chief] intended for the second squadron only, will be pointed out by the signal denoting the second in command.

The second squadron was to be separated *two* miles from the nearest ship of the first, and when sailing with the wind abeam or not far abaft

the beam, was to keep to windward on both tacks. When before the wind, or running free, it was to keep on the starboard side of the first squadron.

When sailing in line of divisions, division columns were to be "a full half mile asunder from each other." Distance between ships in column was one and one-half cables.

Preparatory to forming the battle line, the windward division of a squadron took station so that its rear ship was abeam of the fourth ship of the division next to leeward, the fourth ship being the one next ahead of the flag, which was in the center of each division. (The squadrons sailed en échelon.)

Having recently been forced to retreat before the superior Allied Fleet, Hardy's new orders included an Order of Retreat—taken from the French—and the method of forming it; also one for changing "the Order of Retreat to a Line of Battle."

In considering Howe's and Hardy's fleet signals and instructions, it should be remembered that both were formulated when the fleets commanded by them were inferior to that of an enemy in their immediate vicinity, and with whom they had to cope.

We can visualize the Grand Fleet getting under way from Spithead for Torbay, about September 17, 1779, and exercising en route in the new formations.

The fleet included among its officers Captain Sir Charles Douglas, in the *Duke* (98), (father of Sir Howard Douglas, and later Chief of Staff to Rodney in the West Indies, in 1782); Captain John Jarvis, in the *Foudroyant* (80), (the future hero of St. Vincent); Captain Edmund Affleck, in the *Bedford* (74), (later commodore with Rodney, in 1782); and Rear Admiral Thomas Graves, in the *London,* afterwards in command of the British Fleet off the Chesapeake in 1781.

The Grand Fleet squadrons and divisions, as prescribed by Admiral Hardy on September 15, 1779, was found in Graves' order book (Graves' Collection).

The Admiral commanded the first squadron of three divisions of nine ships each; Vice Admiral Darby the second squadron of two divisions of nine ships each. Division commanders were: 1st Division, Rear Admiral Graves in the *London;* 2nd Division, Rear Admiral Digby in the *Prince George;* 3rd Division, Admiral Derby in the *Victory,* with a tenth ship, the *Edgar,* probably for the Division Commander; 4th Division, Vice Admiral Darby in the *Royal George;* 5th Division, Rear Admiral Ross in the *Britannia.*

Red was then the senior color. Division commanders, first squadron, carried their flags, red and blue, respectively, at the fore topmast head; those of the second squadron at the mizzen. What—if any—division or squadron flags or pennants distinguished individual ships, as was the French custom, is not recorded.

From a note in a memorandum order of September 16, it appears that normally division commanders led their divisions. The note reads:

> When the Admiral would have divisions of the squadron sail in three lines abreast of each other and the flags not to lead the divisions, but keep in their stations in the lines, he will, under the red flag, pierced white, fix a pennant.

When not leading, the station of flagships was in the center of their divisions.

Of course each captain and admiral was furnished with a copy of the orders, and of the instructions and signals issued by Hardy, and Corbett says that, in view of this, it is hard to conceive why such a controversy arose over the authorship of the method of "breaking the enemy's line," as practiced by Rodney against De Grasse in 1782. He considers that Kempenfeldt, while preparing new orders and signals, must have had before him Howe's Instructions and Signal book of 1777-78, as well as those of the French authors, and that most of the new matter was taken from the French.

No copy of the instructions explanatory of Hardy's Grand Fleet new signal book has been found, but two copies of the book itself exist and from it—where it differs from that of Howe—Corbett quotes.

Here we are concerned only with new methods of attack and of handling the fleet.

Under Tactical Signals:

1. Form order of sailing.
11. To form in *close* order of battle, ahead and astern of the Admiral as most convenient.
16. For the fire-ships to proceed to burn the enemy, under cover of particular ships indicated. [See Kempenfeldt's views on use of fire-ships.]
17. Particular ships or divisions to attack any number of the enemy's ships of war seeming to be kept separate for any purpose from the body of the fleet. [Identical with Howe's, already given. Corbett thinks this refers to D'Orvillier's convoy detachments. In these days it might refer to an atttack on a so-called "fast wing."]

Miscellaneous additions:

9. The fleet to form in three lines. [French 5th order of sailing.]

Instructions relating to manner of attack:

1. Same as Howe's "fire and fall off." [Although Corbett overlooks this and gives credit for this revival of an old idea to Kempenfeldt.]
2. For certain particular ships to do the same.
4. When fetching up to leeward of the enemy on the contrary tack to break through their line and attempt to cut off part of their rear. [Cf. Rodney, 1782.]
5. When coming up narrow [close?] to windward of the enemy for the headmost ship to engage the enemy's sternmost ship, the next to pass under cover, etc. [Same as Howe's inverting the line in succession, in preference to the van and succeeding ships passing along the enemy's line from rear to van.]
7. The van of the fleet to double on the enemy's van.
8. The van of the fleet to double on the enemy's rear.
9. The rear of the fleet to double on the enemy's rear.
10. The Admiral means to make his attack on the enemy's center. [This and the two following signals are Kempenfeldt's own.]
11. The Admiral means to make his attack on the enemy's van.
12. The Admiral means to make his attack on the enemy's rear. [Howe had similar signals, but they were to be addressed to particular ships or divisions.]

Kempenfeldt continued to write to Middleton after the fleet arrived at Torbay, and at intervals until his death. On October 19, 1779, he wrote:

Signals pointed out by numbers, and according to that method observed in those you sent me, I have long been acquainted with. They don't require many flags; however there must be three of each sort, or you can't express a number which consists of three figures of the same rank, 222 or 333, etc., [Repeaters had not then been thought of] and for expedition in making signals there should be the whole *nine* flags ready for each masthead.

The numeral way of pointing out the signal is very convenient for those to whom they are addressed, for the ready finding out of their meaning, and a very great ease to the compiler of the signals. The objections to them are that, for the most part of the signals, you have three flags to show instead of *one* in the common method; that ships may often be in a position not to see the flag at the mizen topmast head; that to ships at a distance it will be more difficult to ascertain the colour of two or three flags than of one; that when signals are simple, with only one position, that, assisted by circumstances, may lead to the knowledge of the signal, though the colour of the flag may not be easily distinguished.

However I think all these objections may be obviated; and in my opinion, the signals by numbers, or those by a superior flag, as used by D'Orvilliers the last two summers, are by much superior to any method we have. I could in a very few days (less than a week) arrange our signals according to both methods, could I have those days to myself without interruption.

On the 28th of December, Kempenfeldt unburdened his mind about ship's organization:

. . . if six, seven, or eight hundred men are left in a mass together, without divisions and the officers assigned no particular charge over any part of them, who only give orders from the quarter deck or gangways, such a crew must remain a disorderly mob. . . . The officers having no particular charge appointed them, the conduct and behaviour of the men are not inspected into; they know nothing of their pro-

ceedings; and the people, thus left to themselves, become sottish, slovenly and lazy, form cabals, and spirit each other up to insolence and mutiny. . . .

. . . Each lieutenant's company should be formed of the men who are under his command at quarters for action. These companies should be reviewed every day by their lieutenants, when the men are to appear tight and clean. . . . To keep the seamen properly clothed and clean, they should be uniformed and obliged to possess certain quantity of each species of clothing. . . . Divine service should therefore be performed every Sunday and I think a short form of prayer for mornings and evenings to be used every day would be proper.

. . . What I have here recommended I know is not new; I have thought of it many years ago, and I know many others have done the same; but yet it is not adopted. . . .

The letter was a long one; the extracts show its tenor.

Kempenfeldt seems to have been unaware that Howe had established divisions and nearly all the other reforms recommended by himself at this later date, and his letter must have sounded strange to Middleton, who, in 1775, in command of the *Ardent* (64), did the same for his own ship. Kempenfeldt was lacking in initiative in this respect. Otherwise, feeling as keenly as he did on the subject, he would have urged these changes upon his admiral and had them established in the home fleet, which would have served as an example to others.

Corbett speaks of its being rather startling to learn of the lack of a good internal organization of British men-of-war as late as 1780. Howe's orders on internal organization of ships were less specific than Middleton's who, as captain, went into greater detail. Corbett describes Middleton as "active minded, fond of noting down his ideas, not afraid of expressing them, and eager to get hold of those of others, . . . his order book [as captain] . . . bears witness to an enlightened mind singularly in advance of his day."

Captain's Order Book. 1st August 1775.

By Charles Middleton Esq. Commander of His Majesty's ship *Ardent*.

1. The first lieutenant to make out a watch, quarter and chasing [station bill]. [Corbett's abstract.]
2. Mates and midshipmen, petty officers and men, to be classed in four divisions; each division to be under the direction of a lieutenant. [Corbett's abstract.]
3. The lieutenants commanding the respective divisions to see that the clothes and beds of the men under them are made up to the quantity specified in the following report. . . . Jackets, 3, waistcoats 2, breeches 2, shirts 4, frocks 2, trowsers 2, shoes 2, stockings 4, beds 1, caps or hats 2.
4. Provide for inspection of clothing; punishment for those who are careless or dirty in their clothes or persons, as far as a few strokes [of the cat] by the midshipman commanding, through the boatswain's mate. If habitual to be scrubbed in a tub by order of the lieutenant [of the division].

   It is recommended to the mates and midshipmen to cause the men under their care to wear their own hair: and to get so well acquainted with their character

and disposition as to be able to answer, at any time, such particulars as may be required concerning them.

5. The Articles of War and rules of discipline, as likewise such of these orders as relate to the men to be read once in every month. [publicly and distinctly; to be hung up in some public part of the ship] (part in brackets, Corbett's abstract)

The book contained forty orders—too many to be quoted in full, but worth reading, and following at least in part, today. They provide a cleaning bill; set punishments for swearing, drunkenness, and overstaying leave; regulate use of ships' boats; outline ship and gun drills; prescribe point of aim in action, as "the hull near the mainmast"; take up the uniform of midshipmen and mates; and direct commissioned officers to show a good example.

A part of Order No. 3 shows that there was a lack of uniformity in the clothing of crews: "The boats' crews' shirts to be of the same pattern in the checks and all to have caps of the same kind." (According to other accounts of those days, we read that competition among captains in bizarre clothing for their gigs' crews was as keen—or keener—than in performing evolutions.)

Middleton's fixing a "point of aim" may not have been new, but it was rarely written down. Much of the French fire was directed at masts, sails, and rigging, while the object of the English was to hull an enemy, at, or near, the water-line.

Middleton does not say whether reading the Articles of War once a month was either an Admiralty or a fleet order. He prescribes it for his ship. For many years before our Regulations directed that the "Articles of War" were to be kept conspicuously posted, their monthly reading aloud was required, as well as a monthly muster of the crew, for names and rates.

It is notable that his order about getting well acquainted with their men was addressed only to mates and midshipmen. It is still an essential of good discipline, efficiency, and contentment and applies to division lieutenants as well as to their subordinates.

CHAPTER XVII

WAR OF THE AMERICAN REVOLUTION (*cont'd*)

RETURNING TO fighting instructions and methods of attack, Corbett says that in 1760 Boscawen, or the Admiralty, was issuing "Printed Additional Fighting Instructions" but no copy has come to light.

No complete revision of the General Printed Sailing and Fighting Instructions to incorporate in them approved parts of "additional instructions" seems to have been undertaken since Russell's time.

In 1778, the Admiralty contented itself with issuing its own set of "Additional Instructions." The latter were an improvement on Boscawen's of 1759. The sailing instructions established "line of bearing" formations which Corbett says were herein first called "Bow and Quarter Lines." They were similar to those ordered by Hawke and Anson, but had not been included by Boscawen in his "Additional Instructions."

The "General and Additional Instructions" were accompanied by tabular abstracts of signals, referring to both "to make their meaning to be ascertained rapidly."

This table served its purpose, but Howe's "Signal Book" of 1777 was better and was a start towards our present form.

As we have seen, Kempenfeldt, profiting by his study of French tactical writers, was soon advocating "numerary" (numeral) flags and signals.

Thomas Graves, whose collection of fighting instructions, when brought to light, caused authors who wrote of English naval tactics to modify some of their conclusions, was a distinguished member of a distinguished naval family. His nautical papers appear to have been presented to the R.U.S.I. with no knowledge of the value of their contents.

Graves in 1775 was a lieutenant in command of a tender, *Diana,* in Boston harbor and vicinity, under his uncle, Rear Admiral Samuel Graves. On May 12, the day of the battle of Lexington, he was in action with his ship in the Charles River and was forced to abandon her.

He appears to have started his collection in 1779, while serving in the Channel under his cousin, Rear Admiral Thomas Graves, a squadron commander in Hardy's fleet. He was again on the North American

station in command of the *Bedford* at the Battle of the Chesapeake in 1781; and in command of the same ship under Rodney at the Battle of the Saints, 1782. He reached the rank of captain in 1781; rear admiral in 1801; was Nelson's second in command at Copenhagen; and received his promotion to the grade of admiral before his death in 1814.

He served his country well. He had a keen mind and a flair for tactics, as shown by the marginal notes on his nautical papers.

After the futile efforts of D'Orvilliers and Cordova to bring Hardy to battle and the miscarriage of the allied plan for the invasion of England, Spain withdrew her fleet and major operations in home waters ceased for 1779.

In September, while Hardy was exercising in the Channel, Paul Jones, in the *Bonhomme Richard,* sailed from L'Orient with his small squadron, and on September 23 won his celebrated victory over the *Serapis* (44), off Flamborough Head on the east coast of England.

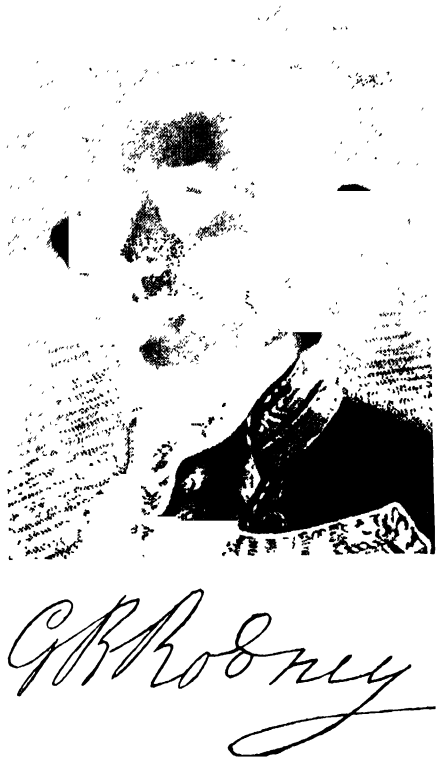


FIG. 48.—(*From Allen's "Battles of the British Navy," George Bell & Sons, London*)

The plans of France and Spain for 1780 were "To blockade Gibraltar, to have in America and Asia sufficient force to hold the British in check, and to take the offensive in the West Indies."

Spain undertook to blockade Gibraltar.

In October, 1779, Rear Admiral G. B. Rodney had been appointed to relieve Byron in the West Indies, and to sail with a small squadron. No doubt, learning of the Allied plans, the Admiralty determined to temporarily increase Rodney's immediate command with a large part of Hardy's fleet, and employ it in convoying supplies to Gibraltar and

Minorca. After executing these orders, he was to detach the Grand Fleet contingent to the Channel and proceed to his station.

Rodney sailed from St. Helen's early in December. He wrote in his journal, on December 15:

> . . . made signal for all lieutenants and delivered signal books, line of battle, private signals rendezvous, etc. to the respective ships.

Four days later, he made another entry:

> . . . at 9 A.M. made signal for recalling signal books, in order to rectify an omission in them, and to prevent any ill consequences that might otherwise arise therefrom. . . .

One of these books, issued to the *Terrible,* still exists. It is No. 18 of the Admiralty's printed Additional Instructions of 1778. Its full title is, "Signals and Instructions in Addition to the General Printed Sailing and Fighting Instructions."

Article 18, as printed, read:

> If the commander-in-chief should chase with the whole squadron and would have those ships that are nearest attack the enemy, the headmost opposing their sternmost, the next passing on under cover of her fire, and engaging the second from the enemy's rear, and so on in succession as they may happen to get up, without respect to seniority or the prescribed order of battle, he will hoist a Dutch flag at the main topgallant masthead and fire a gun, keeping at the same time, the signal for the chase flying.

To this, Rodney added in manuscript:

> If to engage to windward, the above flag, as specified, if to leeward, a blue pennant under the same flag. When each ship as they get up, are to engage their opponents and on no pretence to quit them, until they cannot get away or submit.

The language in which these instructions are couched would indicate that if Rodney's education had touched lightly on English grammar, he had certainly mastered the imperative mood.

On January 8, 1780, he captured a Spanish 64 and six small frigates with a fleet of merchant ships, among which were twelve laden with supplies for the Spanish fleet at Cadiz. He sent these on to Gibraltar.

This capture was made west of Cape Finisterre. Here he was warned of a Spanish squadron cruising off Cape St. Vincent, the southwest point of Portugal.

He sighted the Spaniards on January 16, eleven of the line, under Admiral Juan de Langara in the *Phoenix* (80), with ten 70s and two frigates. The Spaniards bore nearly southeast from the English. The wind was nearly west. Fearing that Langara would attempt to make

Cadiz, Rodney signaled a general chase, and then made the signal provided in Article 18, to engage to leeward.

Some of the English vessels were coppered. The Spanish ships were not and, moreover, they were poor sailers.

Rodney's reason for engaging to leeward was to get between the enemy and Cadiz, which bears southeast from Cape St. Vincent.

It was well along in the afternoon when the Spanish were sighted and as the month was January, darkness fell not long after the signal for battle was made at four o'clock.

The result was a thrilling night action which lasted until 2 A.M. Six of the Spanish line were captured. One blew up. Four others and the two frigates escaped.

By morning the wind had increased to an on-shore gale. Two of the captured ships were wrecked and lost. Four—including the *Phoenix*—were taken into the English navy. Allen says that Captain MacBride, in the *Bienfaisant* (64), was engaging the *San Domingo* (70) when she blew up. He was given the honor of receiving the surrender of the *Phoenix*. Having a scourge of smallpox in the *Bienfaisant,* Captain MacBride sent a letter to Admiral Langara to the effect that he would not, under the circumstances, take off the *Phoenix* crew and put them on board his ship, but "should expect the Spanish officers to consider themselves prisoners of war on their parole of honour. The terms were rigidly abided by."

Rodney's captures were particularly galling to the Allies, because at the time Cordova was lying in Cadiz, fairly close at hand, with 20 Spanish and 4 French ships of the line.

It is Mahan's belief that the Spanish ships were poorly equipped and inefficient. In any case, Rodney proceeded unmolested to Gibraltar, where he lay 18 days, supplied the garrison there and that of Minorca at his leisure, and then sailed for his station in the West Indies, having fully restored English prestige at sea.

All of the Channel fleet that went with him to Gibraltar and a few that sailed with him to the West Indies had Hardy's (Kempenfeldt's) changes in the 1778 Instructions on board, but Rodney does not seem to have made any use of them.

He made his own changes in the Instructions. The addition made to Article 18 is characteristic of his determination to fight decisive actions, but in this he had to reckon with the French.

The "Additional Instructions" of the Admiralty included sailing instructions, by day, by night, and in a fog, and Fighting Instructions

by night. Rodney added two articles to the instructions for night fighting. One of these prescribed fighting lights.

The Admiralty's night fighting instructions were in two articles. One prescribed a signal for forming line of battle at night; two lights in the main topmast shrouds, one above another, with, or without a gun, as there may be occasion. The second provided two lights at the bowsprit end for tacking in succession and following in the wake of the leading ship.

Rodney added eight other articles to the night fighting instructions, the first of which read:

> In case of engaging the enemy at night, the better to know our own ships and prevent their firing into each other, every ship in the action is to hoist three lights in a triangle at the mizen peak, and two at the bowsprit end, one over the other. The Admiral will hoist the same signals, exclusive of the usual lights.

This is one of the earliest prescribed recognition signals for night fighting.

The other seven new articles for night fighting are of present importance only because in two of them Rodney reiterated his orders—already added, in two places, to the fighting instructions by day—that "once engaged on no pretense to leave an enemy" until he was so disabled that he could not get away, or had struck.

The night fighting articles were issued to the fleet before Rodney sailed to supply Gibraltar and were fresh in the minds of captains in the battle with Admiral Langara's squadron.

Rodney did not change the instructions for equalizing the line when meeting an inferior force, but reconciled two articles one of which provided for ships leaving the line to hold themselves in readiness to assist disabled vessels, and the other directed them to rake the enemy's van and rear. He directed that the latter be considered their first duty, but also that a good lookout must be kept for disabled ships, going to their relief, if necessary, or taking their places in the line of battle.

All French authors recognized the superiority of a shorter line of heavy ships over a longer line of smaller ones.

Rodney provided two new signals which show that he also realized the value of concentration and was prepared to profit by it. One of them provided for massing his heavy ships in his van or rear; the other for close order in the line of battle.

The commander-in-chief's position (signal) pennant for "ships ahead" or "on his starboard beam" was "a common pennant on the

jib-boom end"; for ships astern, or on his port beam, "a common pennant at the cross-jack yardarm."

Position pennants were to be repeated down the line and kept flying until ships were in position, each ship hauling down, when her next-away from the commander-in-chief was in position.

Any ship could hoist the position pennant on her next-away from the center, if such ship were out of position.

Bow and quarter line was recognized as a fighting formation, as well as column and line. The signals for these and how to execute them, were contained in the first three articles of the Additional Instructions.

The first article was for line of battle in column, at one or two cables distance as signaled.

The second article was for line of battle in line (line abreast); ships at one or two cables distance as signaled.

The third article was for bow and quarter (battle?) line. Read in the present day, this article is merely a jumble of words. It seems to have been far from clear, even to the seamen of that day. It reads:

> If the commander-in-chief would have the squadron when on a wind draw into a line on each other's bow and quarter and keep at the distance directed in the first article [i.e., at one, or two cables, as signaled] those ships which shall happen to be to leeward at the time of making the signal, forming the van of the line, and those to windward the rear, and all the ships from the van to the rear bearing on each other on the point of the compass whereon they will be on the other tack (always taking it from the center) he will hoist a red pennant under the flags mentioned in the said article [i.e., for one cable distance or two] at the mizen peak and fire a gun, and if he should afterwards tack in order to bring the squadron into a line ahead, the ship that becomes the headmost is to continue leading.

This order was subtracted from, and added to by various admirals. Graves writes on his copy, "How is this to be executed? and are ships to be on the lee or weather quarter of their leaders?"

The fourth article provided for a battle line on a line of bearing different from the course for two and one cable distance, and for ships bearing from each other on any one of the thirty-two points of the compass. (Anson appears to have been the first to provide such signals and also for bow and quarter line.)

The fifth article provides signals for change of course without change of bearing.

Assuming the wind to be north, ships in column, close-hauled on the starboard tack, will be on course W.N.W. and line of bearing, W.N.W. If they go about and come to the wind on the port tack, the new course

will be E.N.E. and the line bearing W.N.W., unless the guide is changed to the leading ship, in which case the line of bearing will be E.S.E.

They are then in bow and quarter line; each ship on the weather quarter of her next ahead.

Should they now change the line of bearing so that each ship takes station on the lee quarter of her next ahead, the formation would still be bow and quarter line, but the line of bearing would be N.N.E. That is, each ship eight points to windward of the original line of bearing.

Graves, in his marginal notes, expresses the opinion that if an enemy were approaching to leeward, bow and quarter line should be formed on the weather quarter; on the lee quarter if the enemy were approaching to windward. With this proviso, he considered bow and quarter line to be the strongest battle formation, because each ship "will always enfilade the ship that engages her second astern."

Graves' note is not very clear. His to leeward and "to windward" should read *from* instead of *to*.

It is evident that by successive changes of line of bearing, without changing course or guide, ships can be revolved around the guide like spokes around the hub of a wheel. Such maneuvers have proved attractive to some admirals in the present day.

Shortly after the turn of the 20th century, line of bearing changes were frequently the rule while cruising and maneuvering. Rules for large changes were worked out. In one instance, these almost reached the extent of changing line of bearing from east to west without changing guide; and from north to south—that is, 180 degrees, without changing guide. Such exercises served some purpose as drill in handling and steering ships, but were of no other value.

It may be set down as a maxim that to change line of bearing for a squadron or fleet, without changing course, is a difficult movement to perform, and that keeping position on a course different from the line of bearing is not an easy formation to maintain, except in modified form.

Signals had developed to the extent that Rodney prescribed "answering, interrogatory and annulling signals." These were:

Answering; a Dutch flag, reversed, at the main topgallant masthead, except for the flagship which answered with a flag, half white, half blue, at the fore or mizzen topmast head.

Interrogatory: a Dutch flag, as for answering, but in natural position.

Annulling: a flag half blue, half yellow, at the main topgallant mast head under the admiral's flag.

These, with others already in the sailing instructions, gave an admiral a fairly wide choice of signals with which to maneuver a fleet for cruising and fighting.

When Rodney sailed for the West Indies after his success at Gibraltar, he was returning, at the age of 62, to a station where he had served twice previously, as commander-in-chief, and was therefore familiar with the winds and currents in and about the islands enclosing the Caribbean Sea.

He took over command on his arrival at St. Lucia, March 27. As re-enforced by the ships arriving with Rodney, the English fleet numbered 20 of the line, as compared with 23 of the line under the French admiral, De Guichen.

Byron and D'Estaing were replaced by two more capable tacticians.

The convoy of homeward, and West India bound merchant ships was a duty of both fleets. This duty sometimes required only frigates, sometimes squadrons of heavy ships, sometimes the fleet.

About the middle of April, Rodney learned that De Guichen was employing his whole fleet in convoying homeward bound merchantmen and had also embarked 3,000 troops at Martinique to attack one of the English islands after clearing the convoy.

Rodney put to sea for a decisive battle. Fort de France in Martinique is a short run from Port Castries in Santa Lucia. Between the islands the trades blow nearly east.

On April 16, Rodney sighted the French to leeward of his fleet and off Martinique, but beating to windward. Apparently the wind was light.

As darkness came on, Rodney formed his line on the starboard tack, to the west of north, and, with his frigates, kept close watch during the night. At daylight, De Guichen was in sight, well to leeward, forming his line on the port tack on a southeasterly course.

Rodney had signaled two cables as night distance. At seven in the morning he signaled for one cable. His fleet was still on the starboard tack and probably making little way. An hour later, he signaled his intention to concentrate on the French rear, and at 8:30 signalled his column to form line on a course west by south and stood down, nearly before the wind, to attack. De Guichen wore his ships together and came by the wind on the starboard tack to close up on his former rear, which had been opened up too much on the remainder of his fleet. Rodney at once brought by the wind on the port tack and opened to two cables.

According to Rodney, the French fleet was extended about twelve miles, while his own covered not more than five, but the two fleets were passing each other out of gun range and De Guichen wanted to avoid action. Rodney wrote, "The different movements of the enemy obliged me to be very attentive, and watch every opportunity that offered of

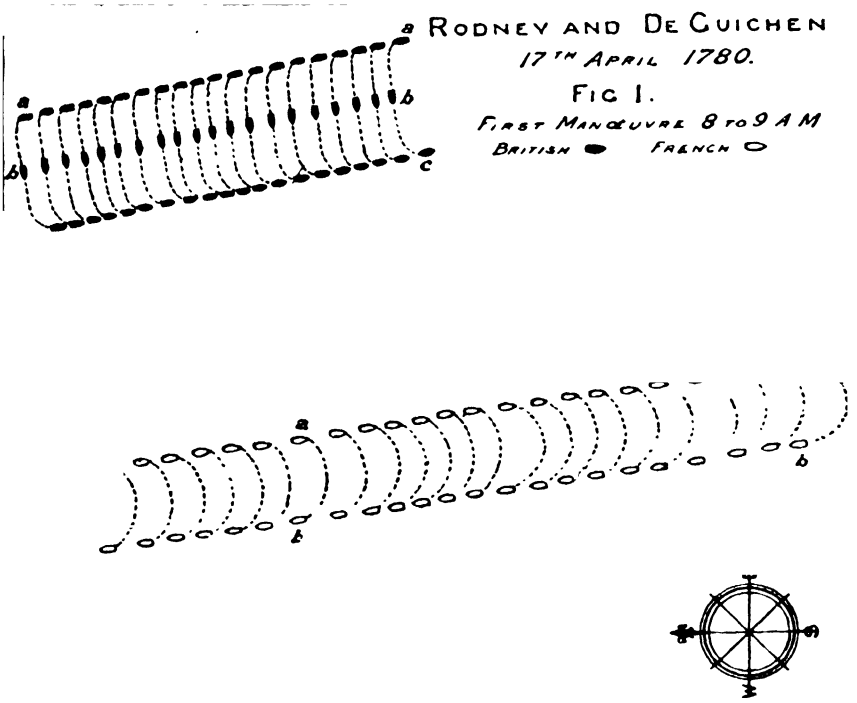


FIG. 49.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

attacking them to advantage." It is to be observed that Rodney was not satisfied to simply bring ship against ship. He was seeking to attack at an advantage.

Mahan comments:

> The wariness of the two combatants, both trained in the school of the eighteenth century with its reverence for the line of battle, will appear to the careful reader.

What Mahan himself thought, he does not record. In another place he writes of what he calls the "spectacular tactics" of his own time and

date of writing, 1897 (a charge through and a re-formation afterwards), but again offers no definite opinion of his own.

With regard to Rodney and De Guichen, he continues:

> Rodney, although struggling through this chrysalis stage to the later vigor, and seriously bent on a deadly blow, still was constrained by the tradition of watchful fencing. Nor was his caution extravagant; conditions did not yet justify the apparent recklessness of Nelson's tactics.

We judge that by "conditions," Mahan means that the French navy had not yet degenerated to a state where it could safely be despised as an antagonist, and where the only tactics necessary were those that brought British ships bows on, or in any other way, within gun range of the French. While not exactly criticising Rodney, he does not praise him, nor does he say what other maneuver Rodney could have employed to come to grips with an enemy who would surely return as good as he received, and who was quite ready to take advantage of any faulty move on Rodney's part.

Rodney kept the opposite tack until his flagship was abeam of De Guichen's. Then, at about 10 A.M., he wore his fleet together (going about towards the enemy). His ships were slow in obeying the signal, and half an hour elapsed before all were on the starboard tack, at two cables' distance, nearly parallel to the French, and on a course about north by west. At eleven, the signal to prepare for battle was made, followed by one to change course to port, and at 11:50, for every ship to bear down and steer for her opposite in the enemy's line, agreeable to the 21st article of "The Additional Fighting Instructions." This was followed in five minutes by the signal for battle, and this again, by a message that the Admiral's intention was to engage closely.

Corbett says that before making the signal to bear down, Rodney signalled for the ships astern of him to close the center. This meant, presumably, to one cable, leaving the vessels ahead, as they were, at two cables' distance. This distance was bound to increase if the signal were interpreted as Rodney said he intended. That is, for each ship, at the time it was made, to steer for the enemy's ship abreast of her, it being agreed that the distance between the French ships averaged considerably more than two cables. So, although the British captains were supposed to keep the prescribed distance from the center, they were also commanded to steer for their opposites. If all had understood the term to mean immediate opposites, instead of the old custom of van to van, it is obvious that four or five of the British ships would have had no direct opponents, thus making Rodney's signal not applicable, under

the circumstances, to a concentration on the enemy's rear, which five hours earlier he had announced as his intention.

As it was, the leading British ship, the *Stirling Castle* (64), Captain Robert Carkett, steered for the French leader, and a number of other

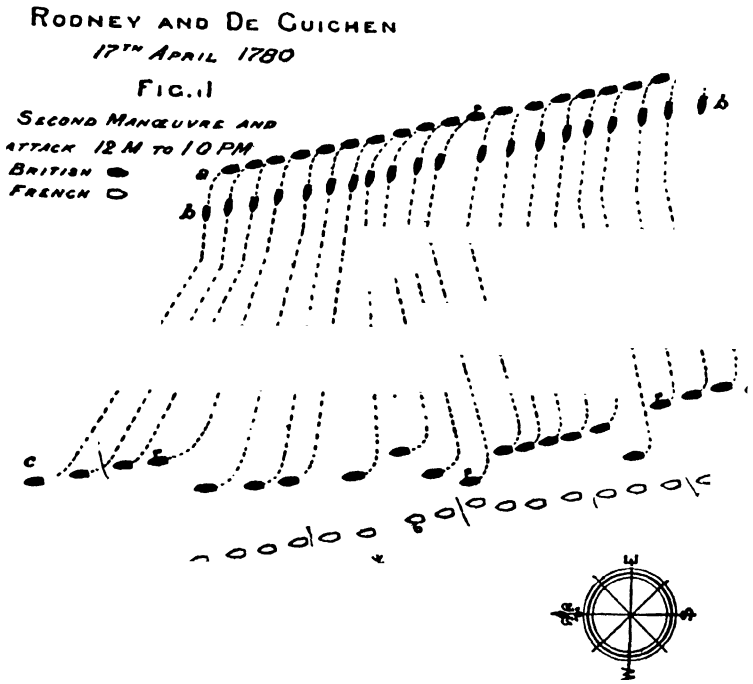


FIG. 49a.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

ships of the van, commanded by Rear Admiral Hyde Parker, followed his example.

According to Mahan's account, Rodney himself, in the *Sandwich* (90), closed the thirteenth ship of the French column, the *Actionnaire* (64), the latter being the second ship astern of the *Couronne* (80), De Guichen's flagship. Ahead of Rodney were 10 of his own ships, as opposed to 12 of the French, and astern, 9 of his own, opposed to 10 French ships.

I have seen no reason offered why Rodney attacked near the center of the French column, instead of concentrating on their rear of 7 ships,

with his flagship and the 9 vessels astern of him. The ships astern of the *Sandwich* could not have avoided following her movements, whether Rodney's intention was understood or not, and Admiral Parker and the 9 captains ahead of the *Sandwich* would have been forced to close action, unless De Guichen chose to go about to succor his rear, as he had done in the morning.

In any case, a fiasco resulted. Mahan says:

A few minutes before 1 P.M., one of the headmost ships began to engage at long range; but it was not until some time after 1.00, that the *Sandwich,* having received several broadsides, came into close action with the second vessel astern from the French Admiral.

He makes no mention of any signal to the ships ahead to steer more to port, or to close the center; nor of any change in the *Sandwich's* own course, although Laughton says that in spite of signals the whole British van followed Carkett. Only the *Sandwich,* the *Albion* (5th), *Terrible* (6th), and *Trident* (7th), ships of the British van and the *Montagu* (3rd) of the rear, seem to have obeyed the signal for close action, and it was the captains of these ships, only, that Rodney commended. Directly or indirectly, he condemned all the others, and *expressly,* the admirals, Parker and Rowley, commanding the van and rear. The captain of the *Yarmouth* and the first lieutenant of the *Montagu*—her captain been wounded—were tried by court-martial.



FIG. 49b.—Comte du Bouexic de Guichen (1712-1790). lieutenant général des armées navales. (*From "Historie de la Marine," L'Illustration, Paris*)

The *Sandwich* fought hardest —from about 1:15 to 4:15—and suffered most, at one period being to leeward of the French column and sustaining the fire of the *Couronne* and two others at the same time. She had 80 shot in her hull—three below the water-line—lost her foremast and main yard and was kept afloat with difficulty, during 24 hours.

She fired 3,288 rounds; an average of 73 per gun, of the guns engaged (apparently only the port battery).

When De Guichen's fleet, at 4:15, bore up together and wore, the battle was over, and Rodney in no condition to pursue.

The numbers of the French killed and wounded, as was usually the case, exceeded those of the British, and likewise, as usual, the British material damage was greater than that of the French.

Having safeguarded his convoy, De Guichen went to Guadeloupe, but was unable to carry out his intention of attacking Barbados.

Rodney repaired damages at sea, and pursued, keeping between the French and Martinique, their West Indian base, but without immediate result.

Mahan discusses at length Rodney's signals and the failure of his captains, and one at least of his admirals, a well known and distinguished officer, to comprehend his desires. He says that Rodney's account "clearly implies that the Additional Fighting Instructions prescribed the direction which Rodney expected Carkett to take," and adds, "If these Additional Fighting Instructions are to be found, their testimony would be interesting." As has been described they *were found,* in the Graves Collection and elsewhere, some years after Mahan wrote, and show that the signal to carry out Article XXI was not, under the conditions, the proper signal. With slightly different wording, Article XXI is the same as one of Hawke's of 1756, already quoted. It reads:

> If the squadron should be sailing in a line of battle ahead to windward of the enemy, and the commander-in-chief would have the course altered in order to lead down to them, he will hoist an Union flag at the main-topgallant-mast head and fire a gun. Whereupon every ship in the squadron is to steer for the ship of the enemy, which from the disposition of the two squadrons, it must be her lot to engage, notwithstanding the signal for the line ahead will be kept flying; making or shortening sail in such proportion as to preserve the distance assigned by the signal for the line, in order that the whole squadron may, as near as possible, come to action at the same time.

No misunderstanding could have occurred if Rodney had repeated his signals of the morning; namely, first, a flag, half blue, half yellow, at the main-topgallant-mast head, with a white pennant under it, meaning that he intended to attack the enemy's rear. Then a union flag at the mizzen-peak, with a blue pennant under it, and one gun fired, to signify line (abreast) at two cables' distance, or a blue flag with red cross, under the union flag with blue pennant under it, and one gun, to signify a distance of one cable.

Then, when he wished to round to, and commence firing, he should

make the signal prescribed in the long established Article XIII of the Permanent Fighting Instructions:

As soon as the admiral shall hoist a red flag on the flagstaff at the fore topmast head, every ship in the fleet is to use their utmost endeavour to engage the enemy, in the order the admiral has prescribed unto them.

One of the results of the experience with De Guichen was that Rodney's flag captain wrote to the Controller of the Navy, Middleton:

I wish to see every captain in the navy who commands a line-of-battle ship to have a complete set of flags, and to repeat the signals through the line, as the French do . . . there would then be no excuse for any officer saying he did not see or understand the signal . . . and I wish most sincerely that an established code of signals were adopted for the use of his Majesty's fleet.

Sir John Laughton's criticism of this action is general, but too severe. He wrote,

It is not going too far to assert that nine-tenths of the miscarriages and blunders made in the eighteenth century arose out of the inability of the commanding officers to give an intelligible order, and of the commanded to understand one if given.

However much this action may be discussed, it is plain that it was within the ability and understanding of all, to comprehend the signal for close action, and to obey it, so that Rodney was correct when he said, in his report of the engagement,

It is with concern inexpressible, mixed with indignation, that the duty I owe my sovereign and my country obliges me to acquaint your Lordships that during the action between the French fleet on the 17th inst. and his Majesty's, the British flag was not properly supported.

Mahan says, ". . . the whole incident is part of the history of the British Navy, far more important than many an indecisive though bloody encounter." What he does not state in his discussion, however, is that no signal made by Rodney that day was inconsistent with the 12th Article of War, the Bible for them all, in the light of which all Fighting and other Instructions and signals must be read:

Every person in the fleet who through cowardice, negligence or disaffection, shall, in time of action, withdraw, or *keep back*, or do not come into fight or engagement, or shall not do his utmost to take or destroy every ship which it shall be his duty to engage . . . every such person, so offending, and being convicted thereof by the sentence of a court-martial, shall suffer death.

Our own Articles of War state the substance of the above, and add, after the word "death"—"or such other punishment as a court-martial may adjudge."

The "superstition of the line" does not adequately explain what hap-

pened in this engagement. If all the crews of Rodney's ships, like that of the *Ardent,* and formerly those of our own navy, had had the Articles of War read aloud to officers and men once a month, uncertainty, confusion, and failure might not have arisen.

So, in our own time, the Articles of War, and the Navy Regulations—subordinate to them—form the Navy Bible, and no theory or philosophy of "indoctrination," "initiative of the subordinate," "follow the leader," and other excellent—when not abused—phrases can, for an instant, be permitted to obscure these two bases of all naval action, in war and peace.

Important side lights, on this and other engagements, are found in the evidence of the court-martial of Lieutenant Appleby of the *Montagu* for withdrawing his ship from action, without signal, resulting in his honorable acquittal, and of Captain Bateman of the *Yarmouth* for withdrawing from his station in battle and failing to obey a signal to get into his station and engage close.

In the Appleby court, it was testified that the *Montagu* was engaged with five enemy ships for about ten minutes, and that she was carrying foresail, three topsails, jib, and foretopmast staysail. She was with Admiral Rowley, who was condemned by Rodney for wearing with part of his command, without signal, to follow a part of the French rear, which wore and stood to the southward for a time.

We quote from the testimony of the sailing-master of the *Montagu:*

Q. What tack was the *Montagu* on in the line of battle?

A. The starboard tack.

Q. At what time did she wear to go on the larboard tack and who ordered her?

A. About three o'clock, the captain, being then on deck, ordered me to haul the mizen up, shiver the mizen topsail, and steer right down on our opponent, as he observed firing at distance was of no use, and only expending powder and shot. The Captain's orders were immediately obeyed, and we were raked twice in going down. The Captain said to me we are now as nigh as I could wish; let us bring her to on the starboard tack again and then we shall be able to give him a dose. The helm was then put down and the mizen hauled out [In later days the spanker took the place of the mizzen, as a better and more quickly handled sail to assist the helm] and the sails braced up abaft, but all to no purpose, the ship came to against her helm to port, as there was little wind. Captain Houlton then asked me what was best to be done; we must bring one broadside or the other to bear upon the enemy. We accordingly shifted the helm and brought her by the wind upon the larboard tack, where we engaged our opponent with our starboard guns. Immediately after, the French admiral of the rear division made a signal and wore with four others and came upon the larboard tack; but in wearing three of them got foul of one another, where we kept up a continual fire upon them, while they were in that situation. A few minutes after, Captain Houlton was wounded; as near as I can recollect about twenty minutes after three. Just after Captain Houlton went off the

deck, those three ships got clear of one another and opened their whole fire on us. I immediately sent the aide-de-camp to Lieutenant Appleby, to let him know Captain Houlton was wounded, and when he came upon deck he told me he had just parted with the captain, who was of the opinion with himself that we should withdraw from the enemy and make the signal for assistance, which I believe Mr. Appleby did. I saw no British ships then in sight, but the *Magnificent,* [64] and the *Andromeda* [a frigate of 28 guns which came to the *Montagu*'s assistance]. The *Magnificent* passed us nearly half a mile to windward, and discharged her larboard guns and I believe some of her shot came on board us; as some were found with a Broad R upon them; three on the lower deck and one in the quarter gallery.

Q. What was the condition of the *Montagu* when Lieutenant Appleby came on deck to take command of her?

A. She was very much damaged both in masts, rigging and sails; her main topsail tore all to pieces above the third reef; her main topmast cut half through six feet above the cap; her main stay cut through all but one strand close to the mouse.

Q. Do you think her not coming round upon the starboard tack as was required, was owing to her being unmanageable by reason of such damage, or for want of wind?

A. For want of wind only, and if we had not come to on one tack, we must have been plump on board the French admiral, [of the rear, *Triomphant* (80)] he then being about musket shot from us.

[The Captain of the *Andromeda* testifying]

Q. Did it appear to you necessary that the *Montagu* should disengage herself from the enemy, considering the condition she appeared to you to be in and the distance she was from the British fleet?

A. I did think it highly necessary, she should disengage herself from those five of the enemy's ships she was engaged with, as she must otherwise, in ten minutes have been taken.

The *Yarmouth* Court for the trial of Captain Bateman met on the *Resolution* off New York, October 24, 1780. Captain Young (Captain of the *Sandwich* and Rodney's flag captain) testified as follows:

Q. You will please relate what you know relative to the action of the 17th of April last.

A. I cannot ascertain the exact time relative to the signals being made on board the *Sandwich,* or the exact time respecting the conduct of the *Yarmouth* on the 17th of April, as I had the fleet to attend to, and the ship I commanded in action at the same time . . . at about half past one the *Sandwich* engaged the second ship astern of the French Admiral [*Victoire,* 74] . . . soon after that [2.00, or later] the Admiral came to me when I was on the lee gangway and informed me that the French Admiral [the *Yarmouth's* opponent] was on the weather bow; soon after which I saw the *Yarmouth* haul out of the line, and brought to with her main and mizen topsails aback, to the windward of our line, and continued lying with her main and mizen topsails aback. The *Sandwich's* signal on seeing him lie to, was made to make more sail, which was answered by the *Yarmouth's* answering flag, the ship still continuing in the same situation, without making sail. The Admiral then directed me to order a shot to be fired into her to make her obey that signal; in consequence of which, I ordered two guns on the upper deck on the starboard side [12-pounders] to be shotted and fired into the *Yarmouth.* The officer and men who were at those guns told me that the guns would not bear on

the *Yarmouth*. I then went to the forecastle and ordered a forecastle gun [6-pounder] to be fired into her. That gun the men could not bring to bear on her as we were then bearing down on the French Admiral to bring him to a closer action, being then engaged with him and his two seconds.

The *Yarmouth* still continued laying to with her main and mizen topsails aback until, as near as I can recollect about half-past three, and about half an hour before the action ceased, between the French Admiral, his two seconds and the *Sandwich*, when the *Yarmouth's* signal was made to bear down into the Admiral's wake which he obeyed; and in the act of wearing I saw her [the *Yarmouth's*] larboard main topsail yard carried away. I suppose by the enemy's shot. She came down in our wake and kept up an incessant and good fire until the action was over.

Q. Had the *Yarmouth* been engaged with the enemy previous to her hauling out of the line?

A. She had and on seeing her engaged at too great a distance, the *Yarmouth's* signal was made to come to closer action, which signal for close action was never taken in from that time till the action was over. . . .

Q. What became of the ship the *Yarmouth* engaged on bearing down, or was she forced out of the line?

A. The French Admiral at 4 o'clock put his helm a-weather and bore away with his two seconds. . . .

Q. When you bore down and brought the French Admiral on your weather bow, how far were you from the wind?

A. I suppose two or three points from the wind. . . .

Q. Was the French Admiral then close to the wind?

A. I believe not.

Q. Do you recollect what signals were then flying? [at the time the forecastle gun would not bear]

A. The signal for engaging and the signal for close action.

[Testimony of the *Yarmouth's* sailing master.]

Q. Did the *Yarmouth* get to her station in the line agreeable to the signal made on the 17th of April?

A. Yes.

Q. Did she bear down and engage her opponent agreeable to the signal made?

A. It was considerable time before we engaged after the rest of the ships had engaged.

Q. What did the delay proceed from?

A. From our not being thoroughly acquainted with the Admiral's meaning.

Q. What was your doubt?

A. Whether we should bear down and engage the ship abaft the beam, or follow the Commodore [Collingwood] who seemed to wish to engage the ships of the enemy's van.

Q. What were Captain Bateman's orders on that occasion?

A. Captain Bateman seemed inclined to follow the Commodore and ordered me to count the ships in the enemy's line beginning with the van; observing to me after I had counted them, that the ninth ship was the ship he was to engage. and which we made sail to get up with. But as the Commodore left us fast, Captain Bateman then changed his determination and said he would engage the ship ahead of that with which the *Cornwall* was engaged. He therefore threw his main topsail aback and said he would wait till those ships came farther ahead. [Evidently he already had De Guichen well abaft his beam.]

Q. What distance were you from that ship you intended to engage when you laid your main topsail to the mast?

A. Better than a mile and a half.

Q. Was the signal out for engaging the enemy?

A. It was.

Q. What was your reason for bringing to and not going immediately to close with the enemy?

A. I understood Captain Bateman's reason for not bearing down was the great distance that both our second ahead and our second astern were from us.

Q. Was the *Sandwich* then engaged with the enemy?

A. Very warmly.

Q. Was the *Cornwall* then engaged with the enemy?

A. She was.

Q. Who directed the main topsail to be laid to the mast?

A. The captain.

Q. Did anybody observe to the captain the impropriety of laying the main topsail to the mast?

A. Yes, the first lieutenant and myself.

Q. Did you apprehend there would have been an impropriety in your continuing to go down instead of bringing to; and to have engaged your opponent in close action without loss of time?

A. No, provided we had taken the ship ahead of that with which the *Cornwall* was engaged.

Q. What reply did Captain Bateman make to you and the first lieutenant when you represented the impropriety of bringing to so far to windward?

A. He said the *Cornwall* would soon be up.

Q. At what distance did you engage?

A. In my opinion at a very proper one until the main topsail yard was carried away.

Q. What directions or orders did Captain Bateman give when your main topsail yard was shot away?

A. He ordered the men at the wheel to put the helm down, by which means we luffed out of the line and lost our station, which we never could regain during the action.

Q. To what distance did you then haul out of the line?

A. Sufficient for the *Cornwall* to pass under our lee.

Q. Did you haul so far out of the line as not to be annoyed by the enemy's fire?

A. Our distance soon became increased from our line, so that no shot from the enemy could reach us. [He had testified that when the *Yarmouth* luffed, both fleets were two or three points off the wind.]

Q. Did you or any other officer or men express concern on that occasion or disapprobation?

A. I informed Captain Bateman of our increasing our distance very fast from our line and he asked me what I would have him do; upon which gave it as my opinion that we ought to close the line between any two ships, sooner than remain in that situation. He wanted to close the line ahead of the Admiral; but we were apprehensive of getting aboard him; thereupon closed the line between him and the *Suffolk*. . . .

Q. Did Captain Bateman during the action of the 17th of April appear to you to be collected and clear, or did he show any dismay or fear?

A. He seemed perfectly collected, though at times rather diffident; but as for dismay or fear, I did not see the least sign of either.

[Lieutenant Tireman, First Lieutenant, testifying. He personally commanded the seven after guns on the main deck.]

Q. Do you remember the last signal for the line on the starboard tack, and also the signal for bearing down to engage your opponent?

A. I remember the first signal being made; and when the signal was made for each ship to bear down and engage her opponent, the master came out and told me that the ninth ship of the enemy's line fell to our lot; and at the same time told me the French Admiral was her; and I then went forward and told all the officers and people at the guns on both decks to reserve their fire for that particular ship. [The ninth French ship in the line was not a flagship, but the tenth, eleventh—de Guichen's—and twelfth, were flagships.]

Q. When the *Yarmouth* obeyed her signal, how near did she approach the enemy before she brought to?

A. About random shot from the ship nearest to us, when we brought to.

Q. Did you then observe to the captain any impropriety in bringing to at so great a distance from the enemy?

A. I went up on the quarter-deck and told him that the *Grafton* left us fast and was then at least two miles ahead of us; and the *Cornwall* was near as far astern, and had shortened sail and begun to engage; that we had better go down to engage the ship ahead of the one the *Cornwall* was engaged with. Captain Bateman said we had better shorten sail and back the main topsail, as we would receive the fire of the French Admiral and his two seconds [ships next ahead and astern, respectively, of the *Couronne*] before we got down to the ship we meant to engage. I then said we had better edge down gradually, and not before the wind to prevent being raked, and at the same time to go under cover of our own smoke; but by no means to shorten sail, as I was certain the Admiral would throw out our signal to make more sail; if he did, or if he would shorten sail, it should be so little as to get alongside the ship we were to engage without retarding our way. He desired me to man the main clew garnets and haul the main sail up; which I did. I then went to my quarters, and looking at the Admiral out of the stern windows, I saw our signal out to make more sail. I then went up on the quarter deck and told Captain Bateman of it, and ordered our answering flag to be hoisted. Found our main topsail was aback which I did not know before. I heard Captain Bateman give orders to fill the main topsail; then went to my quarters again and looking out at the Admiral four or five minutes after, I saw our pennant out again and went and told Captain Bateman of it. He took his spy glass, went into his cabin and looked at the Admiral; ordered the answering pennant to be hoisted, the helm a-weather, and the after sails to be brailed up. I again returned to my quarters and remained during the action. . . .

Captain Bateman made a written defense. A new fact, brought out by him, was that the van of the British fleet, before the signal for action was made, carried so much sail as to leave the center, led by Collingwood in the *Grafton,* somewhat to leeward and a considerable distance astern; that when the action signal was hoisted, the *Grafton* attempted to close the van, while bearing up for the attack; that the *Grafton,* being a better sailer, soon separated from the *Yarmouth,* and

the latter not bearing up as much as the ships of the center, was also soon separated and to windward of the *Cornwall,* and had on her own beam the three Frenchmen, at some distance away, as they were somewhat to leeward of their own line, but were heading up. Consequently, he could not engage as soon as the other British ships.

Of course we can now readily see that Rodney could have repeated his signal of the morning, to form line and bear down on the French rear, at any distance he desired, and his ships could have easily closed on the flagship in going down to the attack, for which he could have made the signal when about ready to round to. In other words, he could have *conducted* his fleet into action, at whatever point in the French column he might choose. Again, of course, De Guichen might not have taken kindly to the spectacle of the entire British fleet bearing down on his rear, and might have run, or wore, and then closed up to meet it on equal terms, as he did in the morning. Whatever blame is attached, rests on the British ships that failed to come to close action, which was in the power of all to do.

We have seen no account of what had happened to the *Cornwall,* next ahead of the *Sandwich,* which permitted the *Couronne* and two other French vessels to concentrate on the British flagship; nor how the *Montagu* happened to be engaged with five Frenchmen at once. There were nine British ships for the nine (or ten) French astern of the *Victoire*—the first opponent of the *Sandwich*—besides another of Rodney's fleet, the *Centurion* (50), not in the line, which had been especially ordered to assist the rear if needed.

Captain Bateman was found guilty, and sentenced to dismissal only, as neither disaffection nor cowardice was proved against him.

According to Mahan, "De Guichen's orders were to keep the sea, so far as the force maintained by England in the Windward Islands would permit, without too far compromising the fleet intrusted to him." With such instructions, he naturally and consistently shrunk from decisive engagement.

Rodney believed that the French must return to Martinique. His frigates watched all approaches to that island and were rewarded on May 7 by sighting the French to windward. They had refitted in Guadeloupe, and were en route to Santa Lucia, with the purpose of recapturing it.

For five days the fleets were in sight of each other, Rodney endeavoring to get the wind of De Guichen and force him to action, but

without success. The French claim that during this time De Guichen was trying to bring Rodney to action. If so, he was equally unsuccessful. Mahan says, "Both admirals showed much skill and mastery of their profession."

In the light of his orders, and being to windward, it may well be that De Guichen would not force an action unless he caught Rodney plainly at a disadvantage, which he was unable to do.

On May 15 the British, appearing to haul off to leeward, were followed by the French, who approached nearer than usual, when a shift of wind to south-southeast put part of the British rear, then leading, to windward of the French van, both fleets having to change course to the southwest.

Rodney at once tacked in succession and stood to the eastward, trying to get to windward with his entire fleet, but De Guichen wore together, thus separating the two fleets, and stood to the eastward almost in line, bringing the British abaft his weather beam and out of gun range, which prevented him from being capped. Both fleets were then on the starboard tack.

The wind soon shifted to the old quarter. De Guichen put his fleet on the port tack and Rodney, to avoid being capped, had to go column left and pass to leeward of the French on the opposite course, his van ships coming into action with their starboard batteries, in succession, as they changed course, and bearing the brunt of the fire from the French center and rear, as they passed. This partial engagement soon ended, to Rodney's disadvantage.

After four days more of maneuvering, a similar, but somewhat more severe action resulted, again to the disadvantage of the British.

Mahan remarks that, by their dexterity and vigilance, each admiral had thwarted the aims of the other.

By this time, the stores and personnel of both fleets were exhausted, and three British ships were so damaged as to be unable to keep the sea. The two fleets separated, the British sailing for Barbados and the French for their base at Fort Royal, Martinique. From the latter port De Guichen wrote asking for his recall. He says, very modestly it seems, "The command of so large a fleet is infinitely beyond my capacity in all respects. My health cannot endure such continual fatigue and anxiety." He had had the misfortune to lose a son in one of the engagements, which no doubt contributed to this depression of spirits.

Rodney wrote to his wife:

For fourteen days and nights the fleets were so near each other that neither officers

nor men could be said to sleep. Nothing but the goodness of the weather and climate would have enabled us to endure so continual a fatigue. Had it been in Europe half the people must have sunk under it. For my part, it did me good.

Anger and resentment over his failure on April 17 persisted. He wrote:

I had given public notice to all my captains, etc. that I expected implicit obedience to every signal made, under certain penalty of being instantly superseded. It had an admirable effect. . . . Admirals as well as captains, if out of their stations were instantly reprimanded by signals or messages sent by frigates and in spite of themselves, I taught them to be, what they had never been before—officers. . . . My eye on them had more dread than the enemy's fire.

Like Howe, but for a different purpose, Rodney said he would shift his flag to a frigate to watch his captains. It seems not to be generally known to historians, or at least not commented upon, that Rodney did, on two occasions, shift his flag to the *Venus* (36), one of the three frigates attached to the center squadron. From the account given by his flag captain Young, this was not done solely to watch his captains, as he had threatened, but to see if he could not, by some means, bring his too skillful antagonist to action.

In a letter to Middleton, dated June 3, Young describes the partial engagements of May 15 (the letter says 16) and 19:

On the 12th they bore down with an appearance to give us battle and to attack us van to van, and each ship opposite to her opponent; but they would have brought to at a distance to windward and cannonaded us. The admiral when they were bearing down moved from the *Sandwich* to the *Venus*, to manoeuvre our fleet to more advantage; but before he left me I proposed making the signal for our fleet to wear together, and to make Mr. Parker with his division our van, . . .

We wore and Mr. Parker led with the starboard tack: This so disconcerted the enemy that they immediately wore and hauled their wind on the same tack, about four leagues to windward, which distance they took great care to preserve until the 16th, when, joined by a line-of-battle ship and four frigates, they again came down in the same manner about noon (when their men had got their wine), and intended the same manoeuvre as before. They endeavoured all they could to get their van well pushed on towards ours, but after letting them come pretty near us, the signal was made for our van to make sail. As we had a fresh breeze this obliged the French to put out all the sail they could; consequently they could not make use of their lee guns until they were near us. The van ship of their fleet, by this means, could get no further than the *Sandwich*, which was the ship he must have brought to action. We waited with patience to get him close to us, as I had the signal ready for our van to tack and gain the wind of the enemy, which would have been made on seeing what execution the enemy's shot would do, for by that I could have judged of the distance. However, the French admiral, seeing that we had jockeyed him, made the signal for his fleet to wear, and at the same instant of time I made the signal for our van to tack, and gain the wind of the enemy, which was immediately obeyed by Admiral Rowley's division. We then thought the game was our own, the point was gained. But how uncertain are

things in general! Providence brought up a black cloud in the N.N.W. (when they had rigged out the fore topmast studding-sail booms to scout for it) which brought forth a wind from that point, on which they hauled their wind, tacked and weathered the van of our fleet.

The *Albion*, being the leading ship and so far advanced, there was no judging how to call her off; on she went and sustained the fire of fifteen enemy's ships; the *Magnificent* was astern of her and received little or no damage and retorted on the enemy what they gave the *Albion,* for so it happened, that when the enemy's ships had discharged their cannon at the *Albion,* the *Magnificent* was loaded and gave it to them when they opened with the *Albion.* Some other ships had some men killed and wounded—the *Conqueror* and some others. This was a mortifying circumstance; however, I am certain the sufferings of the enemy was equal to ours.

This account, by one of the principal actors, though somewhat obscurely worded, may be compared with the short description of the action of the 15th, already given. Young continues,

Still in sight of each other, the French fleet playing with us, on the 19th our van had a shift of wind which brought them up pretty close to the enemy's centre on different tacks. . . . The attack was warm on both sides, and the enemy finding their centre attacked, the van bore away and cannonaded us at their own distance; not that they gained much by this, as we find that we can cannonade as well as they and to as good a purpose.

. . . I was afraid of the consequences of this cursed fighting on opposite tacks, and of some accidents happening to our ships from their powder; . . .

There is no occasion for my describing to you the bad consequences of those irregular attacks; cordage, sails, masts and men must suffer; I therefore hope you will provide accordingly. . . .

Young added to his letter—marked private—a frank disclosure of the Admiral's attempts to direct an engagement from a frigate. From what he says, it appears that Rodney was in the *Venus* from the 12th of May through the 15th, and on the 19th, and that he, Young, directed both engagements from the *Sandwich,* where the admiral's flag continued to fly. He wrote,

I have said in my letter I made signals. This was settled with the admiral after he left me, to make such signals as I saw necessary for the good of the service; which signals I was to show him by hanging them out at where they were to be made; and continued so doing until I saw him blunder, and then I wrote him that I would not be responsible for errors, as I had his flag to defend, as well as to make signals, but that I would repeat any signals he made and give him any information I could.

When the French fleet came down on us the first time, he left me in a confused state, and in short I did not know he was out of the ship. I did by no means approve of his going into the *Venus;* and he at that time proposed my going with him, but as the enemy was near at hand, appearances would have been against me, and I was afraid of the censure of the world to have quitted the *Sandwich* at that time. However, he shall not leave her again without my being with him if I continue his captain. I have discharged my duty to him and my country, and will continue

to do so, as far as my abilities extend, though my situation requires great patience with so unsteady and irresolute a man. His being in the frigate was of no service, as he always kept to leeward of our line. The enemy being to windward he could never be a judge of it; but at last, I got him persuaded to keep between us, which he attended to the last encounter.

To add to Rodney's chagrin over his failures against De Guichen, ten Spanish ships of the line convoying a merchant fleet to Havana evaded his watch on Martinique and joined De Guichen at Fort Royal. Rodney was keen for a fleet of coppered ships. The Admiralty promised all it could send. In anticipation of having special uses for them, and with the prospect of getting more, he prescribed a new signal which read:

when the Commander-in-Chief would have all the ships sheathed with copper chase on any point or quarter of the compass, he will put out a flag for the point quarter and hoist a red flag pierced with white at the main-top-gallant mast-head under his own flag and fire a gun.

Not many of the French at this time were coppered; likewise the Spanish; and no doubt Rodney felt that with a fleet of coppered ships he could so far outsail De Guichen that he could force action.

Throughout the sailing era French ships were on the whole better sailers than the English.

On July 5 De Guichen with his Spanish re-inforcements sailed for the Windward Passage between Cuba and Haiti. There the allies separated, the Spanish bound for Havana, the French for Cape Haitien, closing the campaign in the West Indies for 1780. Rodney believed that the French were bound for the North American coast, and after making provision to protect English possessions and trade in the islands, he sailed for New York with fourteen of the line, arriving off Sandy Hook September 14.

But De Guichen, having orders from his government to return home on the approach of winter, was deaf to the appeals of Lafayette and the French minister to the United Colonies. He sailed in August from Cape Haitien with a merchant fleet of 95 sugar and coffee ships. He reached Cadiz October 25.

Mahan says Rodney's arrival in New York was unexpected and unwelcome to friends as well as foes. He was by no means a popular admiral. While on the coast he took precedence over Admiral Arbuthnot, Howe's successor.

While in New York he convened the courts martial resulting from the battle of April 17. These concluded, he returned to the West Indies

with 9 of the line, sailing November 16 and reaching Barbados December 6.

Although his fleet on our coast was much superior to the French, he took no steps against them. During his absence from the West Indies, a devastating hurricane swept the Caribbean, causing heavy losses among merchant vessels and men of war.

The British lost 13 ships, including one 74, one 64, and 6 frigates.

CHAPTER XVIII

WAR OF THE AMERICAN REVOLUTION *(Cont'd)*

The Grand Fleet on the defensive. Graves and De Grasse; Rodney, De Grasse.

DURING 1780 the Grand Fleet, though during part of the year at least it numbered 31 of the line, was still an inferior fleet acting on the defensive to protect the home coast.

Admiral Sir Charles Hardy, of whose unfitness his chief of staff was thoroughly convinced, died in May. Hardy was succeeded by Sir Francis Geary, then 70 years of age, in poor health and if possible, in Kempenfeldt's opinion, even less capable than his predecessor.

Kempenfeldt continued to express extreme dissatisfaction with the regular (printed) Permanent Fighting and Sailing instructions, and with the "Additional Instructions" from the Admiralty which supplemented the "Permanent Instructions." His letters covered subjects other than tactics and signals, but these were principally and very properly his chief concern. On January 18th he wrote to Middleton:

I believe you will, with me, think it something surprising that we who so long have been a famous maritime power, should not yet have established any rules for the orderly and expeditious performance of the several evolutions necessary to be made in a fleet. The French have long set us the example. They have formed a system of tactics which are studied in their academies and practiced in their squadrons. . . .

Ah!, but it is said by several, our men are better seamen than the French. But the management of a private ship (a man of war not having a flag officer on board) and a fleet are as different from each other as the exercising of a fire-lock and the conducting of an army. . . . I have heard it said that the French outmaneuvered, or showed more generalship than we the summer before last. I should suppose that to have been so, as they had tactics to direct them and we had not. . . . We should therefore, immediately and in earnest, set about reform, endeavours should be used to find out proper persons, and encouragement offered for such to write on Naval tactics, as also to translate what the French have published on that subject. They should enter into the plan of education at our marine academies.

But the most effectual way to obtain every wished for reform in your fleet is to find out a man to place at the head of it, who has genius to comprehend every requisite regulation, and has activity and spirit to enforce their execution. . . . [Rodney was soon doing this, at least in part, in his fleet.]

I shall conclude with observing what an extraordinary genius prevailed amongst the French in Louis XIV's reign, to push up everything to the summit of perfection. They had no sooner created a great navy in that reign (for they had never had

any before), to the astonishment of all Europe. . . . I say they had no sooner effected this prodigy of forming a navy without the apparent requisites, than they had the quickness of discernment immediately to see (what we have never been able to see yet) the great advantage that would result in sea fights from a system of naval tactics. They had no example of it from other nations. All that had been done was the introducing of a straight line for a line of battle, instead of the curve or half moon used before. This was an improvement of the Duke of York's. . . . Père Hoste, a Jesuit, secretary to the Count of Tourville, admiral of the French fleet, was the person who undertook the task, which he executed so well that it remains still, with little alteration, the system they follow.

In March, Kempenfeldt wrote upon the subject of signal flags, rectangular, triangular, and pennants, dealing with their dimensions, colors, and arrangement of colors. The size most approved for rectangular flags was 5½ yards in depth and 9 yards in length. To make the strongest contrast, when two colors were used in a flag, white was always employed with red, and yellow with blue.

Again, in March, he took up the subject of the ordnance of the fleet. In April he discussed the duties of chief of staff, relative to the captain of the ship. In many cases (his own among the number, during the time spent in the Far East) the captain of the ship combined both duties. Of this position he remarks:

If it ever had a prescribed duty, it has been lost and forgot with the disuse of the office. Some think that the origin of admiral's first captain was to have the particular charge of his squadron or division of the fleet, as the commander-in-chief's care and concern for the whole occupied too much of his time to attend to the detail of his own squadron or division. . . . I find that there are some things absolutely necessary to render the person who holds it, of any utility; and these are: First, that all orders from the admiral pass through the first captain.

He included orders to the ship, and also held that the first captain should be "first captain of the ship as well as to the admiral." As it was evident that no captain would consider this, he further recommended that there should be an extra first lieutenant, drawing the pay of captain, but subordinate to the chief-of-staff. He complained that the admiral delivered his orders to the captain of the ship, thus making him—Kempenfeldt—a cypher.

He continues: In fine sir, it is an office that must be defined as to its duty, and have a clear, determined, and undubious authority, or it had better be abolished; for as it now stands no one would choose to accept of it." (In spite of this view of the matter, Kempenfeldt remained with Geary.) He remarks with truth, "the consequence of a person in military office" (and he might have added—in any other office) "is in proportion to his authority. That if a person has not authority equal

to the duty with which he is charged, there is an incompetency, the extent of the duty not being compatible with the limitations of his authority." He then recommends that the admiral should choose his first captain, and that the first captain should select the captain of the ship.

At about the same date, he sent Middleton a list of movements and evolutions, with rules for performing them, saying, "It is rough wrote. I intend to correct it. . . . The best means of dividing fleets, in my opinion, according to the number of ships they consist of, is as follows. . . ."

[Paraphrased.] Fifteen to twenty-seven ships: three squadrons; no divisions of squadrons.

Twenty-seven to forty-five ships; three squadrons, two divisions in each squadron.

Above forty-five; three squadrons, three divisions in each squadron.

When it is necessary to have squadrons of three divisions, each squadron should fly the flags for a complete fleet, whatever the rank of the admirals may be; viz., the commander-in-chief, the red (union) at the main topmast head, the second in command the white, and the third the blue, in the same position.

The admiral of each squadron should have his vice and rear admirals. The junior officers of squadrons should fly their flags, or broad pennants, at the mast-heads for vice and rear admirals, respectively, whether or not of that rank. An admiral and two commodores will suffice for a fleet of 15 sail, but where there are divisions there should be an admiral to each squadron.

Mahan says,

> . . . the Grand Fleet, occasionally cruised at sea from June 8th to August 18th, an imposing force of 31 ships of the line, 11 of them three-deckers of 90 guns and upwards.
>
> While the Grand Fleet was on a cruise, the Allied Fleet put out from Cadiz, and on August 9th, two or three hundred miles west of Cape St. Vincent, captured 55 of a convoy of 68 outward bound English merchant ships and transports. Sixteen of those captured, were carrying troops and supplies necessary for the West Indies. This counted as a major disaster to the British arms.

A few weeks earlier, Kempenfeldt had written Middleton from the Grand Fleet (July 18):

> *Victory*—Lat. 40° 16′. 60 leagues off shore.
>
> I have nothing to write that will give you pleasure. I am afraid the conduct of the fleet will not meet with approbation. . . . We are here cruising between the latitudes of 40° & 30° from 20 to 70 leagues off shore [Cape St. Vincent is approximately in latitude 37°] "in quest of a squadron of the enemy said to be

in this vicinity, looking out for our homeward bound and outward bound trade. But this is not the track of our East or West Indies ships and therefore, I conceive, no station for the enemy to cruise in.

It appears to me by placing ourselves here we leave the enemy at liberty to join their different squadrons and have put ourselves out of the way. . . . of preventing any design the enemy may have on us at home. . . . The 20th we are to make for the channel, but it may be some weeks before we reach there. . . . P.S. Our chief is much perplexed; he wants to square his conduct to the approbation of Admiral Barrington and Lord Mulgrave. But that is impossible as those gentlemen think differently. However, he pays much attention to the advice of the former [second in command] and indeed don't take any step without it. But a man who has no opinion of his own, but acts from those of others, can never act regular and consistent.

In August, Geary was off Ushant and Kempenfeldt exercised the fleet, while on this cruise, in his new tactics and signals. The story goes, according to Corbett, that

One day a fleet of ships supposed to be that of the enemy hove in sight. The signals were resorted to . . . but somehow or other were not managed so well as when made at their leisure. Geary at last became impatient, and going up to Kempenfeldt and laying his hand gently on his shoulder, exclaimed with good natured earnestness; "Now my dear Kempy do, for God's sake do, my dear Kempy, oblige me by throwing your signals overboard and make that which we all understand "Bring the enemy to close action."

When Geary reached Spithead, August 18, scurvy and other diseases were so prevalent in the fleet that he sent 2,500 men to the hospital. Geary himself went ashore ill. It had been a fruitless cruise. Kempenfeldt wrote on August 25,

. . . the fate of our convoy . . . and that our fleet instead of them had not fallen in with the French and Spaniards chagrins and mortifies extremely. . . . To reflect how near we were to the most favourable event that could possibly happen for this country, that is, falling in with the Cadiz fleet, is distracting. I begin to grow sick of everything, particularly my employ; I grow too old. I find a want of activity and quickness of recollection. [He was 62] I think it best to retire from business in time, and not to wait to be told that it is so.

27 August. . . . The fatigue is too much for Mr. Geary . . . 29 August. . . . I find Admiral Geary doesn't go to sea with the fleet. I hope this will relieve me from my present employ which is really too much for my years.

Vice Admiral Barrington was offered command of the fleet, but refused. It is said he professed to distrust his own ability, but really distrusted the Admiralty. Vice Admiral Darby, already in the fleet, received his commission as Commander-in-Chief September 8. Kempenfeldt went with him in the *Britannia* as chief-of-staff, and at last, on September 26, was himself promoted to rear admiral. He had written from the *Britannia,* September 17:

I said . . . I should be glad to be honoured by a flag; but, to be candid, I do not think myself fit for active service. I find great and increasing defects, both with respect to body and mind; and therefore must as I ought to do, retire, in justice to myself and the public, and not risk the mortification of serving down the little reputation I may have acquired.

However, after receiving his commission as rear admiral, he remained in the *Britannia* and continued to occupy himself with tactics and signals for another year. He participated, during that time, in Darby's expedition for the relief of Gibraltar, which left England March 13, 1781, successfully accomplished its object, and was back at Spithead May 22.

Kempenfeldt kept up his correspondence with Middleton, during the year he remained in the *Britannia,* concerning colors and sizes of flags for ships and frigates (repeating ships). On March 9, 1781, he wrote:

I sent you in my last an account of the flags we used in our signals and also their dimensions. They are such as, in general, we find to be very distinguishable.

Every article or order in a signal book should be numbered; and then, any ship possessed of eleven flags, different the one from the other, may express signals to any number.

It has been a common saying that it is an advantage to go by signals we have been used to, and when a new set comes out, to say we have our trade to learn again. This style was very proper . . . when the signals were jumbled together without form or order, and when a long acquaintance with them was necessary to find out the meaning of any signal that was made in the chaotic state they then were . . . when signals are formed on a proper plan, they require no study to comprehend them and when a signal is made you can immediately turn to the article and order alluded to. If the greatest novice can't do this the plan is faulty. . . .

The plan I followed in the signals I made was not what I most approved of. That which I would have adopted . . . I could not get any of the admirals and officers of note to approve and countenance. I, therefore, followed in a great measure Lord Howe's code, he being a popular character.

A few days later, evidently at Middleton's request, he sent to the Admiralty a translation of Villehuet's chapter on the numeral signals of La Bourdonnais.

During his three and one half years as chief of staff, Kempenfeldt compiled and issued a new signal book, containing many new signals and establishing some new fleet formations. A copy, issued from the *Britannia* (flag) on February 11, 1781, still exists. It is signed by both Darby and Kempenfeldt.

One of the new formations, which Corbett thought of great importance, was prescribed in Article 10. It read:

In the order of sailing the ships are to be stationed in such manner as may most favor the ready forming of line of battle in which the squadron of the second in command is to lead. For this reason, the commander in the second post

and his squadron, are to be to windward of the center on both tacks, or on the starboard tack when sailing before the wind. The commander of the third post and his squadron, in like manner to be on the leeward or starboard side . . . ships to pay great attention at all times to keep well closed up, and in their stations and particularly so at day break, in order that the line may readily be formed, should the enemy appear near.

The formation prescribed in Article 10, Corbett considered ". . . the characteristic British sailing formation which so greatly accelerated the handling of the fleet for action. . . ."

The tactical maxim underlying this formation can be stated, generally, as follows. When in the vicinity of an enemy, the fleet formation should be such that the time required to form the battle line is less than the time for the enemy to reach firing range, no matter on what bearing and at what distance he may be discovered. Subject to the above, fleets, during war, may cruise by day in whatever formation is least fatiguing to the personnel.

Kempenfeldt's additions to the Fighting Instructions required that in battle all ships should "wear red ensigns" and that during an engagement "boats are to be kept manned and armed and prepared with hand and fire chain grapnels and other requisites on the off side from the enemy, for the purpose of assisting any ship of the fleet attempted by the fire-ships of the enemy" or for assisting our fire-ships when attacking.

Kempenfeldt tabulated the various forms of attack under "Battle Signals," of which there were 37, followed by "Explanatory Observations."

The signal for breaking the line was number 235: "When fetching up with the enemy to leeward, and on the contrary tack, to break through their line and endeavour to cut off part of their van or rear."

We now return to American waters. The English Admiralty considered its sea force on the North American station as part of its West India fleet, but except for Rodney's brief visit in the fall of 1780 it was practically an independent command.

Vice Admiral Marriot Arbuthnot (1711-1794) had been on the captains' list from 1747 until 1778. In the spring of 1779, at the age of 68, he succeeded Howe and remained in command until July, 1781.

Arbuthnot apparently did not adopt Howe's signal book, nor his fighting instructions. Instead he reverted to the Permanent and Additional Instructions in the forms issued by the Admiralty.

In 1779 he canceled the Article in the Additional Instructions pre-

scribing bow and quarter line as a battle formation, and substituted for it line of bearing of ships from each other on any point of the compass, which included bow and quarter line. In 1780, he re-established bow and quarter line, under that name, but worded differently.

He issued a total of 24 additional fighting instructions, none of which are of present interest except those alluded to above. He added a table of 48 signals, of which a few are quoted in part.

II. Designated "a ship to take charge of the guard twenty-four hours, and speak all vessels coming into the harbor or road."
VII. A signal for the Admiral himself to lead the squadron.
VIII. A signal to re-arrange the battle line to meet enemy's line with equal ships opposed to each other.
XI. A signal to indicate that the Admiral had taken station on his repeating ship, but continuing to fly his flag on the flagship.
XXII For each ship to keep the common pennant hoisted at the mizen-peak during Divine Service.
XXXVI. A preparatory flag to be hoisted about five minutes before the signal for an evolution ("general's intended operation").

In a note of which the date has not been preserved, Arbuthnot said, "It is directed that in action, a portion of every ship's fire be reserved for and directed against the masts and rigging of the enemy, and that all ships in action wear red colors." This may have been written after his action with the French in 1781.

In March, 1781, Arbuthnot, with his squadron of eight of the line and four frigates, was lying in Gardner's Bay, watching a French squadron in Newport under Admiral Des Touches. Arbuthnot had learned that Des Touches had orders to proceed to Chesapeake Bay to prevent English troops from reaching Virginia by water.

Des Touches sailed March 8. Arbuthnot learned this on March 10, and at once sailed in search.

Mahan says that *all* Arbuthnot's ships were coppered, as compared with three in the French fleet. Consequently, the latter were outsailed, and both squadrons arrived near the entrance of the Chesapeake on the morning of March 16.

The weather was hazy and squally; the wind off shore, west to southwest. Arbuthnot was to windward and nearer to the Chesapeake than Des Touches, who sighted the English to the southwest.

While closing, and while both squadrons were maneuvering, the English to keep, and the French to gain, the weather gauge, the wind came out northeast with a rising sea. At this time—about one o'clock—

both squadrons were on a course about east-southeast on the port tack, the French leading, and a little to windward.

Realizing that he would be overtaken, Des Touches wore in succession from the van, crossed Arbuthnot's bow with his entire squadron, and steered to pass to leeward out of gun range. It appears that he deliberately chose the lee gauge so that his ships could use their lower tiers, while ships to windward could not, on account of the heel.

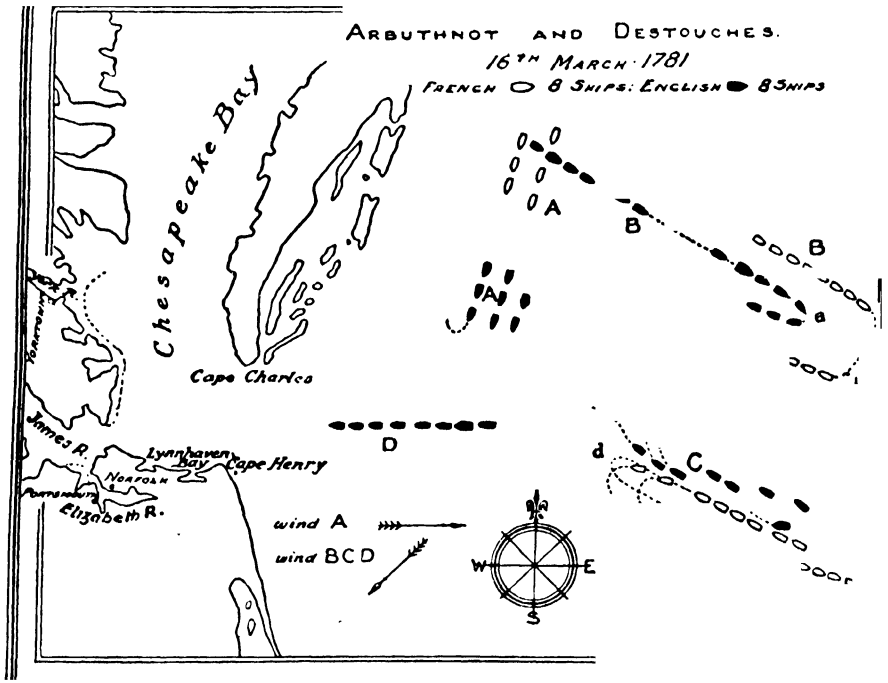


FIG. 50.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

When the French were nearly on his beam, Arbuthnot also wore in succession from the van, keeping to windward, and when he completed the evolution, bore up for the French, but his van was not abreast of them, nor was his column parallel to theirs. Moreover, he lost bearing on the approach and his leading ships were badly crippled by the French who filed past them, giving each its broadside.

Des Touches then wore again, leaving the English incapable of

pursuing him, but abandoning an action which he might well have won.

Arbuthnot was blamed for keeping the signal for the line flying, instead of replacing it with one for close action.

Des Touches was somewhat the weaker in ships, having seven of the line; one 80, two 74s, three 64s, one 64 partially armed, and one 44, as against Arbuthnot's one 98, three 74s, three 64s, and one 50.

English losses, according to Allen, were 30 killed and 64 wounded. All casualties, except 9 of the wounded, were from the three leading ships, the *Robust* (74), *Europa,* and *Prudent* (64s). Arbuthnot was in the *Royal Oak* (74), in which three were wounded. Rear Admiral Thomas Graves was in the *London* (98) in which three were wounded.

As usual, the English suffered greater material damage, especially aloft, while the French lost more in killed and wounded.

Had Des Touches followed up his initial advantage, the French—and therefore the American—control of the Chesapeake might have been secured some months earlier. As it was, Arbuthnot controlled it and Clinton was able to send re-enforcements to Cornwallis by water (1,800 men under General Benedict Arnold).

On March 22, a few days after the indecisive engagement off the Chesapeake, the English in home waters permitted Admiral De Grasse, with 20 of the line and a fleet of 150 merchant ships, to sail unmolested from Brest for Martinique.

Neither Rodney in the West Indies nor Arbuthnot in America were apprised of De Grasse's approach.

Rodney was at St. Eustatius, some 300 miles north of his St. Lucia base. Sir Samuel Hood, with 17 of the line, was cruising off Martinique. There, on April 29, he encountered De Grasse with 24 of the line. In a partial engagement, De Grasse had the advantage but did not pursue it. Instead, he re-fitted at Fort Royal and sailed south for the capture of Tobago, not far north of Trinidad.

Rodney was not ready with his fleet until May 27. He arrived off Tobago two days later, just as De Grasse, having captured and garrisoned the island, was leaving his anchorage. He stood north and Rodney followed, but failed to get close enough to engage until June 5, when having the wind of De Grasse and the latter between him and the Grenadines, he feared to attack, because of the currents that set westward across those dangerous rocks and reefs, in which entanglement would be fatal.

James, author of *The British Navy in Adversity,* says that possibly by this failure to attack, Rodney sealed the fate of his country in

America. While at St. Eustatius Rodney was engaged in his own, and not the king's business.

De Grasse reached Martinique unmolested, re-fitted, and convoyed the trade ships westward through the windward passage to Cape Haitien, reaching there July 26. Thence he despatched the merchantmen to France.

He found in Cape Haitien 4 of the line which increased his fleet to 28. He also found a frigate which had sailed from Boston, June 20, with despatches from Washington to Rochambeau, requesting him to bring his fleet to the Chesapeake, or to New York, in order to strike a blow at one part of the divided English forces, then under Cornwallis in the South and Clinton in the North.

De Grasse responded energetically. He embarked 3,300 French troops, arranged to secure funds from Havana, took on supplies, and sailed for the Chesapeake on August 5, eleven days after his arrival at Cape Haitien.

His course was to leeward, across the Windward Passage, through the Old Bahama Channel to the Straits of Florida, and thence, in the Gulf Stream, northeast to his port, where he arrived August 30, anchoring in Lynnhaven Bay, inside of Cape Henry.

While Washington and De Grasse were concerting an attack on Cornwallis in Virginia, and isolating him from support, either by land or water, what were the English doing afloat?

Arbuthnot had relinquished his command to Rear Admiral Thomas Graves and sailed for England on July 2.

Graves, having heard of a probable increase of the French on the coast, at once wrote to Rodney for re-enforcements. Rodney did not receive the letter, but on learning, July 24, that De Grasse had gone to Cape Haitien with the trade, he believed that like De Guichen, his predecessor, he would return to France, or at most, send not more than 14 of his fleet to America.

In order to forestall this move—were it made—instead of sailing himself for New York and leaving a junior in the West Indies as he had done the previous year, he despatched Rear Admiral Samuel Hood, with 15 of the line, to convoy the Jamaica trade fleet through the Windward Passage and then to make the utmost speed to the Chesapeake. He directed that the Jamaica squadron should re-enforce Hood.

Rodney himself sailed for home on August 1 to defend his reputation, which had suffered from his failures to defeat either De Guichen or De Grasse. He had also to explain his actions in the islands captured



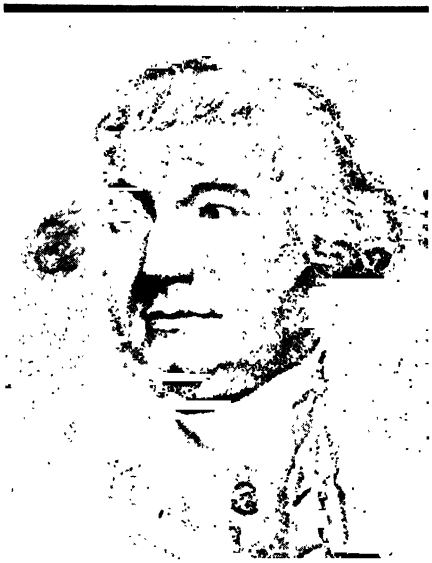


FIG. 51.—Count DeGrasse. (*Courtesy Commander A. H. Miles, U. S. Navy*) The Rt. Hon. Thomas Lord Graves. (*Courtesy of The New York Historical Society Naval History Society Collection*)

from the French and Dutch where he had been accused of unlawful schemes for his own monetary benefit.

Hood's ships were coppered. He took the direct route north, outsailed De Grasse, passed the entrance to the Chesapeake five days before the French arrived, and joined Graves at Sandy Hook August 30, the day that De Grasse reached Lynn Haven Bay.

Graves was watching Des Touches' successor, De Barras, who was in Newport with a French squadron. Learning that De Barras had sailed and believing he was bound for the Chesapeake, Graves, who was Hood's senior, put to sea, August 31, with his own and Hood's squadron, amounting to 19 of the line.

De Grasse, immediately on his arrival, landed his troops to join Lafayette, stationed cruisers in the James to prevent Cornwallis escaping from Yorktown to the southward, and in the York river, to keep in touch with Lafayette and ensure that no aid should reach the British by water. His ships of this line he kept in Lynn Haven Bay.

Washington was en route to the south with 6,000 troops, and Lafayette's force now amounted to 8,000. Cornwallis had approximately 7,000 troops and about 1,000 seamen.

Graves, arriving off Cape Charles, was sighted by the French at 8 A.M., September 5. In addition to his 19 of the line, he had 7 frigates and one fire-ship. At first, the French mistook the British for De Barras, and Graves, having received neither of the two despatches from Hood and Rodney, knew nothing of De Grasse's arrival. He hoped to reach the Chesapeake before De Barras, and in that he succeeded.

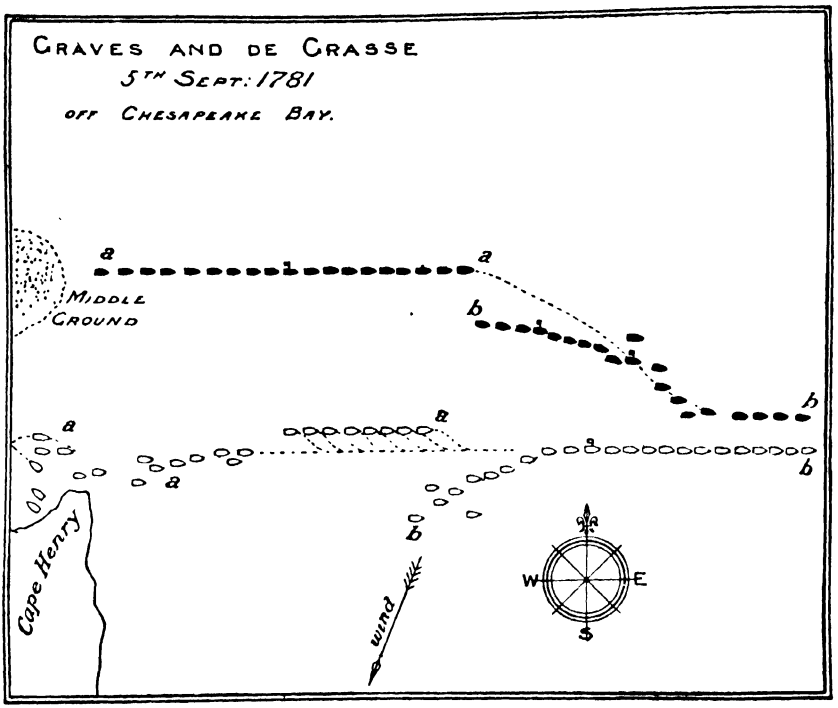


FIG. 52.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Like D'Estaing at Newport in 1778, De Grasse decided to put to sea. The wind being north-northeast, he was obliged to wait for the ebb to get out of Lynn Haven Roads. He began to get under way about noon. The British, meantime, were coming down nearly before the wind, steering for the main entrance to the bay, just north of Cape Henry. Some of the French ships were constrained to tack out, and their line was, therefore, never completely formed. Of his 28 ships of the line De Grasse had but 24 available, as 4 and most of his cruisers, were stationed in the James and York rivers.

At one o'clock, Graves, seeing the French coming out and forming for battle, changed course to west, and at two, his van being close to the Middle Ground, and his flagship, the *London* (98) nearly abeam and three miles north of the French flagship *Ville de Paris* (104), he wore his ships together and came by the wind on the port tack, heading east, parallel and to windward of the French. He then hove to, and waited for them to come up.

On the port tack the British battle order was reversed, putting the second in command, Hood, in the rear, and the normal rear under Rear Admiral Drake in the van. If Graves had counter-marched—and he had room to do so—he might have won the battle, since the able, but apparently sulky, Hood would have been forced into action with his squadron. As it turned out, his ships did not fire a shot.

Before making the signal to bear down and engage, Graves twice signalled his leading ship to steer more to starboard. The order being carried out, his column became oblique to the French, instead of parallel.

At 3:46, he signaled his fleet to close to one cable, bear down, and engage the enemy, but he kept the signal for the line still flying. This was Hood's excuse for not obeying the signal to engage, though the *London* set the example by changing course. In closing, while bearing down, some ships including the *London* over-ran their next ahead, and when they rounded to, blanked the fire of others.

Hood, with his squadron of 6, did nothing, from 3:46 to 5:20, when after the signal for close action had been several times repeated, he at last obeyed, too late. The French, as usual, having crippled the British van ships as they came down in succession, so that they could not follow, put their helms up, ran off, and reformed to leeward. The action was not renewed, and the British finally returned to New York and the French to the Chesapeake. Barras joined September 10 with his squadron of 8. This put De Grasse in overwhelming force—36 of the line.

Mahan criticises both Graves and Hood, and no doubt properly. Corbett is more severe against Hood, and Thomas Graves, who made the Graves Collection, and who had recently been promoted to command of the *Bedford* (74), the ship next astern of the *London* in this battle, wrote in his signal book:

> The foregoing order [see below] was given the day after the action with the French fleet of 24 sail of the line, in consequence of the second in command not bearing down and engaging the enemy, which was his duty: but kept his wind, by which means a most glorious victory was lost, and with it the loss of Lord Cornwallis' Army in Virginia.

If his letters to Middleton correctly portray his character, Hood, however able and popular, was deliberate in attempting to undermine his seniors. In this case, because Graves did not concentrate on the French van, as Hood said he himself would have done, he took shelter behind a fictitious adherence to the *line;* namely, that he could not obey the signal to run down and engage, while the signal for the line was flying.



FIG. 53.—Lord Hood. (*From Allen's "Battles of the British Navy," George Bell & Sons, London*)

Had he been a man of less influence, he—like Palliser and Lestock—would have been court-martialled for not doing his *utmost* to engage the enemy. In fact, he did nothing; although the Additional Instructions of 1778, which were in effect on both the West India and North American stations, contained an Article (XXI), which remained unchanged by any commander-in-chief. It read:

If the squadron should be sailing in a line of battle ahead, to windward of the enemy, and the commander-in-chief would have the course altered in order to lead down to them, he will hoist an Union Flag at the maintopgallant masthead and fire a gun, whereupon every ship in the squadron is to steer for the ship of the enemy which from the disposition of the two squadrons it may be her lot to engage, notwithstanding the signal for the line ahead will be kept flying, etc.

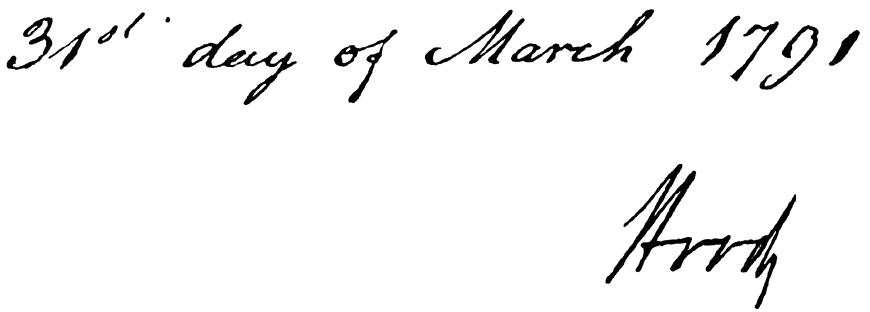


FIG. 53a.—Signature of Lord Hood, as Vice-Admiral. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Again in Article XXIII, which was never altered in substance, Arbuthnot having merely changed the signal for it:

If at any time whilst engaged with the enemy, the commander-in-chief shall judge it necessary to come to a closer engagement, he will hoist a flag, half blue and half white under the signal for engagement at the fore topgallant masthead, and fire a gun . . . whereupon every ship is to engage the enemy as close as possible.

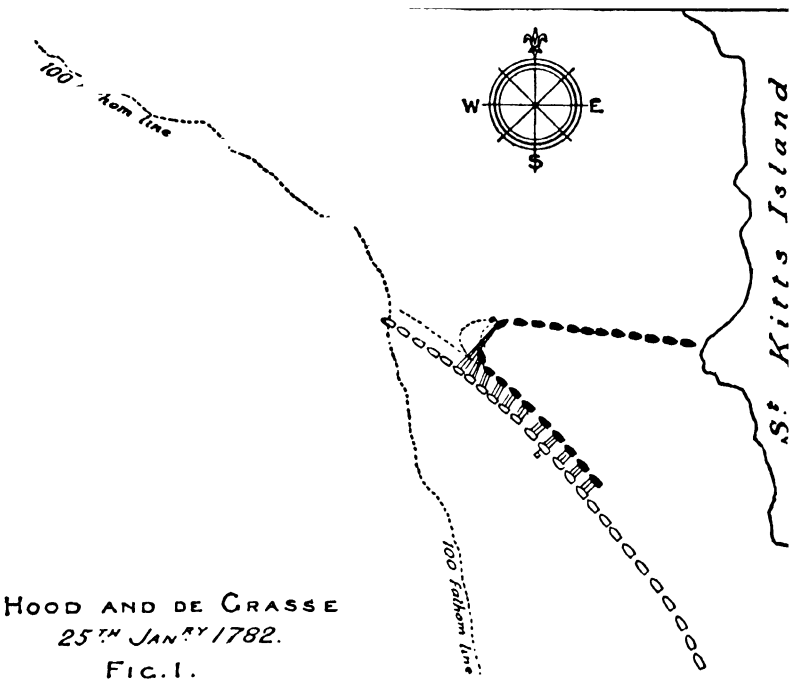


FIG. 54.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*) (See page 340)

This signal was XIX in the final form of the Additional Instructions. Rodney struck out the words "and fire a gun."

It appears from Mahan's account that Hood shut his eyes to both these signals, because one, or both, were flying at the same time with the signal for the line. It seems that Hood, while valuable as a commanding officer, was not good as a subordinate. In another place, Mahan remarks of him, that Nelson, if the pupil of anyone, was the pupil of Hood.

Admiral Graves, as indicated by Thomas Graves' note quoted above, issued the next day a signal "To form the line parallel to that of the enemy as near as possible." A memorandum followed which was construed as a rebuke to Hood, although the matter went no further. The memorandum read:

When the signal for the line of battle ahead is out at the same time as the signal for battle, it is not to be understood that the latter signal shall be rendered ineffec-

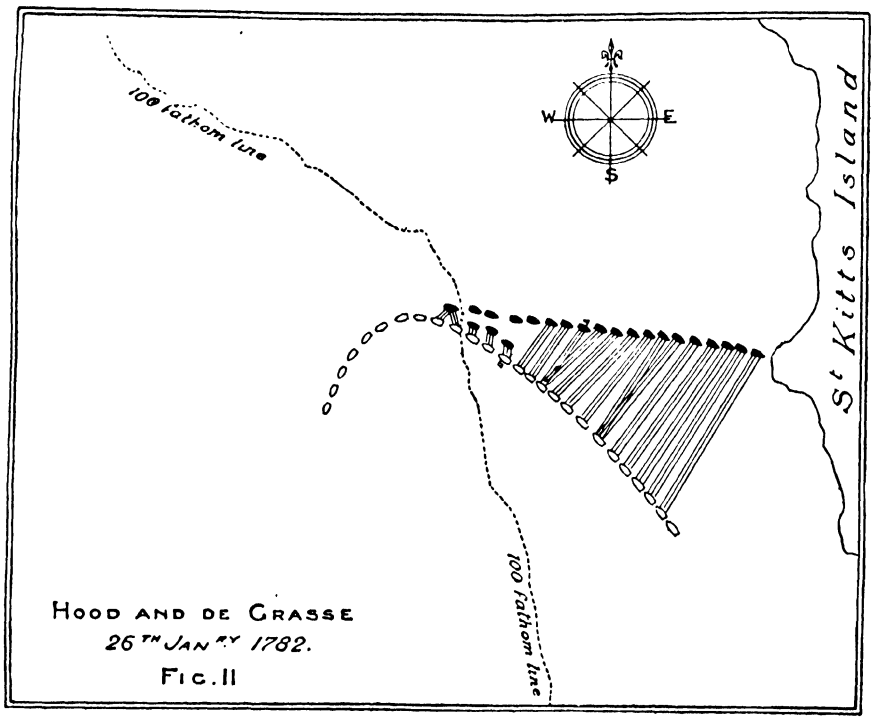


FIG. 54a.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*) (See page 341)

tual by the strict adherence to the former, and the signal for the line of battle is to be considered as the line of extension and the respective admirals and captains of the fleet are desired to be attentive not to advance or fall back, so as to intercept the fire of their seconds ahead and astern, but to keep as near the enemy as possible whilst the signal for close action continues out, and to take notice that the line must be preserved parallel to that of the enemy during battle, without regard to a particular point or bearing.

In this apparently indecisive—but in its political effects one of the decisive battles of the world—the losses on both sides were small. In

Hood's division, there were none. The English casualties numbered about 310 killed and wounded; the French, about 200.

This contrasts with a sanguinary action, just a month earlier, on the Dogger Bank in the North Sea between an English squadron of 7 ships and 6 frigates under Vice Admiral Hyde Parker and a Dutch squadron of 7 smaller ships and 6 frigates under Rear Admiral Zoutman. Each squadron commander was protecting a trade fleet, homeward bound.

Parker was in the *Fortitude* (74). Zoutman's flagship bore an inspiring name, the *Admiral De Ruyter* (68).

Parker, having the wind, brought on the action at 8 in the morning. The Dutch let him round to within pistol shot, before firing a gun. At the end of an hour and 40 minutes, the English withdrew, having 471 killed and wounded. Eighty-seven of these were on the *Fortitude*. Allen says the Dutch loss amounted to 545 killed and wounded, but in effect, it was a Dutch victory. Both sides saved their convoys.

At the Dogger Bank, the English mounted 446 guns; the Dutch 334. Off the Chesapeake, according to Allen, the English mounted 1,408 guns and the French, 1,822.

Allen mentions that junior officers who had fought in the Dogger Bank battle were permitted the distinction of wearing epaulets.

On October 15, Graves, after his return to New York, added three signals, probably based on the Grand Fleet (Kempenfeldt's) signal book. Graves had served with the Fleet prior to coming to America. These signals show that breaking an enemy line was in the minds of the admirals of that day, although Rodney did not have a signal for it.

Graves' signals were: "For the Van to force through the enemy"; "For the Center to force through the enemy"; and "For the Rear to force through the enemy."

These are not very clear, and unlike the French signals, do not give instructions about what to do *after* forcing through.

In the Thomas Graves collection was a table—the earliest known—for keeping station by mast-head angles. Three-deckers were assumed to measure 184 feet from truck to water-line; 74s, 170 feet. Height of eye for measuring angles, 26 feet.

The immediate result of Graves' failure was that Cornwallis, hemmed in by land and sea forces, surrendered his army to General Washington, at Yorktown, on October 19.

This left De Grasse free to return to the West Indies. Hood also

returned to the West Indies and was in command there with 22 of the line until Rodney's return in February, 1782.

In the meantime (November 18, 1781), Kempenfeldt, at the age of 63, obtained his first independent command. He was made a rear admiral and directed to hoist his flag on the *Victory,* in command of a squadron assembled to prevent re-enforcements and supplies from reaching De Grasse.

To insure the safe clearance of the supply fleet and 5 of the line for De Grasse, Admiral De Guichen, with a strong squadron of 12 of the line, accompanied them to sea. Kempenfeldt, with an equal number of the line, one 50, 4 frigates, and a fire-ship, sailed in search on December 2.

After ten days of thick and squally weather, it suddenly cleared and he found himself close aboard, and to windward, of the French supply fleet, with De Guichen, on this occasion unlucky or imprudent, ahead and to leeward. This may have been due to a shift of wind. In any case, he was helpless and Mahan relates that Kempenfeldt swooped down on the merchant ships which scattered, but not before he had captured 15, laden with military and naval stores of great financial value and still greater military importance.

Kempenfeldt at once despatched his fire-ship the *Tisiphone,* commander Saumarez, to warn Hood, who commanded in Rodney's absence, of the approach of French re-inforcements and supplies. A few days later, however, a storm so shattered the French that only 2 of the line and 5 transports continued the voyage. Rodney not long afterwards sailed from England with 12 of the line to resume his command.

Kempenfeldt's own account of the affair, which deservedly brought him great credit, does not quite agree with Mahan's in Clowes' *History.*

Writing to Middleton, Kempenfeldt says:

N. 59 E. 62 leagues,
14th December.

. . . The look out frigate to windward made signal soon after day for a fleet in the S.E., the wind then in that quarter. Made signal for the two-decked ships and frigates to chase. At nine we perceived they were going large to the westward; at half-past ten, observed several of the line ahead and to leeward forming in line of battle; upon which, made the signal for the line; but having a prospect of passing between the enemy's ships of war and part of their convoy, I continued to press sail with the view of cutting them off, and succeeded in part. Several struck to us; the exact number I can't tell . . . some of which were not taken possession of, night drawing on, it blowing fresh and the weather thick. . . . After collecting the ships together, I made sail on the same tack with the enemy, and at daylight . . . saw them to leeward. They were in line; we formed ours, but their superiority to us

was such that I could not think of hazarding an attack. Besides we must have engaged to windward, and the weather was such, we could not have opened our lower deck ports to leeward; they might have done theirs to windward.

De Grasse, after his return from the Chesapeake, had captured Nevis and occupied St. Kitts, except for the British garrison on Brimstone

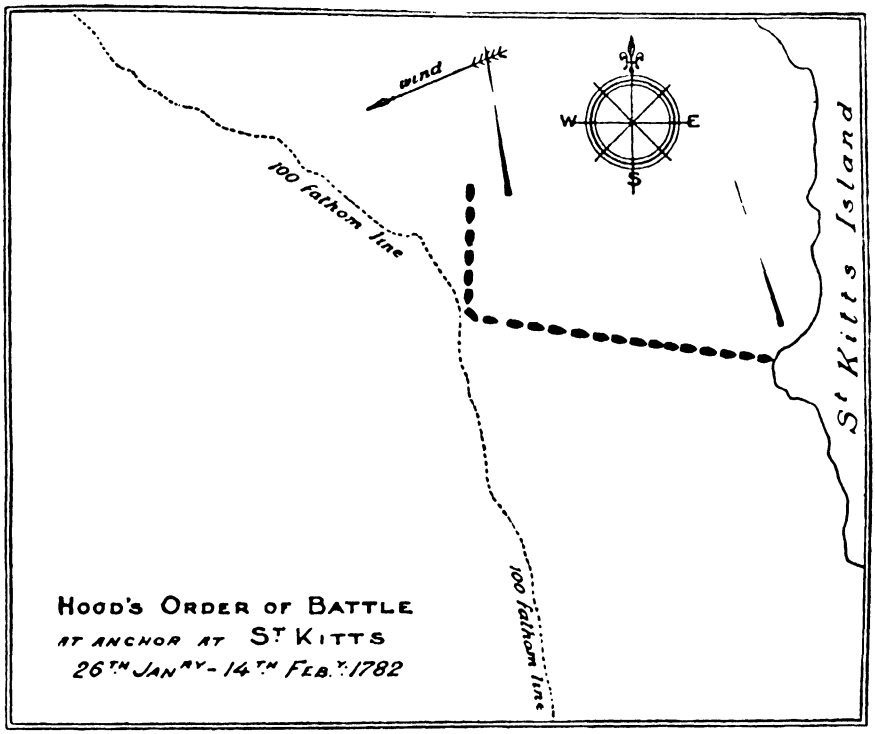


FIG. 54b.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Hill, whose commanding officer, General Shirley, had sent to Hood for succor. Hood responded with his fleet of 22 of the line, announcing his intention to give battle to the French regardless of their numbers, and reached Antigua, less than 50 miles from St. Kitts, on January 21.

Embarking some troops and supplies, he sailed on the evening of the 23rd and reached Basse Terre the next morning, expecting to surprise De Grasse. He found the latter anchored in the roads, but not in formation for defense. Hood evidently had intelligence of this before leaving Antigua, and on it based his hopes of attacking the French at anchor. These hopes were foiled, however, by a collision between a

frigate and the leading ship of his column, which delayed his arrival and gave De Grasse, who had 24 of the line with him, time to get under way on the afternoon of the 24th and stand to the southward.

Hood, on his arrival, hauled off also to the southward, but to windward of De Grasse.

Here we have another example of the French declining the risk of a possible attack at anchor, but getting under way quickly, as did D'Estaing at Newport and Tobago, and De Grasse himself on this occasion and at Lynnhaven Bay.

On the morning of January 25, the French being several miles to leeward, Hood seized the anchorage in Basse Terre Roads, his ships coming to with springs on their cables in a defensive formation, previously agreed upon, for which he received much credit. He certainly displayed great courage in taking up an anchorage almost under fire of a slightly stronger French fleet, steering for him. That he was not seriously attacked, or even beaten, was due to De Grasse's lack of resolution. For Hood's column, at anchor, extended from close in shore, to the westward, practically to the 100 fathom line, and its outer end was subject to destruction by any skilful enemy (Fig. 54).

As it was, De Grasse reached within gun range of Hood's rear before the latter anchored, and a partial engagement ensued, in which the *Bedford* was among the ships conspicuously well fought. Her captain was Graves of the Graves collection, who commanded her in the Chesapeake action. Mahan, in writing of this affair of Hood's, considers that it was equal to any of the brilliant deeds of Nelson. But that should not blind us to the fact that while the wind, always off shore, made the anchorage difficult to approach, it was an untenable position against a determined foe, and in the sequel little was accomplished.

On the morning of the 26th, the 6 outer ships of Hood's column were brought inside the 100 fathom line to the northward, making an L formation. In column, its outer end was vulnerable to attack in succession, as also was the knuckle of the L. In neither case, regardless of springs, could the British bring their full broadsides against such an attack. The knuckle, attacked at 500 yards, would have been over 2,000 yards (random shot, in those days) from the shore end of the British column. The 6 ships extending north from the knuckle could not employ their guns effectively against an enemy which could blank their fire by approaching somewhat in shore, and then bear up out of the range of most of them, after delivering his own fire against the knuckle and the next few inshore ships.

De Grasse attacked again, but ineffectively, on the morning and afternoon of the 26th, before Hood had formed his L, with his flagship, the *Barfleur* (98), at the knuckle. The losses on each side were about equal: British, 72 killed and 244 wounded; French, 107 killed and 204 wounded. No ships were put out of action.

De Grasse's fleet was now augmented to 32 of the line and Brimstone Hill surrendered to the French. Hood escaped to sea by cutting his cables on the night of February 14, De Grasse having anchored off Nevis to take in stores.

Hood returned with his fleet to Antigua. En route from there to Barbados, he was relieved by Rodney, who returned from England and joined, February 25, with 12 of the line. Being now superior to De Grasse, Rodney attempted to cut the latter off from his base at Martinique, but was unsuccessful.

After re-fitting Hood's ships at St. Lucia, Rodney's fleet comprised 36 of the line.

The French, however, were also strengthened and supplied by the arrival of a large convoy, which took the place of the one dispersed and partially captured by Kempenfeldt. Thus De Grasse, by the end of March, had 35 of the line ready to convoy his troop transports to leeward from Martinique for the attack on Jamaica, pursuant to his orders. He had also, under his protection, the homeward-bound French trade, which together with the transports, amounted to 150 sail.

Rodney laid his plans to prevent the accomplishment of this purpose, and, being slightly superior, to bring De Grasse to action. Mahan blames De Grasse for not having crushed Hood, when he had 36 ships to Hood's 21. He now found himself confronted with a force equal if not superior to his own, and moreover, hampered by a convoy.

De Grasse put to sea April 8, and Rodney, who was watching him from St. Lucia close by, got under way and pursued the same day. Mahan is of the opinion that De Grasse should, and could, have captured St. Lucia long before this (his attempts were feeble), and thus have deprived the British of any base nearer than Barbados, about 100 miles to the southeast.

As it was, Rodney sighted the French on the evening of the day they sailed and continued to overtake them during the night.

On the morning of the 9th, some of the French were in sight, becalmed under the land, at the northern end of Dominica; others beating to windward in the channel between Dominica and Guadeloupe.

De Grasse put his convoy in charge of two 50-gun ships to conduct

it to Basse Terre in Guadeloupe and made his preparations to engage by wearing his leading ships and standing south to oppose the British van under Hood, who was standing north on the starboard tack, the trade wind between the islands being nearly east. On the west side of Dominica, however, it draws to the north, which made a head wind for the British center and rear off the land, with a calm close in.

Mahan says the French ships were larger, deeper, had better lines than their opponents and were naturally better sailers. He thought even coppering did not entirely overcome the original British disadvantages. He is positive that, with Hood separated from the center, through having caught the breeze, De Grasse could have crushed him, had he gone about it more vigorously. He did pass by Hood's column, with 15 ships, to windward, but at long gun range only. First, coming down out of range on the opposite tack, the French wore (counter-marched), attacked Hood's rear, passed up his windward side, tacked, and repeated the operation, but too far away to inflict severe damage, though they outnumbered him two to one. The only reason that can be assigned for this reluctance to come to closer action, is the fact that the British ships were armed with carronades, in addition to their long guns. The French had none, then or later in the war, and were careful not to come within range of the "smashers."

The first French attack lasted from 9:48 to 10:25; the second from 12:14 to 1:45, by which time some of the British center had come up, and two of them joined the action. No great damage was done on either side. The French had a 64 crippled, to the extent of requiring to be sent to Guadeloupe. The British injuries were minor. Rodney sent Hood's squadron to the rear to repair damages and the fleet lay to, during the night of the 9th, for that purpose.

Rodney resumed the pursuit on the morning of the 10th, but lost, instead of gaining, for the next two days. De Grasse, working to windward, suffered the temporary loss of another 64, due to a collision. Still more unluckily for him, two 74s had mast accidents, which threw them to leeward about three miles. During the night of the 11th, one of these ships, the *Zélé,* which De Grasse bore up to protect, collided with the flagship, *Ville de Paris,* and lost her foremast and bowsprit. A frigate took her in tow for Guadeloupe.

At daylight, Rodney sighted the *Zélé* in tow, and ordered Hood to chase. De Grasse, observing this, came down on the port tack to chase the 4 ships of Hood's squadron, which were themselves pursuing the *Zélé.*

This move brought the two fleets into a position where an action was unavoidable, and by 8 A.M., the opening guns were fired. The meeting was on opposite tacks, the British to leeward. Both fleets, at first, were close-hauled, thus meeting at an angle of nearly four points.

Rodney, in the beginning, signaled for a battle line on a line of bearing, N.N.E.-S.S.W., expecting an east wind, but the wind held southeast, so he annulled the line of bearing signal and ordered line of battle ahead, at one cable.

The British were well formed up, heading about E.N.E. on the starboard tack, in inverted order, Rear Admiral Drake's squadron leading as at the battle of the Chesapeake. De Grasse's fleet, owing to his hasty decision and the bearing up to succor his 74, was not well closed up, or in good column. According to Mahan, some of the French, at daylight, were 10 miles to windward and could not get to their stations by 8 A.M., although, by shortening sail, or lying to, their Commander-in-Chief could have given them ample time to join before the heads of the two fleets were in gun range. Also, De Grasse's change of course brought him within the zone of the light airs and baffling winds of the shore line of Dominica, which deprived the ships of their power of maneuvering, at least in part. Mahan thinks that De Grasse intended to limit the battle to passing on opposite tacks.

Before contact, the wind shifted to the eastward, heading the British off to N.N.E. and allowing the French to come up to S.S.E. from their previous heading S.S.W. This caused the leading ships of the two columns to pass beyond gun range.

The battle began when Rodney's leader, the *Marlborough,* came within firing distance of the eighth ship in the French column, the *Brave* (74).

The captain of the *Marlborough* put his helm up to parallel the French, and stood to port along the French column, towards their rear. Rodney thought the *Marlborough* was not close enough and signaled her, and her next astern, to steer a point more to starboard. De Grasse, seeing his seven ships in the van out of action, signaled the leader to steer S.S.W., to parallel the British center and rear. His van thus got into action with Hood, but at rather long range.

The slow progress, under battle canvas, of the two fleets, on practically opposite courses, is shown by the fact that the *Brave* fired the first shot at 8 A.M. But Rodney's flagship the *Formidable* (98) did not commence firing until 8:23, and Hood's flagship the *Barfleur* (98), number thirty-one in column, not until 9:25.

About 9:15, a shift of wind to the southeast forced the French into bow and quarter line, with their heads towards the British. Rodney followed the wind and led through the French column, astern of the 19th ship. The *Bedford* (Graves' ship), apparently not being able to see her next ahead, also followed the wind and led through the French column, astern of its 12th ship. Hood's squadron followed the *Bedford*.

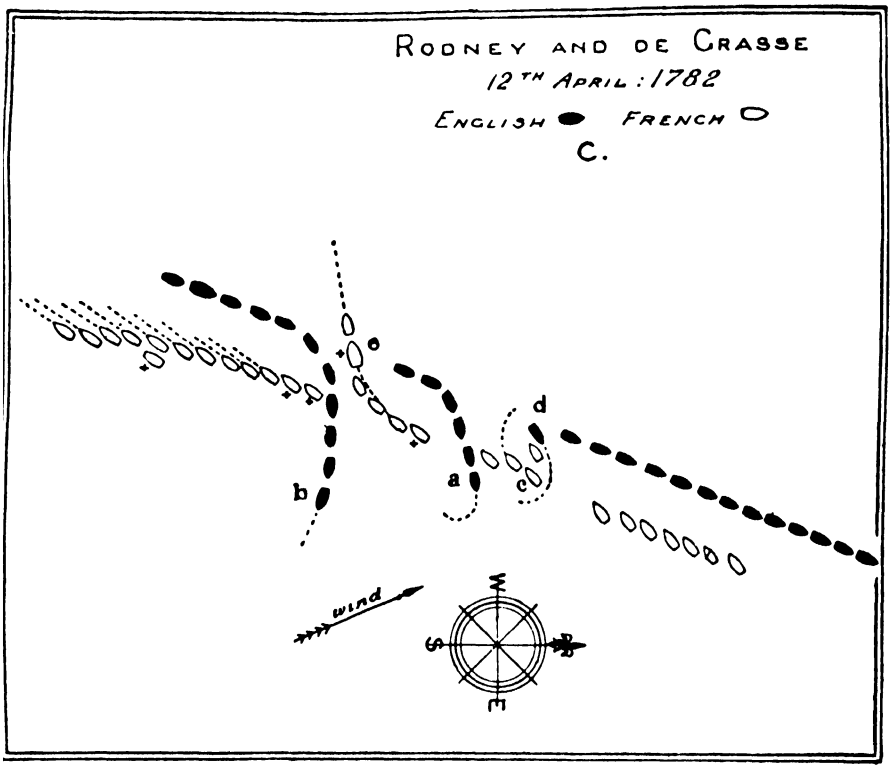


FIG. 55.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

The British ships ahead of Rodney followed each other in a sort of bow and quarter line along the French rear.

Each fleet was now in three groups: The smallest group, consisting of 6 French ships, one of them the *Ville de Paris,* was between 6 British ships with Rodney to starboard, and Hood, with his entire squadron, to port.

The two vans and the head of the British rear, led by the *Bedford,* soon passed out of action. Hood's flagship ceased firing at 10:45.

At 11:33, Rodney signaled his van—its greater part, by then, well astern of the French—to tack. De Grasse tried to re-form his fleet to leeward, but could not.

There was no further united action in either fleet. Rodney hauled

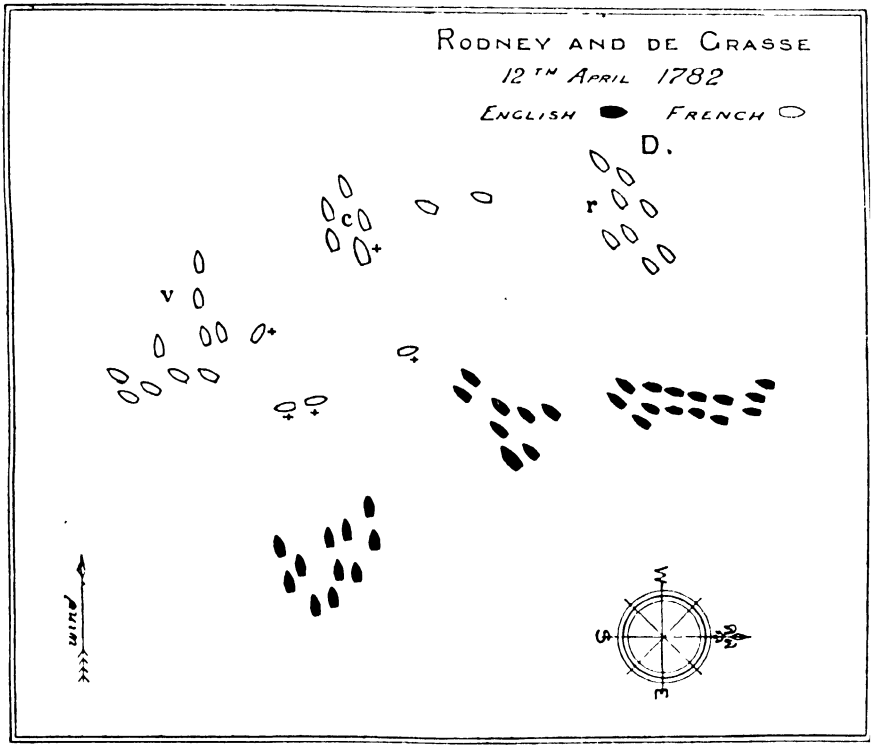


FIG. 55a.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

down the signal for the line, and later hoisted the signal for close action, thus leaving individual ships—as one writer said—"to annoy the enemy as their respective commanders judged best."

Mahan says that the pursuit of the French was languid. Hood was very bitter on the subject.

The remainder of the battle centered around the *Ville de Paris,* which was forced to surrender about sunset. Four other disabled French ships were taken.

The reason given by Rodney for his failure to chase, was that the French went off in a body—24 of the line—and would have destroyed pursuing ships, one at a time.

At 6:45, about 15 minutes after De Grasse surrendered his flagship, Rodney made the signal to bring to on the port tack, and remained thus during the night.

In this action, the British lost 243 killed and 816 wounded. The French losses are unknown, but were probably much greater, for distributed among their ships were 5,400 troops intended for the attack on Jamaica. Six French captains were killed, as compared to two British.

One of these British captains was Lord Robert Manners, of the *Resolution* (74). Corbett cites this officer as evidence that the British were, before this date, acquainted with the works of Morogues. He quotes from one of Manners' letters to his brother, dated September 20, 1780. Its postcript read: "Pray send me a Delphin Horace, Morogues sur la Tactique Navale, a Court Calendar, or any other book or new pamphlet." He gave as his address, "The Windward Islands, Jamaica, or elsewhere."

Manners, at the time of writing, had recently been made a captain in the *Resolution,* under Rodney. He had been with Hood in his partial action with De Grasse off Martinique, in April, 1781; with Graves off the Chesapeake in September, and again with Hood at St. Kitts in January, 1782.

Rodney's flag captain in the *Formidable* was Sir Charles Douglas, and his second captain (captain of the ship) Captain John Symons. So it appears that Douglas' duties were entirely those of chief of staff.

The controversy that for a century centered around Rodney's "breaking of the line" and whether the credit for this maneuver belonged to Rodney, Douglas, or Clerk of Eldin, was finally settled by the discovery of the Graves Collection, showing it to be something with which all those concerned were familiar, and not, as long supposed, a new and important departure in naval tactics. Corbett is not even inclined to credit its deduction to Clerk, as original, but thinks he must have learned of it through the French authors, or through his wide acquaintance with officers of the Channel Fleet.

Sir Charles Douglas' account of the battle is worth quoting, especially as his point of view seems to have been that of a gunnery expert and enthusiastic inventor, rather than a chief of staff.

He wrote to Middleton—with whom he seems to have corresponded regularly—from the *Formidable;* at sea, April 28, 1782:

. . . On the 12th, be it consigned to perpetual record in the annals of our long injured, and I hope, shortly avenged country, at break of day . . . the wind being E.S.E., our heads to the northward, and one of Mr. De Grasse's ships, towed by a frigate, square under our lee, with his bowsprit and foremast prostrate athwart his forecastle . . . the *Valiant* and *Monarch* were sent in chase thereof . . . that high spirited De Grasse edged down accordingly; . . .

When the French admiral had got far enough for this our purpose, the signal was made to call in the *Valiant* and *Monarch,* and they took their places in the line of battle with promptitude. . . . Admiral Drake's division [leading] . . . fetched the sixth or seventh ship of Mr. De Grasse's line. . . . In stemming towards them, the commander-in-chief . . . was fired upon by the eighth or ninth ships of Mr. De Grasse's line, but did not return it, the distance being too great, but began with the next; and by giving some little elevation to his guns, to good effect, still standing in a straight line, with a full sail, and angling in upon the enemy in order. to penetrate his line of battle, which under favour of. . . the smoke and the most dreadful fire of the Duke [Douglas' former command] our immediate second ahead, the *Formidable* . . . happily effected.

Behind the third or fourth ship astern of the *Ville de Paris* was the point where we cut through, the almost silenced intermediate ships having passed close to our starboard side, one almost in contact therewith, about a ship's breadth from us. The immediate effect which this penetration produced was the bringing all together, almost, if not quite, in contact with each other, the four ships of the enemy which were the nearest to the point alluded to, and coming up in succession. This unfortunate group, composing now only one large single object to fire at, was attacked by the *Duke,* the *Namur* and *Formidable* wearing round upon her heel; . . . From this moment, victory declared for the juster cause. . . . Shortly after sunset the French admiral's flag and ensign were struck on board the *Ville de Paris.* . . .

On May 7, 1747, in the action between Anson and De la Jonquière, De Grasse, then an ensign in the *Gloire,* was captured with his ship. Douglas, then a midshipman in the *Centurion,* served Anson as an interpreter and thus made De Grasse's acquaintance. In writing to Middleton, he spoke of De Grasse, who as a prisoner again became his shipmate, as "My old acquaintance of thirty-five years standing."

De Grasse—to complete our account of him—after being released, was tried by a French council of war and banished from the Court.

Douglas, who at his own expense had fitted the *Duke's* guns with locks (see Ch. XXI) and changed the carronade mountings to increase the horizontal angle of fire, goes on to say:

Such ships as have their guns fitted accordingly, derived unspeakable advantage from some improvements lately made in the use of naval artillery, their fire having been so very quick and so very well directed and extending so far to the right and left, that the French cannot comprehend how they came to lose so many men, and we so few, on the late bloody day. . . .

It was claimed by admirers of Clerk of Eldin, that he, or one of his friends, had given Clerk's first essay on Naval Tactics to Rodney, before

the latter sailed from England to resume his command, and that it was this essay which suggested to Rodney the idea of breaking the French line. On the other hand, Sir Howard Douglas always maintained that the credit was due to his father, Sir Charles, who, moreover, experienced much difficulty in persuading Rodney to steer through the gap in the French column. We now have the knowledge that signals for this maneuver had already been established in the Channel and on the North American coast, and this must have been well known to Rodney, as it certainly was to his chief of staff, although Rodney had provided no signal for it in his Fighting Instructions. But the question of providing one must have been discussed, because when Rodney went to Jamaica about the end of April, leaving Hood in command, the latter on April 27, according to Corbett, added a signal to the Additional Instructions which read, in part:

> When standing toward the enemy in line of battle, on a contrary tack, for the leading ship to lead through his line, in order to cut off his van and rear . . . or for any particular ship to lead through his line, etc.

The English Admiralty was greatly heartened by De Grasse's defeat. Both Rodney and Hood were elevated to the peerage and monuments to those who died in this action were placed in Westminster Abbey.

Only a month later, however, Rodney was on the defensive because Admiral Vaudreuil who succeeded De Grasse was joined by a Spanish squadron of 15 of the line with a large convoy of supply ships. However, Vaudreuil did not take the offensive.

Rodney, owing to the fall of the Ministry which appointed him, was detached in July. Only one other signal of importance was added by his successor Pigot to the orders for the West India fleet. It enabled the admiral to act, regardless of whether his line was well formed or parallel to the enemy:

> If at any time more surely to bring on, or with greater efficacy to continue an engagement, the commander-in-chief would have his ships (independently of each other) steer for and engage those of the enemy happening to be opposite to them for the time being etc.

It is strange that the General and Additional Instructions, in their final form (before they were replaced by a signal book) as issued by the Admiralty, should have been lost. A complete set was found in the Graves Collection, issued by Rodney to Graves himself, then captain of the *Bedford,* off Barbados, February 19, 1782. Prior to the discovery

of the Graves Collection in 1905, however, Mahan had brought to the attention of the British Admiralty a copy found in our Navy Department, partly in manuscript. Corbett says that the printed portion of these is the long sought set which Rodney used, previous to the "Battle of the Saintes."

Mahan says that all heart had been taken out of the French and Spaniards by their various failures, but their continued numerical superiority, "inefficiently though it had been used . . . weighed heavily upon the imagination of the British Admiralty, which had now abandoned all hope of subduing the American Colonies."

The English Channel Fleet—the so called Grand Fleet—had been on the defensive in home waters for three years.

The best admirals would not serve under Sandwich. Neither Hardy nor Geary was enterprising and the Admiralty was timid.

In the new Ministry formed in March, 1782, Admiral Keppel succeeded Sandwich as First Lord. Howe returned to active service and was given command of the home fleet on April 20, with Vice Admiral Samuel Barrington as second-in-command and Rear Admiral Kempenfeldt third, with his flag on the *Royal George* (100).

Howe was more enterprising than his predecessors. He protected British trade, captured a convoy of the enemy en route for India with supplies and re-enforcements, and held the Dutch in check in the North Sea, preventing their junction with the French and Spanish.

While he lost an outward bound American convoy to the Allies, he escaped from their forces (36 of the line under Don Luis Cordova and De Guichen) in July, by taking his fleet of 25 sail through the perilous passage between Scilly and Land's End. Later, a gale having driven the Allies to the south, Howe regained his home coast. His last exploit of the war was the relief of Gibraltar with supplies and re-enforcements for one year, in the face of a numerically superior allied fleet.

While Howe's expedition of 137 transports and supply ships, 34 of the line, and a dozen frigates was being assembled, the *Royal George,* then being heeled at Spithead for under-water repairs, capsized at her anchors, carrying down with her about 800 people, including Kempenfeldt himself.

His career, at this time, seemed tragically cut short, just as it had reached the beginning of fulfilment, after years of comparative obscurity and subordination. But Kempenfeldt's name, immortalized in Cowper's verse, is better and more widely known than those of many of

his fellow officers who were given far greater opportunities, and though

"Kempenfeldt is gone,
His victories are o'er
And he and his eight hundred
Shall plough the waves no more."

his fame has been secured forever.

On the signing of peace, Howe became First Lord for a few months, relieving Keppel, and again on December 31, 1783, he succeeded Keppel for the second time until July, 1788.

Among other eulogies of him, Mahan says, "The utmost of skill, the utmost of patience, the utmost of persistence, such had Howe."

CHAPTER XIX

SUFFREN VS. HUGHES IN EAST INDIES, 1782-1783

WHEN THE war at sea had practically ceased in the Atlantic and adjacent waters, England and her chief antagonist, France, were still fighting fiercely for control of the East Indian seas.

Communication in either direction requiring four to six months, results in the home theatre did not immediately affect events in the Far East. Thus they can be treated separately.

In March, 1779, Rear Admiral Edward Hughes had been despatched



FIG. 56.—Admiral Suffren. (*Courtesy Redwood Library and Athenaeum, Newport, R.I.*) Admiral Sir Edward Hughes. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

to India with a small squadron, 6 ships in all—one 74 and five 64s. French ships were sent only occasionally until 1781, but the French Admiral Suffren had also sailed in March, 1779, with three 74s and three 64s to frustrate an English expedition under Commodore Johnson intended for an attack on Cape Colony, then a Dutch possession.

The two squadrons met—unexpectedly to both—at Porto Praya, in

the Cape Verde Islands. The English fought at anchor and an indecisive engagement resulted.

Suffren reached Cape Colony first, landed troops, secured the Cape against attack and after a two months' stay, sailed for the Île de France (Mauritius). After two months there, he sailed as second in command

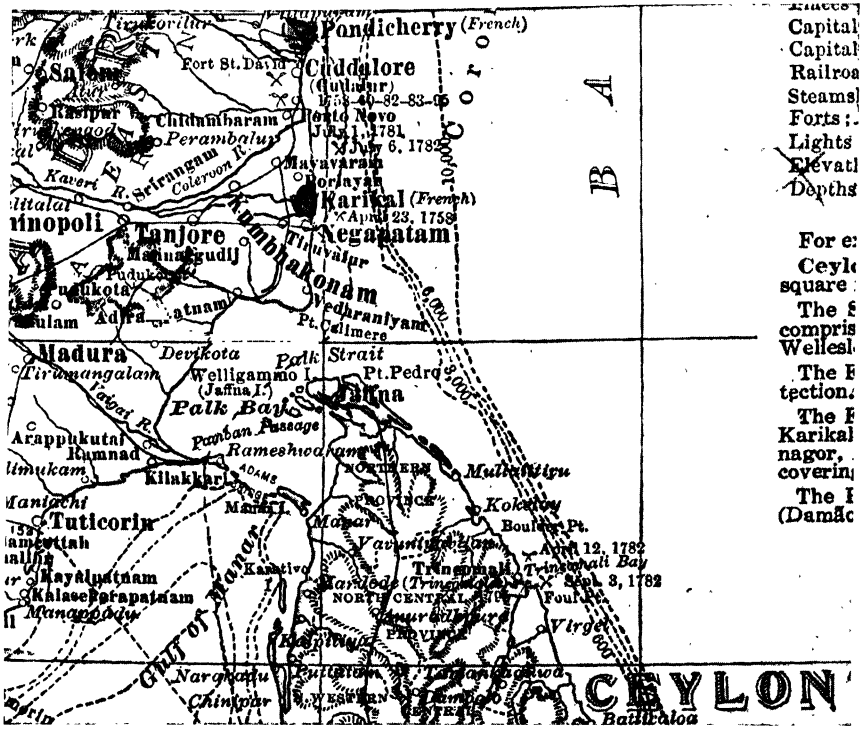


FIG. 57.—Southern India. (*From "The Century Atlas of the World," D. Appleton-Century Company, Inc., New York*)

of a larger squadron, three 74s, seven 64s, and two 50s, under the Comte d'Orves. Their destination was the Coromandel coast in Hindustan, on the southwest side of the Bay of Bengal (Fig. 57). The death of d'Orves left Suffren in command.

Suffren appeared off Madras about the middle of February, 1782, where he found the somewhat smaller English squadron at anchor. Hughes had two 74s, one 68, five 64s, and one 50. He had been on the station since January, 1780.

Suffren was convoying transports with troops and supplies and had

taken several prizes. He may have expected to find Madras in possession of the French.

Sighting the English squadron, Suffren stood south for Pondicherry, a French possession about 60 miles from Madras. Hughes followed, attacked the convoy, and recaptured some of the prizes and a few of the French transports. He also had it in mind to prevent an attack by Suffren on Trincomalee in Northern Ceylon, which he had recently taken from the Dutch and which afforded him an excellent base of operations.

Suffren tried to force an action, but could not bring it to pass until after a chase of nearly two days in the direction of Trincomalee.

On the afternoon of February 17, after several shifts of wind, Suffren found himself in an attacking position to windward. With the wind about N.N.E., Hughes formed his line on the port tack. Suffren attempted to double on him with 6 ships to windward and six to leeward, but lack of skill, or understanding, on the part of his captains, made his maneuver ineffective.

Two of his ships did attack from leeward, but a shift of wind nearly eight points to starboard placed Hughes' van to windward. After the English van came into action, Suffren hauled off after an indecisive engagement of about an hour.

Casualties in the squadrons were about equal, somewhat over 100, but the material damage was greater to the English.

The unusual feature of the action was that the *French attacked.* The two squadrons re-fitted, Suffren at Pondicherry, Hughes at Trincomalee. They met again off Ceylon on April 12, the day of Rodney's battle with De Grasse. On this occasion Hughes had three 74s, one 68, six 64s, and one 50; an increase of two of the line, giving him 11 to Suffren's 12. Suffren equalized the line by directing his twelfth ship to take station on the lee side of the British rear.

Hughes was bound for Trincomalee to strengthen it, neither seeking nor shunning attack. Overtaking, and having the wind, Suffren intended to make a parallel attack, but his approach was irregular. His own flag, in the center, with three adjacent ships, came to close action, but the van and rear were engaged at too great distance. His flagship became unmanageable and drifted into the British column.

The battle centered around two British ships, the *Superb* (flag) and the *Monmouth,* and three French, the *Heros* (flag), the *Orient,* and the *Brilliant.* It lasted from a little after noon until about 3:40 P.M. When the British wore, the French followed, attempting to take possession of

the *Monmouth,* but failed. Both squadrons soon anchored, neither in condition to resume the fight.

This was a *second French attack.*

The losses on both sides were heavy, especially in the center. The British totaled 137 killed and 430 wounded; the French, 137 killed and 357 wounded. Clowes calls the battle between the centers one of the bloodiest in naval annals.

For a week they remained at anchor, only two miles apart, both busily re-fitting. At the end of the week, Suffren offered battle, but did not attack. The *Monmouth* was in such bad condition that Hughes refused to move.

Suffren then sailed for a position off Ceylon, which covered his own convoys from Europe and flanked Hughes. The latter finally reached Trincomalee, where he remained for two months, sailing, June 23, for Negapatam, about 75 miles south of Pondicherry and 120 miles north of Trincomalee.

Suffren, in the meantime, having taken some British transports, was off Cuddalore, a few miles north of Negapatam. On July 5, he appeared off Hughes' anchorage. Hughes got under way in the southwest monsoon and stood southward during the night to gain the wind, in which he was successful, finding the French at anchor the next morning, well to leeward.

On this occasion, the squadrons had 11 ships each, on account of an injury to one of the French 64s, the *Ajax,* in a squall the preceding day.

Suffren, sighting Hughes, immediately got under way and formed column on the starboard tack, close-hauled, heading about S.S.E. to await the British approach. Hughes formed his line of battle on the same tack and when abreast of the French, bore up, to get within gun range.

The action began about 11 A.M., with the British van engaged closer than the center and rear. The fourth French ship soon lost her mainmast and hauled out to leeward and astern.

About 12:30, the wind came out a little on the port bow. Most of the British paid off to starboard and the majority of the French to port, thus separating the combatants, with the exception of four British and two French ships which paid off toward each other, and in such manner that each of the Frenchmen found himself between two of his adversaries.

Suffren came to the aid of his two ships, wearing the rest of the squadron. Hughes also wore for the same purpose and gave orders to

chase, but two of his vessels being disabled, he annulled the signal and forming column on the port tack returned to Negapatam, while Suffren anchored ten miles to the northward.

The British losses were 78 killed and 233 wounded. The French had 178 killed and 691 wounded.

Suffren the next day went to Cuddalore, where he re-fitted and by July 18 was again ready for sea. On August 1, he returned to Ceylon for re-enforcements and a convoy of supplies and troops. Hughes did not pursue.

Suffren, having been joined by a 74 and a 60 and 600 troops, sailed for the British base at Trincomalee, and captured it August 31, after operations covering six days.

Hughes arrived off Trincomalee September 2, with his squadron increased by one 64. Suffren had re-embarked his men and the guns used on shore and was ready to meet him.

Hughes had 12 ships in his squadron and Suffren 15, including a 36-gun frigate.

Not knowing that Trincomalee had changed masters, Hughes stood for the entrance, heading about S.S.E., close-hauled on the starboard tack. Then, making out French flags on shore, he changed course to E.S.E. and shortened sail.

Suffren came out to pursue, in line of bearing and to windward. Hughes wished to draw the French to leeward of the port, and kept away, regulating his speed by his slowest sailers.

Suffren, in line of bearing, could not keep formation. He gained, however, and by 2 P.M. was in position to bear up and engage, running free, with the wind about two points abaft the starboard beam.

At 2:30, still badly formed, Suffren gave the order to attack at pistol shot range, firing a gun to enforce obedience. Firing the gun was misunderstood by the crew of his own ship, which immediately let go a broadside, and the engagement began, the French in bad order and the English in good formation. Some of the French ships blanked the fire of others.

Suffren had detached two ships to double on the British rear. These were unsuccessful, and in a light wind shifting slowly from southwest, the British followed it around to starboard, enveloping the center of Suffren's confused squadron. At 5:30, a sudden shift to E.S.E. came on. Hughes wore his fleet and continued the action on the port tack to leeward. Some of the French van meantime had towed their heads around with boats and managed to get between the French center and

the British. Hughes then hauled off. Fighting to leeward, he had suffered at the water line, as well as in masts and rigging.

Shut out from Trincomalee, with the monsoon about to change, making the east coast of Ceylon a lee shore, he went to Madras, reaching there September 9. Suffren got back to Trincomalee September 7, losing a 74 at the entrance by grounding.

This engagement was less severe than the others; the British losing 51 killed and 283 wounded, the French 82 killed and 255 wounded.

With the change of the monsoon, naval operations on the east coast ended for the winter. Hughes went to Bombay and Suffren to Sumatra.

The next spring, Hughes, now a Vice Admiral, had 18 of the line against Suffren's 15 and came to the east coast in April, 1783, to assist in the reduction of Cuddalore (near Pondicherry), which had received re-enforcements from France.

Suffren's fleet came from Trincomalee to raise the naval end of the siege. Hughes, not wishing to engage while at anchor, got under way on Suffren's approach and spent three days trying to get to windward.

Suffren anchored near the town, in Hughes' absence, and embarked 1,200 troops to assist his crews at the guns. He then got under way, June 18, and the two fleets maneuvered for the advantage of the wind until the 20th, when Hughes, farther off shore, with a west wind, determined to accept battle to leeward, and formed his battle line on the port tack.

Suffren did the same, but this time he was careful to be in exact order before bearing up to engage. He brought to, as designed, on the British weather beam, at point blank, and began an engagement which lasted from 4 to 7 P.M., when the two fleets separated.

The British loss was 99 killed and 434 wounded. The French lost 102 killed and 386 wounded. No ships were lost on either side. Hughes lay to after the fight. Suffren anchored the next morning about 25 miles north of Cuddalore, and off the town the day after, much to the distress of the British land forces besieging it.

Hughes reported several ships disabled, 1,121 men down with the scurvy, and a shortage of water. He sailed for Madras.

This was the last battle of the war, fought five months after the preliminaries of peace had been signed (Jan. 20, 1783).

Mahan says,

> . . . it was a French victory, strategically and tactically; tactically, because the inferior fleet held its ground and remained in possession of the field; strategically, because it decided the object immediately at stake; the fate of Cuddalore . . . with

poorer instruments, both in men and ships, the former [Suffren] overcame the latter [Hughes].

This engagement and others in the Far East, as well as in other fields of operation, during the five years' struggle, showed that the guns of that day could not sink the ships that carried them.

It also showed that the French, when attacking, or awaiting the attack, as conditions indicated, were fully equal to the British in battle, and in the engagement just cited superior to them. While in the other theaters of war, the *defensive,* adopted as a policy, finally resulted in defeat.

Suffren felt that his captains lacked skill in handling their ships. On that account his plans for doubling failed more than once. After the battle off Trincomalee September 2 he wrote: "If I do not change several captains it is because I have not the men to replace them. It is dreadful to have had four opportunities to destroy the English fleet and they are still in existence."

Both Hughes and Suffren were veterans. Hughes was a captain in 1758 and a Vice Admiral when he last fought. Suffren, born in 1726, saw his first service in the war of 1744-48. On his return to France in 1783, he was received with the highest honors and made a Vice Admiral. He was killed in a duel in 1788.

CHAPTER XX

BRITISH FIGHTING INSTRUCTIONS: 1781-1783

EVEN AS the Admiralty's *first* printed set of Fighting Instructions, compiled by Admiral Russell in 1691, lay undiscovered until Clowes unearthed a set in Holland, so it was with the *last* printed Instructions issued by the Admiralty, until the discovery of a set in our Navy Department by Mahan. This set was supplemented later by copies found in the Graves Collection. The date of printing is not given, but the Instructions were in force between 1781 and the close of our Revolutionary War in 1783.

Corbett quotes the following from Mr. Charles W. Stewart, Superintendent of the Navy Department library:

> . . . I have to inform you that we have a volume in this office which purports to contain Rodney's fighting Instructions, with the title page as follows: "Sailing and Fighting Instructions for his Majesty's Fleet."
>
> The publication is not dated. There are about twenty-five pages (eight in MS.), size 9 by 14.

Corbett printed the Fighting Instructions, only, in Vol. XXXV of the Navy Records Society's publications, 1908.

As had long been the custom, the Fighting Instructions were divided into two parts: General and Additional Instructions.

For convenience, tabulated lists of day, night, and fog signals were furnished with the Instructions by all admirals.

The first official use of the word "signal book" seems to have been by Admiral Howe in 1777. In this book, as already described, Howe included the Sailing and Fighting Instructions. His work on these culminated in his "Signal book for the ships of war," with numeral signals, issued prior to June 1, 1794. With modifications, this was the official British signal book to the close of, and beyond, the sailing ship period.

The General Fighting Instructions, as found in the Navy Department's copy of 1782, or earlier, comprised 32 printed articles.

The instructions provided for two formations only; column and line:

I. Fleet to draw into a line of battle, one ship ahead of another.

> When the Admiral would have the fleet draw into a line of battle, one ship ahead of another (according to the method given to each captain) he will hoist an Union flag at the mizen-peak and fire a gun and every flagship in the fleet is to make the same signal.

II. Ditto, abreast of each other.

When the Admiral would have the fleet draw into a line of battle one ship abreast of another (according to the method given to each captain) he will hoist an Union flag and a (blue) pennant (under it) at the mizen peak and fire a gun and every flagship in the fleet is to do the same.

Articles III, IV, and V prescribed signals to squadrons or divisions to tack and "endeavour to gain the wind of an enemy."

Article VI prescribed a signal for the ships of the fleet when the Admiral was to leeward, to take position in his "wake or grain."

Article VII prescribed a signal for ships to leeward of him when he was to leeward of the enemy, to form line of battle in his wake or grain after he bore up sufficiently for them to do so.

Articles VIII to XII, and also XIV to XVI, relate to tacking of ships and sub-divisions, flagships taking position on the Admiral and signals for making sail and lying to, "frigates of the Admiral's squadron to come under his stern."

The signal for battle was in Article XIII:

As soon as the Admiral shall hoist a red flag on the flag-staff at the fore topmast head, and fire a gun, every ship in the fleet is to use their utmost endeavour to engage the enemy in the order the Admiral has prescribed unto them.

Article XVII. Instructions to be observed in engaging the enemy.

If the Admiral see the enemy's fleet stand toward him and he has the wind of them, the van of the fleet is to make sail till they come the length of the enemy's rear, and our rear abreast of the enemy's van; then he that is in the rear of the fleet is to tack first, and every ship, one after another, as far as they can throughout the line; and if the Admiral would have the whole fleet (prepare) to tack together, the sooner to put them in a posture for engaging the enemy, then he will hoist a Union flag on the flag staves at the fore and mizen topmast heads and fire a gun (and no ship or particular part of the fleet whatsoever shall presume to tack or wear, whilst in action, except by signals, or order from the Admiral so to do) and whilst they are in fight with the enemy, to keep within half a cable's length of each other, or, if the weather be bad, according to the discretion of the commanders.

In addition to the above XVII article. Very shortly after the signal for the whole fleet to prepare to tack together, agreeable to the said XVII article, has been repeated, as above directed, the commander-in-chief will fire a second gun (which is not to be repeated), at which instant of time the helms of the whole fleet are to be put a-lee.

Article XIX. How to engage the enemy when the fleet has the wind of them.

If the Admiral and his fleet have the wind of the enemy, and they have stretched themselves in a line of battle, the van of the Admiral's fleet is to steer with the van of the enemy and there to engage them.

Article XX. Not to fire until within point-blank.

Every commander is to take care that his guns are not fired until he is sure that he can reach the enemy upon a point blank and by no means to suffer his guns to be fired over any of our ships.

Article XXI. Not to pursue a small number of the enemy till the main body retreats or is disabled.

None of the ships in the fleet shall pursue any small number of the enemy's ships till the main body be disabled or run.

Article XXII. When a ship is in distress.

If any of the ships of the fleet are in distress and make the signal, which is a weft with the jack or ensign, the next ship to them is strictly enjoined to relieve them.

Article XXIII. The Admiral or any flagship in distress.

If the Admiral or any flagship should be (hard pressed or) in distress (in battle) and make the usual signal, the ships in the fleet are to endeavour to get as close up into a line between him and the enemy as they can, having always an eye to defend him, if the enemy should come to annoy him in that condition.

Article XXIV. No ship to go out of the line without leave, and the next ships to close up the line.

No ship in the fleet shall leave his station, upon any pretence whatsoever, till he has acquainted his flag, or the next flag-officer to him, with the condition of his ship and received his direction herein; but in case any ship shall do so, the next ships are to close up the line; and if any commander shall be wanting in doing his duty, his flag, or the next flag officer to him, is immediately to send for the said commander from his ship and appoint another in his room.

Article XXV. When a flagship is disabled.

If any flagship be disabled, the flag may go on board any ship of his own squadron or division.

Article XXVI. The whole fleet to chase.

If the enemy be put to the run, and the Admiral thinks it convenient the whole fleet shall follow them, he will make all the sail he can himself after the enemy, and take down the signal for the line of battle, and fire two guns out of his fore-chase; and all the flag-ships are to do the same; then every ship in the fleet is to use his best endeavour to come up with the enemy, and lay them on board.

Article XXVII.

If the Admiral would have any particular flag-ship and his squadron or division give chase to the enemy, he will make the same signal that is appointed for the flag-ship's tacking with his squadron or division and weathering the enemy.

Article XXVIII.

When the Admiral would have given over chase he will hoist a white flag at the fore topmast head and fire a gun.

Article XXIX. Prescribed signals to flagships of squadrons or divisions to cut or slip cables and endeavor to weather an enemy.

Article XXX. Prescribed signals to flagships of squadrons or divisions to form column or line, with their commands.

Article XXXI. Prescribed signals for line of battle in column at one or two cables distance and directed who should lead.

Except to require forming a line of battle and directing how to engage from windward on the same and opposite tacks, the General Instructions left an admiral free as to other methods of attack and conduct of an action. Careful provision was made for the protection of flagships in distress, should a flag officer indicate his distress by the signal prescribed.

The Additional Instructions, which admirals could alter, and to which they could add, provided for other formations than column and line, and forms of attack other than parallel columns, ship to ship. They comprised 38 Articles.

Only such Articles as prescribed new formations or new forms of attack are quoted in full.

Articles I and II contained signals for regulating distance between ships in column and line.

Article III. To draw into a line of battle and bear on particular points of the compass from each other [lines of bearing].

When the commander-in-chief would have the squadron draw into a line of battle (at the distance of two cable lengths asunder) and regulate themselves by bearing on some particular point of the compass from each other, always steering (with precision while so formed) the same course as the commander-in-chief, he will make the signal expressed against the points of the compass (in the following table and fire a gun).

Articles IV to XIII prescribed signals for changing course without, and with, change of bearing; tacking; regulating distance in column; forming double column; bringing-to with main topsail instead of head sails to the mast; and changing stations.

Article XIII. This Article, as printed, merely provided that when the fleet was in line of battle, all signals made by the Admiral to a particular unit were to be repeated by the flagships between him and that unit.

The Article was supplemented by an important, but obscurely worded

manuscript addition which has no relation to the printed part of the Article and might better have been given another number. Corbett thinks it was the outcome of the failure of Rodney's attempt on De Guichen's rear, on April 17, 1780, which led to the court-martial of some of his captains. The manuscript addition reads:

. . . And when at any time the signal for inverting the line of battle (or any other signal, the fleet being in line of battle, or otherwise) shall have been made, though hauled down, after having been duly repeated and acknowledged, its operation is still to continue in force until it be annulled by the annulling flag, or until it be naturally superseded by the purport of some subsequent signal. But the signals for the line of battle, ahead or abreast, and for engaging the enemy, are to be (respectively) kept flying so long as the commander-in-chief shall judge proper to have the ships continue in line, or to continue engaging the enemy. Sailing in two or three lines, according to the 34th Article of the Additional Fighting Instructions, being considered as a kind of sailing order, the signal for the fleet so to form itself is to be hauled down, when acknowledged, but to continue in force until annulled by the annulling flag, or until superseded by the meaning of some subsequent signal.

Article XIV. "The whole squadron being in chase, to engage the enemy in succession as they may happen to get up." (This is Rodney's Article which he issued to his fleet, in 1780, when he sailed for the relief of Gibraltar.)

If the commander-in-chief should chase with the whole squadron and would have those ships that are nearest attack the enemy, the headmost opposing their sternmost, the next passing on under the cover of her fire and engaging the second from the enemy's rear, and so on, in succession as they may happen to get up, without respect to seniority or the prescribed order of battle, he will hoist a Dutch flag at the main top-gallant-mast head, and fire a gun, keeping at the same time the signal for chase flying. When each ship as they get up are to engage their opponents, and on no pretence to quit them, until they are so disabled that they cannot get away or submit; if to engage to windward the above flag as specified; if to leeward a blue pennant under the same flag.

Article XV. "The whole squadron being in chase, for some of the headmost ships to draw into a line of battle ahead and the rest to strengthen that line as they get up."

If at any time, when the whole squadron shall be in chase, the commander-in-chief would have a certain number of ships that are nearest the enemy draw into a line of battle ahead, in order to engage the ships in their rear, endeavouring at the same time to get up with the van, he will hoist a red flag with a white cross at the main top-gallant-mast head and fire one gun if he would have five ships draw into line ahead of each other, three guns if he would have seven ships draw into line ahead of each other.

Whereupon those ships are immediately to form the line without any regard to seniority, or the general form delivered, but according to their distances from the enemy, viz., the headmost and nearest ship to the enemy is to lead, and the sternmost to bring up the rear, that no time may be lost in the pursuit; and the rest of

the ships are to form and strengthen that line as they get up, without paying any respect to the prescribed order of battle.

Article XVI. Directed the leading ship, when beating to windward, to hoist a pennant when she could weather the enemy's van, and the rear ship to do the same, if so directed by the commander-in-chief.

Article XVII. This Article describes the standard British approach: "When in a line of battle ahead to windward of the enemy, to lead down to them, and every ship to steer for her opponent."

If the squadron should be sailing in a line of battle to windward of the enemy, and the commander-in-chief would have the course altered in order to lead down to them, he will hoist an Union flag at the main top-gallant-mast head, and fire a gun. Whereupon every ship in the squadron is to steer for the ship of the enemy, which, from the disposition of the two squadrons, it must be her lot to engage, notwithstanding the signal for the line ahead will be kept flying; making or shortening sail in such proportion as to preserve the distance assigned by the signal of the line, in order that the whole squadron, may as near as possible, come to action at the same time.

Article XVIII is the companion of Article XIV and was issued by Rodney on the same date. "The headmost ship to attack the enemy's rear, and so on in succession till the sternmost become the leader and opposed to the enemy's van."

If the squadron should be to windward of the enemy (or in any other position that will admit of it) and the commander-in-chief would have the headmost ship lead down out of their line-of-fire and attack their rear, he will hoist a Dutch flag at the main top-gallant-mast and fire a gun. The second from the leader is then to pass on under cover of her fire and attack the second ship from the enemy's rear; and so on until the sternmost ship become the leader and opposed to the enemy's van. If to engage to windward, the above flags as mentioned; if to leeward, a blue pennant under it.

N.B. You are referred to the latter part of the 14th Article respecting your opponents when up with them.

Article XIX (briefed). Signal to come to a closer engagement.

Whereupon every ship is to engage the enemy as close as possible.

Article XX. Signal for equalizing the line.

Ships signaled to quit the line to take station to assist or replace; the strongest to be the first to replace a disabled ship in the line. [Audley; 1530. Vernon; 1740]

Articles XXI to XXIII. Provided signals for attack on a convoy and for priming fire-ships, and directed ships to be kept always ready for action and to have a boat manned to ward off, or assist, fire-ships.

Article XXIV. For the three-decked ships to form in the van or rear. Others to close up.

Article XV (briefed). To shorten distance between ships.

Articles XXVI, XXVII, XXVIII (briefed). To attack the enemy's center, rear, and van.

When the commander-in-chief means to make an attack on the enemy's center, he will hoist a Spanish jack at the fore topgallant mast head, with a red pennant over it. A Spanish jack and white pennant to attack the rear. A Spanish jack and blue pennant to attack the van.

Articles XXIX and XXX. Provided signals for which admiral should lead in action and for closing van or rear on the center. Also directing that no ship should chase during action unless the enemy's main body is beaten, or a signal to chase is made.

Article XXXI. Provided necessary signals for forming a temporary line of battle with such ships as might be in company with the commander-in-chief and assigning ships to divisions. This article also provided that "In action all ships are to wear red ensigns (and proper English pennants)."

Article XXXII (briefed). "If at any time from baffling winds or other causes, I think it expedient for my division to lead the fleet into action in line of battle for attacking the enemy, I will etc. . . ." (This order was issued by Rodney when he was trying to bring De Grasse to action.)

Article XXXIII. Provided a signal for inverting the order of battle.

Article XXXIV. Provided signals for forming a fleet in two or three columns and prescribing the distance between ships in columns, the interval between columns, and the bearing of the columns from each other. Frigates, sloops, and fire-ships were to follow in column astern of their repeating ships, and these to bear on the weather quarter of their divisions.

Article XXXV. To break the line. This article was issued subsequent to Rodney's detachment in 1782, after the Battle of the Saintes.

When standing towards the enemy in line of battle on a contrary tack, for the leading ship to lead through his line in order to cut off his van or rear, a flag chequered blue and yellow will be hoisted at the fore topgallant masthead; and when so standing towards an enemy or being actually in battle, for any particular ship to lead through his line and all the rest stationed astern of that ship to follow in due or close succession to support her for the same purpose, a flag quartered red and white (with such particular ship's signal displayed) will be hoisted at the fore or mizen topgallant masthead, respectively. If at the mizen topgallant, or mizen topmast head, a red pennant will be hoisted over said flag.

Article XXXVI.

If at any time, more surely and speedily to bring on, or with the greater efficacy

to continue an engagement, the commander-in-chief would have his ships (independently of each other) steer for, and respectively engage those of the enemy happening to be opposed to them for the time being, he will hoist a flag, half blue, half yellow, at the fore topgallant masthead, with, or without, firing a gun, as may be proper.

Articles XXXVII and XXXVIII. Provided signals for wearing together and in succession.

This completes the description of all methods of attack for which signals were provided in the final form of the General and Additional Fighting Instructions.

It is to be noted that there is no signal for doubling, nor for any of the following, contained in the Battle Signals of the Channel Fleet.

(a). Attacking the enemy's rear in succession (firing and falling off).

(b). For particular ships to attack any number of enemy ships seeming to be kept separate from the body of the fleet.

(c). For stretching out the line, when inferior in number, so as to engage the enemy's van and rear and prevent doubling.

(d). To re-enforce the van, center or rear; although massing heavy ships partly accomplished this.

It is also to be remarked that on the West India station no signals were provided for.

(e). Raking enemy van or rear with ships not needed to equalize the line. Arbuthnot provided raking signals on the North Atlantic station, in 1781, as did the Admiralty's Additional Instructions of 1778.

Corbett says that Kempenfeldt, in the Channel Fleet, provided for every known form of concentration and extended the idea of raking, or "crossing the T" by providing a signal, "For particular ships or *divisions* to rake the enemy's van," and that he also had a signal for long range firing.

(f). To fire single round shot leisurely at the enemy as soon as within reach, aiming at their masts, the guns to be pointed by some of the best marksmen.

Rodney believed in concentrating his whole force on part of the enemy, thus precluding the use of a part of it for doubling, raking or breaking through, except as incidental to massing on a portion of the enemy.

Corbett quotes Rodney as making the following criticism of Graves at the Chesapeake:

His mode of action I will never follow. He tells me his line did not extend as

far as the enemy's rear. . . . If the enemy had extended their line to any considerable distance, by contracting his own, he might have brought his nineteen against the enemy's fourteen or fifteen and by a close action totally disabled them before they could have received succor from the remainder.

In a volume of Clerk's *Tactics,* Rodney writes of himself and his ideas, thus:

It is well known that attempts to bring to action the enemy, ship to ship, is contrary to common sense. . . . During all the commands Admiral Rodney has been entrusted with he made it a rule to bring his whole force against part of the enemy's, and never was so absurd as to bring ship against ship. [He added] I suppose every Admiral will carry his fleet down in a standing line . . . and if the enemy's line is extended, will bring his whole force against part of the enemy's.

Rodney also advocated when the enemy was seeking to avoid action, to mass the heaviest ships in the van to attack his rear. This assumed that the enemy was retreating in column.

A study of Rodney's actions shows that he did not succeed in carrying out his ideas on concentration. This was partly due to his own failures to make use of available signals and partly because he was continually baffled by skilful opponents.

CHAPTER XXI

SHIPS AND GUNS IN THE 18TH CENTURY

NEARLY ten years of peace at sea followed the end of the War of the Revolution in 1783.

The losses in ships by each belligerent—whether by capture or destruction (by the enemy or otherwise) during the eight years after 1775 —are quoted from Allen (privateers are not included).

Guns	*French*	*Spanish*	*Dutch*	*American*	*British*
110	1				2
80		1			
74	9				8
70		7			1
64 to 60	9		2		5
56 to 40	4		2		8
40 to 30	17	7	1	13	19
30 to 20	11	4	1	32	35
Sloops	11	5	2	40	103
Totals	62	24	8	85	181

Grand total of losses by countries fighting against the British, 179; British total, 181. Losses of ships of the line (60 guns or above) 29 and 16 respectively.

This was by no means a net loss on either side, considering the total numbers in commission during this war. At its close, the British had in commission 112 of the line and 150 frigates, and more than 100 ships building. The number of seamen voted for 1783 was 110,000.

Similar data for the French, Spanish, and Dutch are not at hand. The American navy was wiped out.

There were no ships much larger, and none carrying more guns, than the French *Soleil Royal* (110), which fought and was lost at La Hogue in 1692.

Seventy-fours were the standard ships of the line in all navies. Their tonnage was probably equal to earlier first-rates.

Poops and forecastles were less prominent than at the end of the 17th century. Ships handled better and were more weatherly.

The coppering of ships' bottoms was spreading fast in the British navy. Coppered ships were popular. Rodney *demanded* them. In this the English were in advance of the French and coppering served some-

what to equalize the naturally unequal sailing rates of the ships of the two navies.

Long guns and gun carriages showed little change. In 1752, guns on British men-of-war were reported to be 15 calibers in length. The axis of the trunnions continued to be in the plane of the bottom of the bore.

In 1732, the French had sights for guns. The English had never had them, except—and this was probably also the case with the French—a notch at breech and muzzle for the line of sight.

In England, the Army Board of Ordnance provided all guns for navy as well as army.

Clowes says of the British Navy that

> gun locks and tin firing tubes [primers] had been used in a few ships during the latter part of the Seven Years War [1756-63] but the general feeling of the service was against them. The old match was reverted to until after 1780, when the flint-lock with an improved primer became common, though the match tub was retained for use in case of a break-down.

Muller, in the 1780 edition of his *Treatise on Artillery*, says English primers were made of tin, and the French, of reeds.

Tin primers were 5 or 6 inches long and .2 of an inch in diameter (just large enough to enter the vent) with a cap on top. The tin was cut slanting at the bottom and the point strengthened with solder so that it was both priming wire and primer. A quick match filled the body of the primer, surmounted by a cap filled with mealed powder, moistened with spirits of wine. It could be fired by a slow match or the spark from a flint-lock. Each primer cap had a paper cover to protect it until needed for use.

Muller considered that French reed-primers were quicker in firing, having a hole the size of a knitting needle through their length, but they required a priming wire to pierce the powder charge before inserting the primer.

English primers corroded in salt air, which caused Sir Charles Douglas to substitute goose quills in ships that he commanded.

The use of primers accelerated gun fire to a degree. Inserting a primer took less time than filling a touch-hole with powder and laying a train to it. This was true, whether the powder was fired by a lock or a match. But firing by a lock-string in the hands of the gun captain had other advantages.

After laying a gun on shore, the time of the application of the match to the priming powder had no effect on the fall of the shot. But an entirely different condition existed on the moving gun platform of a ship. The pointer, or gun captain, must determine by his line of metal, or

other form of sight, just when the gun is about to bear and anticipate this by pulling the lock laniard. His time interval is less variable than the application of the match to the powder train by another person after receiving the order.

The use of lock primers increased both rate and accuracy of fire.

The difficulty in the way of using locks was the prevention of their being put out of action by the blast from the vent. It was many years before the problem was solved, but the use of locks was common in both the French and English navies after 1780.

Captain Garbett, R.N., (*Naval Gunnery,* 1897) says that Sir Charles Douglas, at his own expense, fitted the *Formidable,* Rodney's flagship, with flint-locks, as he had previously fitted the *Duke* when under his command in the Channel Fleet, and that in the great action against De Grasse in 1782, the quick and efficient firing of both the *Duke* and *Formidable* was so conspicuous that all further opposition to the introduction of locks was borne down.

Douglas himself wrote,

> . . . not a single goose-quill tube failed, nor did a gun require being wormed, so long as flannel-bottomed cartridges lasted on board the *Formidable* or *Duke;* nor of the 126 locks on board the latter (every lower-decker having two) did a single one fail. One Kentish black flint to each, served during the entire engagement, in one lock excepted. . . .

One of the objections to tin primers was that they were apt to fly out and wound the gun crews. After the battle of Quiberon they had been described as "very pernicious things."

Douglas had also contrived a means of increasing the train of his guns. This, with the increased rate of fire due to his locks and primers, enabled him to fire "never less than two, and sometimes three broadsides at each passing Frenchman before such Frenchman could bring a gun to bear on him."

Douglas goes on to say that the *Ville de Paris,* De Grasse's flag-ship, edging down on the *Arrogant* (74), Captain Cornish, and thinking herself out of the line of fire, was much surprised to receive a broadside when she was but four points on the *Arrogant's* bow. The ordinary gun-port would not permit train more than 30 or 35 degrees forward and abaft the beam.

Rodney was so much impressed with the improvements made by Douglas that he asked the Admiralty to appoint an Inspector-General of Artillery for his fleet, to continue the study of gunnery and gun fittings.

Douglas is also credited with the introduction of flannel to replace

paper for powder bags, although in his letter to Middleton about the action with De Grasse, he mentions flannel-bottomed bags, only.

Powder-bags, as we have seen, were made of paper as early as 1545. Muller says that parchment and bladders had been used, as well as paper and flannel. The necessity of some material that would be completely burned at each discharge was realized. He goes on to describe the defects of paper and of parchment and bladders. When the bags were made of paper, the bottoms remained in the piece and accumulated so much that the priming could not reach the powder, and therefore must be removed from time to time, which retarded the service of the gun. Also they retained fire, and if particular care were not taken with sponging, they would set fire to the next cartridge, as sometimes happened, and the gunner loading the cartridge would be in danger of losing a hand or an arm. When they were made of parchment or bladders, the fire shrivelled them up and blew them into the vent so tightly that the priming wire could not pierce them. Nothing had been found up to 1780 to answer better than flannel, which was the only thing used at that date, because it would not retain fire and therefore did not cause accidents in loading. On account, however, of the powder dust passing through the flannel, a parchment cap was made to cover the bags, which was taken off before they were put into the piece.

Muller also describes the best way of preparing flannel for cartridges. He recommends boiling it in sizing which would render it impervious to powder dust and would make the bag stiffer and easier to handle; especially in large charges.

Flannel held its place as the best material for powder-bags until recent years.

Sir John Laughton, referring to the rapid firing of the *Formidable,* wrote: "The exercise, so born, continued as long as the old men-of-war and the old guns—'ships passing on opposite tacks, three rounds of quick firing.' "

It was said to be a French custom, when passing an enemy on the opposite tack, to lay their guns abeam and fire when the enemy came on the line of metal, which would mean but one broadside in passing. This was probably true only when the antagonists were under a press of sail.

After the peace, Douglas wrote to Middleton:

> But now that the war is over, the less said of improvements in the use of our naval artillery, of what nature soever, the better. Discontinuing the same and every trace thereof, only holding it in remembrance and keeping a model or two of it,

is now surely best . . . and I beg that you may be pleased to take this, my suggestion into your consideration, and if you think it of consequence to take order with Lord Howe [the First Lord] for letting the whole improvement in allusion, as fast as may be proper, dwindle into seeming disregard and oblivion. . . .

Douglas was writing, not only about his primers, locks, powder-bags, and increase of train for broadside guns, but also of improvements in controlling recoil which he had proposed.

Laughton remarks that it is strange that Douglas, in his account of the battle with De Grasse, does not mention carronades which were then mounted on almost every English ship and which the French did not have. They should have been very effective at such short ranges.

James, the British naval historian, also comments on the fact that carronades were never placed on the official list of ships' guns, though by 1781, 429 ships mounted one or more of them.

Several writers mention that it had long been recognized that a shot which just pierced a ship's side, or the wall of a fortification, did more damage than one which made a clean hole. The shattering effect was greater.

With this object in view, General Robert Melville of the British Army, in 1774, persuaded Carrons, a Scotch iron-founding and shipping firm, to cast for him a short 8-inch gun, weighing only 31 hundredweight, yet firing a *nicely fitting* 68-pound bomb, with a charge of but five and a half pounds of powder. The name "smasher" was given to the gun by its inventor, and it was described as for use with "solid shot, shell and carcass shot."

The same company, a little later, began to cast for its own ships a smaller gun, resembling a "cochorn," patterned after the original "smasher." These became known as carronades.

According to James, the original smasher was shorter than a navy 4-pounder and lighter than a 12-pounder, but had a caliber of eight inches. He writes, "As the smasher was calculated, chiefly, if not wholly, for a ship gun, the Carron Company made early application to have it employed in the British Navy, but owing to some not well explained cause, were unsuccessful."

The new gun was not popular with the Board of Ordnance (Army), but met with the approval of the Navy Board which urged its adoption.

The Carron Company cast pieces to take—with reduced windage—24, 18, and 12-pound shot. These new pieces, says James, were

readily disposed of among captains and others employed in fitting out private armed ships to cruise against America during the Revolutionary War and were

introduced, about the same time, on board a few of the frigates and smaller vessels belonging to the Royal Navy.

James also mentions that repeated experiments had shown that the smashing effect was greater from hollow shot which just penetrated, than from solid shot of the same weight and like condition of penetration. This permitted cored shot of the same caliber to be substituted for the 68-pound solid shot of the original type of smasher (8″).

The cored shot, being lighter, were less cumbrous to handle and "would range further in the first graze, or that at which the shot first strikes the surface of the water, and the only range worth attending to in naval gunnery."

The Carron Company appears to have presented its guns for naval approval, late in 1777.

Before half the expiration of the year in which the first carronade had been cast, a scale was drawn up by the Navy Board, and sanctioned by the Lords of the Admiralty, for arming the different rates in the service with the 18 and 12-pounder calibers.

At the beginning of 1781, 429 ships of the British Navy mounted one or more carronades. Among them were some 24- and 32-pounders. Soon, 42- and 68-pounders were recommended for forecastles, and it was proposed to cast some 100- and 130-pounders.

Still the Board of Ordnance [rightly in this instance] in repeated conferences with the Navy Board, maintained the superiority of the old gun, resting their arguments chiefly on the comparative length of its range; while the Navy Board urged, that a vessel, able to carry 4-pounders of the common construction might, with equal ease, bear 18-pounders of the new; that the latter gun was worked with fewer men; that its shot was far more formidable and destructive; and that its range was quite sufficient for the purpose required. The commissioners adduced, as one instance, the case of the *Flora* frigate, whose boatswain, assisted only by a boy, made a surprising number of discharges from a forecastle 18-pounder [carronade] and caused great havoc and destruction on board the French frigate *Nymphe,* ultimately their prize.

In 1782, the Admiralty replaced the *Rainbow's* battery of 44 18- and 12-pounders with 48 carronades, 68-, 42-, and 32-pounders, and in April of that year sent her to sea in search of an antagonist. The *Rainbow's* battery of carronades threw a broadside weighing 1,238 pounds, as compared with her long gun battery of 318 pounds.

It was not until September that she fell in with a ship of her own class, the *Hebe,* an 18-pounder, 40-gun French frigate, throwing a broadside of 335 pounds. The *Rainbow* was firing 32-pounder carronades as bow-chasers. Again quoting James:

Several of the shot fell on board and discovered their size. The French captain,

rationally concluding that if such large shot came from the forecastle of the enemy's ship, much larger ones would follow from her lower batteries, fired his broadside "pour l'honneur de pavillon" and surrendered to the *Rainbow*. . . .

The rapid adoption of the carronade by the usually conservative British, and the part it played in all naval wars up to the end of the sailing ship period, warrant further notice.

James had a passion for transcribing lists of guns and numbers of

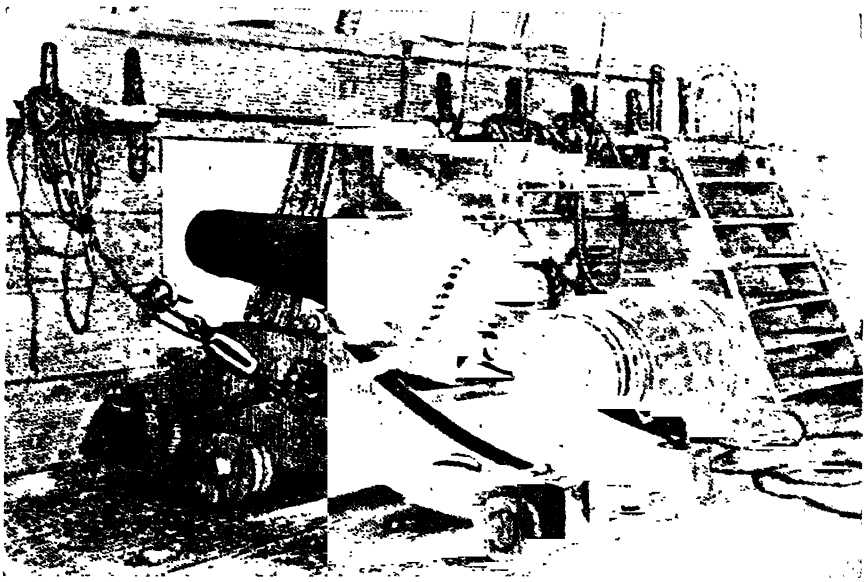


FIG. 58.—Brig's 12-Pr. Carronade of the Time of the American War of 1812-1815. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

complements with the object of showing that British ships, when defeated, were inferior in one, or both particulars. He writes:

The most extraordinary circumstance connected with the employment of carronades in the British navy, is that with all their alleged advantages, they should never have been thought worthy to be ranked among the guns of the ship that carried them. Whether they equalled in caliber the heaviest of these guns, added to their number a full third, or to their power a full half (in the 14-gun sloop class, the additional eight carronades made the numbers as 32 to 14, and the broadside weight of metal, in pounds, as 96 to 42), still they remained as mere a blank in the ship's nominal, or rated force, as the muskets in the arm-chest. . . .

Although, by January, 1781, 429 British ships mounted carronades, none are listed on the *Serapis* in the famous action with the *Bonhomme*

Richard, 15 months earlier, and we have read nothing to indicate that any of our ships in the Revolutionary War mounted carronades though they were common on British ships.

Clowes says that the carronade does not appear to have been adopted by foreign powers until after 1783, while Reiffel (Meyer) states

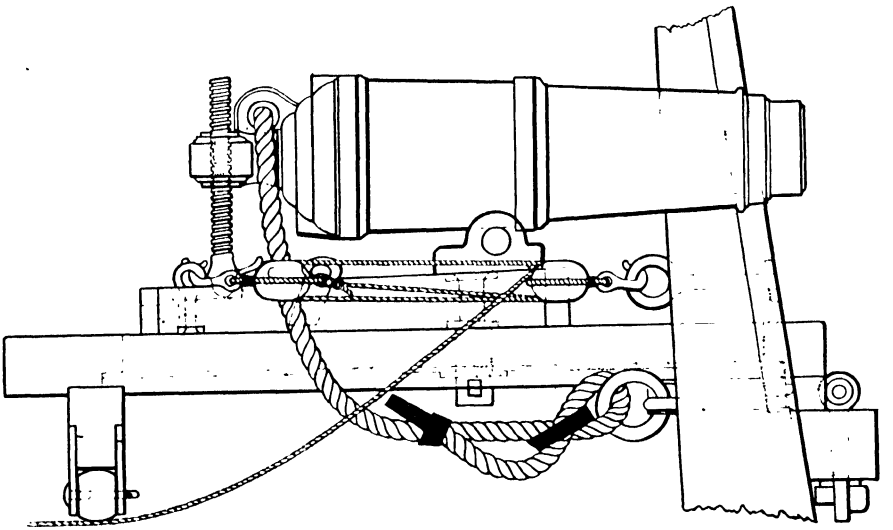


FIG. 58a.—A 24-pdr. Carronade, circa 1820. (From Ch. Dupin.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

that the French, apparently for the first time, began the manufacture of carronades at Douai towards the end of 1787.

Carronades were mounted on slides, which moved on a bed or platform mounted on a four-wheeled carriage pivoted to the ship's side. What might be called the trunnions were practically tangent to the lower surface of the outside of the gun, which made a carronade even more prone to revolve around its trunnions, on firing, than other ship's guns and accounted to some extent for the complaints of captains about the violence of their recoil. The breeching was similar to that of an ordinary broadside gun. The elevating quoin of the ordinary ship's guns was replaced by a screw, resting on the mount and working in a threaded hole in the cascabel. Both the slide and mount and the elevating screw were innovations which did not disappear with the carronade.

Robertson says that it was a matter of fact that a considerable increase of range could be obtained by shortening a gun's recoil, and

that in the case of carronades, it was a common procedure in chase, to lash the breeching in order to prevent recoil, and thus to help the shot on its way, and this was seriously proposed as a permanent method of mounting, but "pivots were broken, ship structures strained, and the whole system found ill adapted for warships' requirements." Beginning in 1793,

> the carronade played a considerable part in the succession of duels and actions which had their climax off Trafalgar. It was now generally adopted as a secondary form of armament, captains being permitted, upon application, to vary at discretion the proportion of long-gun to carronade armament which they wished to carry. In the smaller classes, especially, a preponderance of carronades was frequently accepted; the accession of force caused by the substitution of small carronades for 6 and 9-pounder long guns in brigs and sloops could hardly be disputed. In ships-of-the-line the larger sizes continued in favor. The French now benefitted, too, by their adoption; on more than one occasion their poop and forecastle carronades, loaded with langrage, played havoc with our personnel. Spaniards and Dutchmen did not carry them. How far their absence contributed to their defeats it is not now to inquire; but how the tide of battle would have been affected by them—if the Dutch fleet, for instance, had carried them at Camperdown—may be a not unprofitable speculation.

Captain Henry Trollope of the *Rainbow* had the good fortune to earn another victory with carronades. He was ordered in command of the *Glatton,* an East Indiaman, bought by the Admiralty in 1795. At Trollope's request, she was armed with carronades exclusively, and in broadside only. She had neither bow nor stern fire. Her battery, consisting of 68-pounders on the lower deck and 32-pounders on the upper deck, totalled 50 guns.

On the evening of July 15, 1796, Trollope, off the coast of Flanders, attacked at close quarters a French squadron composed of the frigates *Brutus* (46), *Incorruptible* (38), *Magicienne* (38), *Republican* (28), and two 22-gun corvettes. Quoting Robertson:

> . . . at ten o'clock a close action began. The *Glatton* was engaged by her antagonists on both sides, her yard-arms almost touching those of the enemy. She proved to be a very dangerous foe. Her carronades, skilfully pointed and served by supply parties who worked port and starboard pieces alternately, poured out their heavy missiles at point-blank range. So heavy was her fire that one by one the frigates had to haul off, severely damaged, and the *Glatton* was left at last to spend the night repairing her rigging, unmolested, but in the expectation that the French commodore would renew the attack in the morning. To her surprise, no action was offered. The blows of the 68-pounders had done their work. Followed by the *Glatton* with a "brag countenance," the enemy retired with his squadron in the direction of Flushing.
>
> The action had more than one lesson to teach, however, and no more ships, except small craft, were armed after this upon the model of the *Glatton.*

Allen in describing this engagement says that

> the French ships . . . on the following day reached Flushing, where one of the ships sank, and four of them had their decks ripped up and received great damage; but their loss in killed was never ascertained. The *Glatton* had none killed and two (Captain H. L. Strangways, of the marines and one marine) wounded. For this most dashing performance Captain Trollope was presented by the merchants of London with an elegant piece of plate.

It has been related how General Melville reduced the windage and obtained "a nicely fitting bomb" by turning the bore of the 68-pounder carronade to a slightly smaller diameter than that of the long 68-pounder. This practice was followed, generally, in all carronades. Their calibers were about .15 inch less than that of the corresponding long gun.

In later years when the British Ordnance Department, which also furnished naval ordnance, reduced the windage of land service shot by enlarging the shot, it was impossible to use them in existing carronades until the latter had been re-bored.

Our own costly error in arming the *Essex* with too large a proportion of carronades will be referred to in its proper place.

Muller, in 1768, recommended attaching sabots to shot to increase loading speed. His recommendation was eventually adopted.

A sabot (wooden shoe) was a flat, circular piece of wood, slightly less in diameter than the shot. It was recessed on the side next the shot to fit the curvature and was secured by two straps of flat iron, passing over the shot at right angles to each other. The sabot made shot more convenient to handle and they could be safely set down on deck without being chocked with swabs to keep them from rolling about.

For long guns, the weight of powder charge averaged about one-third of the weight of shot. Carronade charges were much smaller.

All gun-carriages and especially carronade-carriages were subject to violent stresses at each firing, caused by the effort of the gun to revolve around its trunnions.

Breeches usually ended in a spherical-shaped knob (cascabel) which the English called a "button." On top of the cascabel, and cast as part of it, was a ring, through which was rove the breeching that checked the recoil. In later years, cascabels of smooth-bore guns were slotted horizontally to receive the breeching. This permitted it to be snatched in place without reeving it through the cascabel or button ring.

The slot, which was closed by a cascabel block held in place by a pin, was known as the "shark's mouth."

There are at the U. S. Naval Academy four 18-pounders, captured

with the *Macedonian,* which have neither button rings nor sharks' mouths, indicating that these were not universal. Some other means of attaching the breeching to the gun or gun-carriage must have been employed.

Few men now living are familiar with the means of pointing the guns which won sea battles through the centuries. The gun-carriage was controlled by two side-tackles and an in-tackle—the side-tackles to run the gun out, the in-tackle to run it in. Both were manned when the ship was rolling. The in-tackle eased it out if running too fast and the side-tackle eased it in if running too fast. The in-tackle was unhooked from the gun before firing, and the side-tackle falls were coiled clear for running on the recoil when fired.

The breeching brought up the recoil when the muzzle was in the port, where the sponge could be entered and the gun re-loaded.

During action, the in-tackle was not always necessary, its place to hold the gun in the loading position being taken by one or two chocking coins, or wedges, jammed against the out-board side of the wheels, the instant the recoil brought the breeching up taut.

The gun was trained by the side-tackles, assisted by a hand-spike under the rear of the carriage. It was elevated by an elevating quoin, sliding on a wooden bed, laid on the carriage under the breech. The hand-spike—or crowbar—was used to lift the breech, so that the quoin, marked in degrees on its side, could be put in place. It and the bed were often displaced at each discharge.

The front of the carriage was parallel to the port sill. This made training difficult. An invention was a sweep-piece, fastened to the carriage and curved on the outside, so that it touched the port-sill at but one point.

Another innovation was dispensing with the two in-board wheels of the four-wheeled carriage, thus letting its rear cross-transom slide on deck. The friction of the sliding transom helped to check recoil and to keep the gun stationary over a deeper roll, without the help of side-tackles, in-tackles, or chocking-quoins. With it, came a roller hand-spike to lift the rear transom clear of the deck and guide the breech-end of the gun when running in or out, or shifting from one gun-port to another.

Finally, iron replaced wood for carriage and wheels; and screw elevating gear replaced the bed and the quoin.

Time brought little change in sponging and loading. Sponging always had to be carefully done for safety's sake, and both charge and shot

rammed home. Primers, and later elevating screws and sweep-pieces, increased the rate of fire. Any other increase came from skill in handling, resulting from diligent drill.

General Sir Howard Douglas, the great English gunnery author of the first half of the 19th century, and a son of Sir Charles Douglas, tells us that no standard gun drills were prescribed by the British Admiralty until 1817. There is, however, in the Naval Academy library a small volume, without date but evidently printed in the 18th century from its use of the long "s," entitled *Exercise of the Small Arms and Great Guns, for the Seamen on Board His Majesty's Ships.* The authority for publishing these exercises is not given.

Under the caption "Exercise of the Great Guns," the preliminaries are that "The Guns are to be loaded with Powder and Shot, and Water-Tubs in their Places, the Matches lighted, the Crows, Handſpikes, Spunge Staves and Rope Spunges, placed in Order by the Guns, and the Men at their Quarters," after which follow forty commands for casting loose, priming, aiming, firing, and re-loading the gun. Those preliminary to pointing if the gun is cast loose, are:

5. Take out the Tampion.
6. Take off the Apron.
7. Unſtop the Touch-hole.
8. Handle the Priming Wire.
9. Prick the Cartridge.
10. Handle the Powder-horn.
11. Prime.
12. Bruise the Priming.
13. Secure the Powder-horn.
14. Take hold of the Apron. [The apron was a metal cover for the vent]
15. Cover the Vent.
16. Handle your Crows and Handſpike.
17. Point the Gun to the Object.

Many references to ricochet firing at sea can be found. But ricochet firing meant ranges greater than point-blank.

The distance to "first graze" was sometimes determined for particular guns, in smooth water, but so many factors were involved that this knowledge was of little use. Among these were: relative weight of shot and powder (muzzle velocity); height of gun above water; and angle of elevation.

The practical value of ricochet firing was the knowledge that fired at point blank, or low elevation, the rise of a shot after first graze was not over 25 feet, and subsequent rises less. There was no deflection, so in all cases it was better to be sure of firing short, than over, when beyond point-blank.

The naval world was not yet ready for sights, other than the line of metal. It was said that sights for siege artillery were not common until the increased range of small arms forced siege operations to be conducted at ranges of over 800 yards and some means of obtaining exact elevation and direction had to be contrived.

Our Revolutionary War brings us one instance of the use of incendiary projectiles, other than mortar bombs. Clowes relates that at the battle of Bunker Hill, June 17, 1775, the senior British naval officer, Vice Admiral Samuel Graves, who was present on shore at the battle, ordered his ships to fire red-hot shot to burn the village of Charlestown. The *Glasgow* (20), Captain William Maltby, which the next year escaped from Hopkins' squadron, obeyed the Admiral's order.

The use of red-hot shot (boulets-rouges) for field and garrison service was a custom almost as ancient as the use of artillery. It is first mentioned as having been employed by the Arabs at the siege of Algeciras, in 1342, but shot furnaces on ships were almost unknown until the last years of the 18th century. It is possible that Clowes' note was caused by some British claims, made later, that hot shot were a French innovation, frowned on by the British. Nelson called the use of "hot shot" a diabolical practice.

The British Navy Records Society has published nine letters written to Middleton by Douglas. One, from the *Duke* which he commanded in the Grand Fleet in 1779, described his efforts (successful) to increase the train of his guns. This was important tactically.

Another in the same year was written after Hardy had been chased into port by D'Orvilliers and Cordova.

Douglas' concern for the state of the war, his family sorrows, and a plan for increasing the *Dukes'* gunfire are all blended in this letter:

> The fleet having made good its retreat, the meditated blow of a dangerous invasion may yet be warded off. That the public danger may point out to our rulers what men and measures further to employ for that purpose, may the Almighty of His infinite goodness and mercy grant, ... and to you and good Mrs. Middleton, long health. ..... Yesterday on my arrival here I found my dearly beloved spouse in the silent tomb, my son Frederic (this moment dead) ..... dwindled to a shadow and my little daughter (now recovering) ill of the measles. Such scenes of sorrow are at any time terrible to a man of feeling, as a husband and parent; but particularly so, after having so recently been obliged to retire before the fleet of France and Spain.
>
> I am dear Sir Etc
>
> P.S. I am just going to apply to your board to order the cutting of one port more abaft the present ones on the *Duke's* quarter-deck, whereby a gun in shifting one over may be added to the broadside; nor can it weaken her to any degree so as to shorten her duration a single hour. My carpenter is of the same opinion.

CHAPTER XXII

THE AMERICAN NAVY OF THE REVOLUTION

WHEN THE United Colonies of America began to make war on the sea, men-of-war and their guns had long been standardized, except for such changes and improvements as have been summarized in the last chapter.

Tactics applied only to "ships fit to lie in the line."

Frigates did not form part of the battle line and had no settled rules for fighting, other than to strive for the weather-gauge, rake a disabled enemy or one "in irons," or to board, if gun-fire did not bring surrender.

Frigates fled from ships of the line; corvettes, sloops, and gun brigs fled from frigates. Practical parity of batteries was the general rule when action was accepted by both of two antagonists.

Our first navy was founded by direction of the second Continental Congress, which convened at Philadelphia, in May, 1775. The most comprehensive and instructive account of its ships and their operations during the eight years of the Revolutionary War, is found in *The Navy of the American Revolution* (1906), by Oscar Paullin. Paullin's work has been amplified by the valuable contributions of Gardner Allen in his *Naval History of the American Revolution* (1913), in two stirring volumes. More recently Captain Dudley Knox, U.S.N., has thrown additional light on the subject in his book, *The Naval Genius of George Washington* (1932).

The Navy of the Revolution included ships of the State or provincial navies, as well as those commissioned by the Continental Congress. In addition, both States and Congress issued letters of marque.

Competition was keen between commissioned ships—State and Continental—and privateers for both officers and men. On the whole, it may be said that the rewards of privateering, though uncertain, proved the greater attraction. As a rule, Continental and State commissioned ships operated singly, although they—and privateers, as well—combined on occasion.

The Continental Navy was larger than the navy of any individual state, but the ships of the State navies, as a whole, outnumbered those of the Continental Navy and the two largest ships that flew our flag during the war belonged to the State Navy of South Carolina, the *Bricole* (44) and *South Carolina* (*Indien*) of 40 guns.

Paullin includes in his history short separate accounts of the State

navies and their operations. The most important were those of Massachusetts, Connecticut, Pennsylvania, and South Carolina. The nuclei of all four existed before the Continental Congress took the definite and necessary steps to establish a United Colony—or United States—Navy.

Marines formed part of the complements of most of the ships of the Continental Navy and some of the State navies.

Practically every one of the thirteen former colonies issued letters of marque. Privateers outnumbered commissioned ships, Continental and State.

Rhode Island's navy was not foremost in size, but that enterprising colony was the first to fit out armed ships for her own protection and also to urge the creation of a navy on the Continental Congress. The first chairman of the Naval Committee, Stephen Hopkins, was from Rhode Island, and his brother Esek was the first Commander-in-Chief.

Two days before the battle of Bunker Hill, the General Assembly of "Little Rhody" ordered its Committee of Safety to fit out two suitable vessels for the defense of Rhode Island's trade, and two sloops, the *Katy* and *Washington*, were chartered. The *Katy*, the larger of the two, mounted ten 4-pounders and carried a crew of 80 men. She was commanded by Abraham Whipple. He was given the "rank and power of commodore over both vessels." He captured a tender of the British frigate *Rose* on the day he was commissioned, June 15, which—it will be observed—is the date of the Assembly's Resolution to create a navy. Whipple and Rhode Island thus set an example of promptness for navies of all time and justified the motto *semper paratus*, since carried by some men-of-war and emulated by all.

Whipple also made the first foreign naval cruise. In September, 1775, complying with a request from General Washington, he was sent by the Governor to Bermuda, to obtain powder.

Prior to this, the Rhode Island Assembly had instructed her two delegates to the Continental Congress, Samuel Ward and Stephen Hopkins, both former Governors,

> to use their whole influence at the ensuing Congress for building at the Continental expense, a Fleet of sufficient power for the protection of these Colonies and for employing them in such manner and places as will most effectually annoy our enemies and contribute to the common defence of these Colonies.

These resolutions were laid before the Continental Congress on October 3. On October 5, the Congress directed that a plan be prepared for intercepting two unarmed brigs, which it had been learned were at sea

bound from England to Quebec, loaded with arms, powder, and other stores.

On the same day, the Congress directed Washington, the recently appointed Commander-in-Chief of the Army, to obtain two Massachusetts State cruisers, and despatch them to intercept the brigs.

Washington had anticipated the great need of powder and had procured Whipple's orders to Bermuda. But when Whipple arrived there he found that the ammunition had already been despatched to Philadelphia. Also, on his own responsibility, Washington had secured the schooner *Hannah,* under the command of Nicholas Broughton, to cruise against British transports bound for Boston. The *Hannah* sailed September 5.

Washington continued to fit out ships to capture transports and supply ships, reporting his actions to Congress. The vessels fitted out by him for service in Massachusetts Bay, and others later in Long Island Sound and in the Hudson when his headquarters were shifted to the vicinity of New York, came to be known as "Washington's Fleet." Those in the vicinity of Massachusetts Bay were active until 1777, when the Marine Committee ordered them out of commission.

Following the *Hannah,* Washington obtained the schooner *Lee.* She was one of the most successful and the last to be put out of commission. Her captain, John Manly of Marblehead, sailed from Salem on his first cruise towards the end of October, 1775.

The colors flown by Washington's ships appear to have been the New England Pine Tree flag, with the motto, "Appeal to Heaven."

Manly's commission was confirmed by Congress, and he later served as a captain in the Continental Navy.

On October 13, Congress directed the purchase of two brigs, later named *Lexington* and *Reprisal,* to be armed and equipped and to cruise three months to the eastward for the interception of British transports.

On October 13, Congress also appointed a Naval Committee of eleven members to manage naval affairs, and on the same day authorized it to procure and fit out two brigs and two larger ships "for the protection and defense of the United Colonies." The brigs mounted 16 guns each.

On November 2, the Naval Committee was given power to "agree with such officers and seamen as are proper to man and command" the vessels Congress had authorized.

On November 5, Esek Hopkins, a sea-captain and privateersman during the French and Indian War, was selected by the Naval Com-

mittee to command the fleet. As already stated, his brother, Stephen Hopkins, was then and later chairman of the Committee.

On November 10, a Marine Corps was established as part of the Navy, and in the same month, November 28, Congress adopted "Rules for the Regulation of the Navy of the United Colonies." These were formulated by John Adams, a member of the Naval Committee, and were based on English Navy Regulations.

Thus our first navy was established.

One of the earliest and boldest acts of the Continental Congress was to dispatch a force under General Benedict Arnold, through Maine, to besiege Quebec in cooperation with another force under General Montgomery, which proceeded to Montreal via Lake Champlain, and thence to Quebec. The city was unsuccessfully attacked December 31, 1775.

Arnold reached Quebec November 13. While he was waiting for the troops from Montreal, reinforcements from England reached Quebec. General Montgomery was killed in the assault. Arnold continued the siege until April, 1776, when he was forced to withdraw first to Montreal

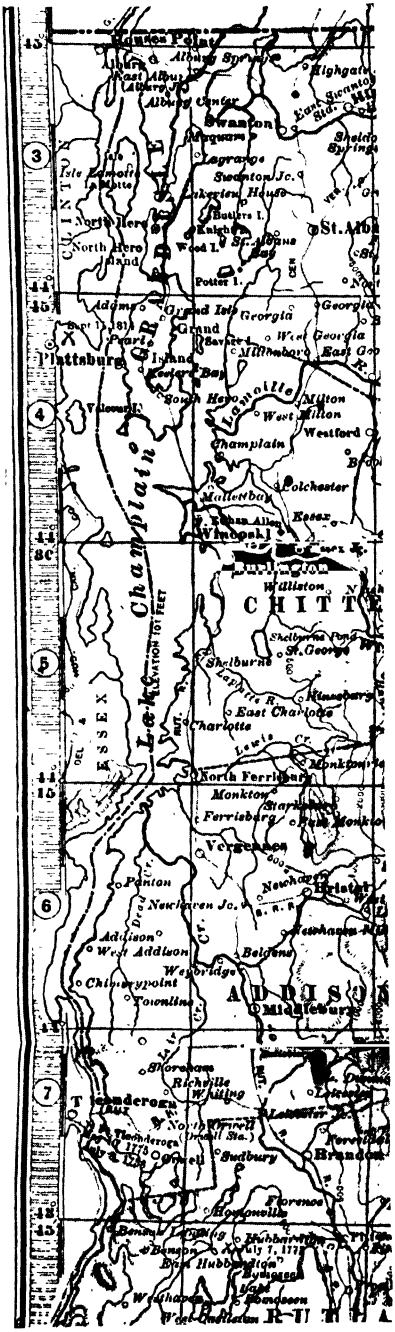


FIG. 59.—Lake Champlain. (*From "The Century Dictionary and Cyclopedia," D. Appleton-Century Company, Inc., New York*)

and then up the Richelieu into Lake Champlain, where he spent the summer, equipping the small craft on the lake to contest the English advance by water.

Part of the English plan, after relieving Quebec, was to gain control of Lake Champlain and the valley of the Hudson. Captain Charles Douglas, part of whose later services has been related, was in command of the squadron which conveyed the troops for the relief of Quebec. His ships carried frames and rigging for vessels to be set up in Lake Champlain. A party of 600 seamen and mechanics from his squadron transported the material up the Richelieu to the lake, and by great diligence had 25 vessels afloat and manned by October, 1776. It was claimed that the largest of these, the *Inflexible,* ship-rigged and mounting eighteen 12-pounders, was put together in 28 days.

Captain Thomas Pringle, R.N., was placed in command of the flotilla and of the bateaux with stores that supplied and accompanied it.

The Americans had not been idle during the summer. General Arnold, in conjunction with General Waterbury, with their force of soldiers and lake sailors and mechanics, had got ready a force of 17 small craft, armed and manned.

The total number of guns mounted in each of the two flotillas did not differ widely. Calibers varied from 4- to 24-pounders. Although the English crews were principally sailors from Douglas' squadron, they were supplemented by some soldiers and Indians—in all, about 1,000. Arnold's crews were almost wholly soldiers and totalled about 800.

Captain Pringle in the schooner *Maria* (fourteen 6-pounders), sailed south with his flotilla from his base at St. John's on the Richelieu River, on October 4.

About the same time, Arnold in the *Congress* galley (two 18-pounders and eight 12-pounders), and General Waterbury in the *Washington* galley (one 18, one 12, two 9, and six 6-pounders), with the American flotilla advanced north from Skenesborough at the south end of the lake.

A week elapsed before they met. On October 11, in the morning, Arnold was at anchor off the west side of Valcour Island, about four miles south and east of the present town of Plattsburg. He sighted the English flotilla standing south with a northeast wind.

Pringle passed before sighting the Americans. As Arnold thought that the English would be at a disadvantage in attacking from leeward, he decided to await them at anchor with his whole force, except the

three galleys *Congress, Washington,* and *Trumbull* and one schooner, the *Royal Savage.* He ordered these four craft to get under way; for what purpose is not clear, since they would have to keep close to the rest of the flotilla.

In his report, Arnold said that, through bad management, the *Royal Savage* was the first attacked and suffered so much that she had to be beached on Valcour.

Some time after noon, the enemy gun-boats "beat and rowed up within musket shot of us." There were 20 of these and one gondola.

Pringle reported that he could not beat up with his larger ships.

Arnold's report said the English

> continued a very hot fire with round and grape shot until four o'clock, when they thought proper to retire to about six or seven hundred yards distance and continued (their fire) until dark.

The fight had gone against Arnold. He had lost the schooner *Royal Savage,* and the *Congress* and *Washington* were much cut up. The gondola *Philadelphia* sank about an hour after the firing ceased.

During the night Arnold consulted with his senior officers and concluded that another day's battle would be disastrous, partly on account of shortage of ammunition.

He decided to retreat to Crown Point at the south end of the lake. The wind continuing fair, he got under way during the night and stood south, passing through Pringle's flotilla without being fired upon or followed. A shift of wind forced him to anchor, after making about ten miles. He undertook repairs, but the English being sighted, coming up, he was forced to get under way again.

By morning he was 28 miles north of Crown Point. Two gondolas had sunk during the night. These were small craft, carrying an 18-pounder in the bows and a 9-pounder on each beam.

The English were faster sailers and came close enough during the day to begin a running fight. The damaged *Washington* was overtaken and captured. Arnold ran the *Congress* and four gondolas ashore above Crown Point and burned them. The rest of the flotilla escaped.

Though suffering these losses, Arnold had delayed the English advance an entire summer.

There were no roads. The lakes—Champlain and George—were the only routes south. Until the English controlled them, they dared not advance an army. The middle of October was too late to begin a campaign. The English could not advance until the spring of 1777. The

intervening months gave the Continentals time to make the preparations which resulted in Burgoyne's defeat at Saratoga.

Though out-numbered and out-gunned, Arnold need not have accepted battle at anchor, and, when he decided to do so, he might have disposed his vessels to better advantage to meet the English attack. Instead he left the initiative to Commodore Pringle, who was free to take any feasible advantage of the situation.

However, Arnold's flotilla put up a good fight. His little "fleet in being" served a good purpose, though the components were captured, sunk, or dispersed.

During the year covered by Arnold's expedition, neither the Continental Congress, the Colonies, nor the craft they had commissioned had been idle.

On December 13, 1775, Congress authorized the building of 13 small frigates—five 32s, five 28s, and three 24s—one for each colony. The following day, it chose by ballot a committee of thirteen—one from each colony—to superintend the building and fitting out of the ships authorized.

This committee later replaced the Naval Committee of eleven members and was known as the Marine Committee.

The Naval Committee, some of whose members were also members of the Marine Committee, continued its work of fitting out ships previously authorized, which Hopkins had been ordered to command.

John Barry, master of the *Black Prince,* had arrived in port from English waters on October 13. The Naval Committee purchased his ship, changed her name to *Alfred,* and designated her as Hopkins' flagship.

Barry was made a captain and appointed to command the brig *Lexington.* Captain Lambert Wickes was appointed to command the *Reprisal.*

In addition to the *Alfred* (24), *Lexington* (16), *Reprisal* (16), the Naval Committee before the end of the year purchased and commenced to fit out—principally for Hopkins' fleet—nine other merchantmen, and also directed the building of a sloop, the *Hornet* (10), and a schooner, the *Wasp* (8), at Baltimore. The other converted merchantmen were the ship *Columbus* (24), brigs *Cabot, Andrew Doria,* and *Hampden* (14s), brig *Providence* (12), sloops *Independence* and *Sachem* (10s), schooner *Fly* (8), and sloop *Mosquito* (4), making in all fourteen.

The *Providence* was Whipple's *Katy,* re-named. He brought her to

Philadelphia with crews for the *Alfred* and other ships enlisted by Hopkins in New England. Whipple was appointed to command the *Columbus*.

The 8 ships under Hopkins' immediate command comprised the *Alfred* (flag), Captain Dudley Saltonstall; *Columbia,* Captain Whipple; *Andrew Doria,* Captain Biddle; *Cabot,* Captain John B. Hopkins (son of the Commodore); *Providence,* Captain Hazard; *Hornet,* Captain Stone; *Fly,* Captain Hacker; and *Wasp,* Captain Alexander.

The *Alfred* was manned and armed under the superintendence of Paul Jones, who on December 7 had received a commission as a first lieutenant in the navy. Commodore Hopkins took command on January 3, 1776.

In her *Life of Paul Jones,* Mrs. De Koven says:

> As Hopkins gained the deck, Captain Saltonstall [who had recently joined] gave a signal, and John Paul Jones hoisted with his own hands the first flag which ever floated over an American ship-of-war. With this act, the American Navy began its existence and Paul Jones' association with it remained a pride to his glory-loving heart until the latest day of his life.

The *Alfred* was commissioned under the so-called "Pine Tree" or "Rattlesnake" flag, which differed from that designed for Washington's fleet. The pine tree in the *Alfred's* flag, says a British writer, had a rattlesnake coiled at its foot, with the motto, "Don't tread on me." According to the best authority, however, the flag did not carry a pine tree, but simply a coiled rattlesnake on a ground of yellow silk, with the aforesaid motto below.

De Koven quotes the British writer as saying:

> A strange flag lately appeared in *our seas,* bearing a pine tree, with the portraiture of a rattle snake coiled up at its root, with the daring words, "Don't tread on me." We learned that the vessels bearing this flag, have a sort of commission from a society of people in Philadelphia, calling themselves the Continental Congress!

The first Union flag—stars and stripes—had been hoisted by Washington's orders, in Cambridge, Massachusetts, on January 2—the day before Hopkins took command in the Delaware.

About a month after the commissioning of the *Alfred,* Christopher Gadsen, a member of the Marine Committee, in memory of the occasion, presented a duplicate of her flag to Congress.

On January 5, the Naval Committee issued to Hopkins "Orders and Directions for the Commander-in-Chief of the Fleet of the United Colonies." He was charged to correspond regularly with Congress and

with "the Commander-in-Chief of the Continental forces in America." Other instructions in the nature of regulations were included.

He was ordered to proceed to sea with his fleet, "to search out, and attack, take, or destroy" the enemy's forces in Chesapeake Bay and in North and South Carolina, and then proceed to Rhode Island for the same purpose. He sailed from Philadelphia February 9, with his ships flying the Union flag (stars and stripes). No mention is made of when the change of flags took place, nor by whose direction. Congress did not officially adopt the Stars and Stripes as the national flag until June 14, 1777.

The fleet cleared the Delaware Capes February 17. The Commodore's orders gave him discretionary authority to abandon his cruise to the Chesapeake and Carolinas if unforeseen difficulties arose. He decided before leaving the Delaware to avail himself of the permission to change his destination. He appointed a rendezvous off the southern part of Abaco, one of the Bahama Islands, and set his course for Nassau on New Providence Island, to seize British ordnance stores which Congress had learned were there.

The second night out, the *Hornet* and *Fly* were separated from the other ships. They had fouled each other during the night. The *Fly* rejoined. The *Hornet* got back to the Delaware six weeks later. The other ships reached the rendezvous on March 1 and sailed for New Providence, where Hopkins landed 250 marines and sailors for the capture of Nassau, the capital. The fort to the eastward was abandoned on their approach and the town, after being summoned, surrendered without resistance, as well as the fort to the westward.

The ships then entered the harbor and took on board 71 cannon (9- to 32-pounders), 15 mortars, and 24 casks of powder. The Governor had managed to send 150 casks away.

After two weeks employed in loading the captured stores, Hopkins sailed, after appointing a rendezvous off Block Island. What, up to April 6, had been a most successful cruise, was marred at its end by an unfortunate occurrence. While underway off Block Island, in a light breeze, Hopkins about 2 A.M. fell in with the British *Glasgow* (20), Captain Howe, and her tender. The *Glasgow* was first attacked by the *Cabot,* which she disabled by her first broadside, and then by the *Alfred,* whose wheel-ropes were shot away. She then made sail for Newport where a small British squadron was lying.

The *Columbus* chased until about 7 A.M., when Hopkins signalled her to rejoin and proceeded to New London with his small fleet and the

prizes. These included the *Glasgow's* tender, which had surrendered, an armed brig, a brigantine, and a sloop.

The *Glasgow* was under fire for three hours and was badly cut up before making good her escape. Hopkins' losses were 10 killed and 14 wounded.

Much dissatisfaction was aroused by the escape of the *Glasgow*. Captain Whipple, who was accused of cowardice, demanded a court-martial and was acquitted. Captain Hazard of the *Providence* was relieved of his command. However, before the resentment in Congress came to a head, John Hancock, its President, sent Hopkins a letter of congratulations on his captures of stores and ships. Later, the Congress investigated Hopkins' conduct of his cruise and censured him for failing to carry out his orders to visit the Carolina coast.

Hopkins was never again in favor with Congress, although Paul Jones said he was generally respected throughout his squadron.

In November, 1776, Congress fixed the relative rank of army and naval officers, as it stands at the present day.

Hopkins' salary as commander-in-chief was $125 per month, with rations. After he was censured in August, 1776, his enemies charged him with slandering Congress and the Marine Committee. He was suspended, without a hearing, in March, 1777, and was dismissed in January, 1778. No other commander-in-chief was appointed. Ships received their orders direct from the Marine Committee or its agents.

After Hopkins' dismissal, the senior officer was James Nicholson of Maryland, captain of the *Trumbull*. Captains received $60 per month and rations.

Nicholson was never in command of more than his own ship. He was brave and did good service, but was unfortunate.

None of the 14 vessels commissioned by the Naval Committee survived the war. By 1779 all had been captured, sunk to avoid capture, burned, blown up, or had foundered. The same fate befell the 13 frigates authorized in December, 1775.

The *Randolph* (32) was the first of the 13 to get to sea and the only one built at the seat of government (Philadelphia) to succeed in doing so. Before she sailed, early in February, 1777, Robert Morris—for the Marine Committee—gave Nicholas Biddle, her captain, some tactical advice. He wrote, in part:

> . . . there are no cruzing ships an overmatch for you, excepting the two-Deckers . . . therefore you have only to avoid two-Deckers, or engaging when there is more than one in sight. Any of their other single ships you need not fear; especially if

you can persuade your men to board. Remember what a glorious exploit it will be to add one of their frigates, or 20 Gun ships to our navy in a few days after you get out, and if the *Randolph* has but heels, I think you can and will do it. . . . If your ship sails remarkably fast, you may take liberties with them. If she does not, be more cautious and try to find out her trim. . . .

In another letter, he said:

. . . as you command the first American frigate that has got out to sea, it is expected that you contend warmly on all necessary occasions for the honor of the American flag.

Nicholas Biddle, then about 27 years old, had served in the British navy for a time and had commanded the *Franklin,* galley of the Pennsylvania navy, before being appointed a captain in the Continental service and given command of the *Andrew Doria* in Hopkins' fleet. Unfortunately for the high hopes entertained for him and the *Randolph,* she was dismasted in a gale, not long after clearing the Delaware Capes, but managed to reach Charleston, South Carolina.

After re-fitting there, Biddle made a short, but successful cruise, taking four prizes. He was then ordered to France to report to the American Commissioners, whence he speedily returned to Charleston, and early in 1778 sailed in command of a squadron consisting of the *Randolph* and four vessels of the South Carolina Navy, carrying 150 troops to serve as marines. The *Randolph's* battery, at this time, was said to be twenty-six 12-pounders, six 6-pounders, and "4 coehorns in each top."

Finding no enemies on the coast, the squadron sailed through the West Indies and cruised for prizes east of Barbados.

As darkness came on, March 7, Biddle fell in with the *Yarmouth* (64), a two-decker. He engaged to leeward, assisted slightly by his largest consort, the *General Moultrie* (18).

According to accounts, the advantage in the action lay with the *Randolph* when tragedy overtook her. She blew up, some parts of her falling on board her opponent. Five days later, while chasing another ship, the *Yarmouth* sighted and rescued four of the *Randolph's* crew, who were afloat on a piece of the frigate's wreck.

From these, the sole survivors, it was learned that Captain Biddle had been wounded in the thigh, early in the fight, but continued to command, seated in a chair.

Such was the tragic end of the first frigate of our first navy and of her promising young captain.

The *Hancock* (32) was the first American frigate to be captured.

She sailed in 1777, under the command of Captain John Manly.

In company with the *Boston* (24), Captain McNiel, Manly captured the *Fox* (28), Captain Fotheringame, near the Newfoundland Banks, June 27, 1777.

On the way to Boston with his prizes, he was sighted on the evening of July 6 by the *Rainbow* (44), Captain Sir George Collier, in company with the *Viper,* a 10-gun brig. Collier chased till morning and was then joined by the *Flora* (32). The *Flora* recaptured the *Fox*. The *Boston* and *Hancock* separated. Collier chased the *Hancock* and overtook her on the morning of July 8. After a short engagement, he forced her surrender. The *Boston* escaped.



FIG. 60.—Captain Nicholas Biddle. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Allen speaks of the *Hancock* as the finest ship of that time in the American navy. He gives her crew as 229 and her armament as 12-pounders. She was taken into the British navy and renamed *Iris* and a description of her was sent to Admiral Howe, then commander-in-chief.

Her principal dimensions were given as:

Length of keel for tonnage, 116 ft.; length on upper deck, 140 ft.; beam 30 ft.; tonnage, 764; draft forward, 14 ft.; aft, 15 ft.; height of midship gun ports above water, 8 ft. She carried a figure-head: "A Man's Head with Yellow Breech, white Stockings, Blue Coat with Yellow Button Holes, small cocked Hat with a Yellow Lace. . . . Has a Rattle Snake carved on the Stern; Netting all around the Ship; Stern Black and Yellow; Quarter Galleries all Yellow.

Her subsequent history as the *Iris* is worth recording. Cruising with the *General Monk* (18), the *Iris,* Captain Dawson, on August 8, 1781, dismasted and captured the "celebrated rebel frigate" *Trumbull* (28), in an engagement lasting somewhat more than an hour. The *Trumbull* was the last of the 13 American frigates. A short time later, September 11, the *Iris* herself was captured off the Chesapeake by one of the French fleet under Admiral De Grasse.

The *General Monk* was later taken by one of our privateers, the *Hyder Ally*, and brought into our navy under the name of *General Washington*. Like her renowned name-giver, she survived the war.

Captain John Barry was another of the Revolutionary commanders to lose his ship, the *Raleigh* (32). On September 25, 1778, off Boston, he fell in with the *Experiment* (50) and the *Unicorn* (22). In spite of the overwhelming odds in ordnance, there was an action that lasted nine hours, after which Barry ran his ship ashore and escaped with most of his crew. The *Raleigh* was afterwards floated by the British and taken into their navy.

Barry fought again in the *Alliance,* became senior captain in our second navy in 1794; fought in the undeclared war with France, 1798-1801; and died in Philadelphia in 1803, at the comparatively early age of 58.

In 1777, Congress acquired eight additional ships for the navy: *Alliance, Confederacy,* and *Hague* (32s), *Queen of France* (28), *Duc du Lauzun* (20), *Saratoga, General Gates,* and *Ranger* (18).

Four of these eight names foreshadowed our alliance with France the following year. After France became our ally in 1778, her navy was a principal arm of our defense and few of our own ships were commissioned.

Of the eight acquired in 1777, the *Duc du Lauzun, Alliance,* and *Ranger* survived the war. All the others went the way of their predecessors.

Congress also authorized the building of four 74s and five 36s. The *Confederacy, Alliance,* and *Hague* were part of this program, but were built as 32s instead of 36s. One 36, the *Bourbon,* was laid down but not launched. Our only 74 was the *America,* built at Portsmouth, New Hampshire. Paul Jones superintended her building and was to be her captain, but Congress, when she was completed in 1782, presented her to France to replace the *Magnifique* (74), stranded and broken up in Boston Harbor.

Accounts of the loss of the *Randolph, Hancock, Raleigh,* and *Trumbull* have been given. Some others of the 13 frigates authorized in 1776 saw service but none survived the war. The fate of each is set forth here:

Delaware (24), captured in the Delaware River, 1777—never got to sea.

Congress (28), destroyed in the North River, 1777, to avoid capture.



FIG. 61.—John Paul Jones. From the engraving by Moreau le Jeune, in the collection of Mr. Charles A. Munn. (*From De Koven's "The Life and Letters of John Paul Jones," Charles Scribner's Sons, New York*) (*Bust courtesy White Studio*) Captain Sir Richard Pearson, Kt., R.N., Lieut.-Govr. of Greenwich Hospital. (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

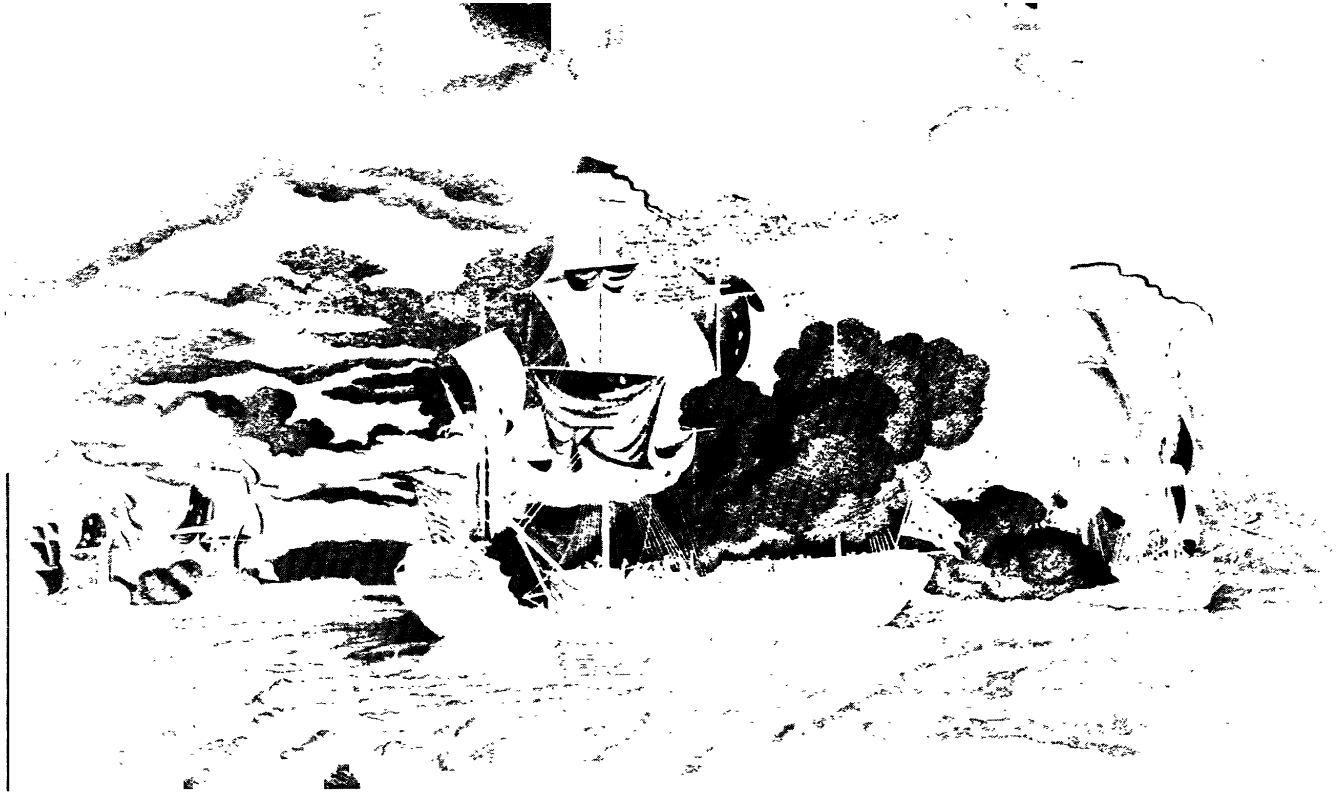


FIG. 62.—*Bon Homme Richard* and *Serapis*, September 23, 1779. (*Courtesy Naval Historical Foundation. From Beverley R. Robinson Collection*)

Montgomery (24), destroyed in the North River, 1777, to avoid capture—never got to sea.

Washington (32), burned in Delaware Bay, 1778, to avoid capture—never received her battery.

Effingham (28), destroyed off Delaware Bay, 1778, by the enemy—never received her battery.

Virginia (28), captured in Chesapeake Bay, 1778, while aground.

Warren (32), burned in Penobscot Bay, 1779, to prevent capture.

Providence (28), captured in Charleston, South Carolina, 1780, when city surrendered.

Boston (24), captured in Charleston, South Carolina, 1780, when city surrendered.

The exploits of Paul Jones are too well known to need recounting. His first service was as first lieutenant of the *Alfred*. He was promoted to captain in May, 1777. Mrs. De Koven, one of his biographers, emphasizes the fact that on June 14, 1777, the Congress adopted two notable resolutions. The first made the Stars and Stripes the national banner of the United States. The second appointed Paul Jones to command the *Ranger*. The position of the first is still secure among the flags of the world and the fame of the second endures.

His daring and successful cruise around the British Isles in the *Ranger* earned Jones the command of a squadron of five ships. Four of the five were loaned by France. Of these the *Bon Homme Richard* of imperishable fame rests in the North Sea. The *Pallas* (30), *Cerf* (18), and *Vengeance* (12) were returned to France, and with them the *Serapis* (44) and the *Countess of Scarborough* (20) to replace the *Bon Homme Richard*. The *Aliance* (32) was the fifth ship of the squadron of five. Her disgraceful record under Landais was at least partially retrieved later under Captain John Barry. The end of the war in 1783 found but four ships remaining of all that had flown the Stars and Stripes in the Continental Navy.

Except when the French were on our coast in force, the throttling effect of English blockading ships and frigates—superior in numbers and guns—was severely felt. Ships in the State Navies at the peace were decommissioned and State Navies ceased to exist.

Of the four remaining in the Continental Navy, the *Hague* (32) and *Duc du Lauzun* (20) were sold in 1783. The *Alliance* was laid up in Philadelphia until 1785, then sold and converted to an Indiaman. Her bones finally rested on Pellets (Petty's) Island in the Delaware River opposite Philadelphia. The fourth and last to fly the flag was the

General Washington (20), captured from the English in 1782. After the war, under command of Captain Joshua Barney, by direction of Congress, she carried Paul Jones to France to negotiate for the payment of prize money due him, his officers and men from the French Government. On her return (1784) she was sold.

Thus ended our first navy. The brief account here given relates almost wholly to ships. The deeds of their officers and men, their achievements in the ships they built and manned, brought them and their country the respect of allies and enemies. This was true of the State Navies and privateers. Single ship actions were the rule. Our officers excelled in ship handling, in and out of action—a great tactical asset, but requiring experience to employ it in concert with other ships in a squadron or fleet.

Our one ambitious effort during the war to operate more than two or three ships together ended in complete failure. Commodore Hopkins' squadron was not drilled well enough to act as a unit. Arnold's flotilla was an agglomeration, but not to be condemned on that account —it was the best to be had.

The failure referred to was with a fleet of Continental and State ships and transports commanded by Captain Dudley Saltonstall of the Continental Navy and the first captain of the *Alfred*.

The expedition under Saltonstall was sponsored by Massachusetts and directed by the Governor of that State, although 75 per cent of the total cost (two million pounds) was allocated to the Continental Navy which supplied the commanding officer and three ships: *Warren* (flag, 32), *Providence* (12), and *Diligent* (12). New Hampshire furnished the *Hampden* (22). The Massachusetts ships were the *Tyrannicide* (16), *Hazard* (14), and *Active* (14). There were also 1,000 Massachusetts troops embarked in 20 transports and 13 Massachusetts privateers, a total of 40 vessels.

The object of this armada was to drive the British out of what is now Castine, at the mouth of the Penobscot.

Saltonstall sailed from Boston July 19, 1779, with the fighting ships and transports. The troops were under the command of General Lovell. Paul Revere, with rank of lieutenant colonel, was chief of artillery.

We have no record of the signals prescribed for the conduct of the fleet. It reached the mouth of the Penobscot about the end of the month and attacked the British base, with partial success only.

While the Americans were concerting further action, a British squadron of four ships—which included the *Raisonnable* (64) and the *Vir-*

ginia (32) captured by the British in Chesapeake Bay—appeared. Three small craft at the base escaped from it and joined the squadron of four, which then proceeded to attack Saltonstall's ships. These, without waiting for the British to come within range, slipped their cables and fled up the river, pursued by the enemy. All were lost by burning or capture. Their crews and troops made the best of their way back to New Hampshire and Massachusetts.

Saltonstall was court-martialed and dismissed from the Navy.

It was a badly conceived, badly carried out, and fatal expedition, which dampened the ardor of the people of the northern states and encouraged the British. The account is of negative value only, and is cited as a warning.

This chapter concludes in a far different vein, with a reference to Paul Jones' service with the French. In 1782 Congress had selected him to command the *America*. When it was decided to present her to France, he was directed to put her in commission and transfer the command to the Chevalier de Martique, former commander of the *Magnifique,* representing Louis XVI. The transfer was made on the day the *America* was commissioned.

Jones, being without a ship, obtained permissioin to join a French squadron of 10 of the line, then at Boston under the Marquis de Vaudreuil, for the purpose, as he stated, of acquiring "military marine knowledge, in order better to serve my country, when America should increase her navy."

He was quartered in the flagship *Triomphante,* which sailed with the remainder of the squadron and a part of Rochambeau's army to join the combined French and Spanish fleet operating against Admirals Hood and Pigott in the West Indies. No general action, such as Jones had hoped, resulted. Hostilities having ceased, he sailed from Cap Francois for America, arriving in Philadelphia May 18, 1783.

During the year that he was employed in superintending the building of the *America,* Jones had studied the theory of naval tactics and had read the biographies of European naval officers. While in France, he had met D'Orvilliers, then at the height of his fame and in command of the combined French and Spanish fleets in the Channel, where he kept the British on the defensive.

In Philadelphia, after his return from serving with the French fleet in the West Indies, Jones wrote:

> If midnight study and the instruction of the greatest and most learned sea officers, can have given me advantages, I am not without them. . . . The English

are very deficient in signals, as well as in naval tactics. This I know, having in my possession their present fighting and sailing instructions, which comprehend all their signals and evolutions. Lord Howe has, indeed, made some improvements by borrowing from the French. But Kempenfeldt, who seems to have been a more promising officer, has made a still greater improvement by the same means. . . . A captain of the line, at this day, must be a tactician. A captain of a cruising frigate may make shift without ever having heard of naval tactics.

In view of the foregoing, it may have been that Jones, appointed to command our first ship of the line, felt it incumbent upon him to continue his studies of naval tactics, earlier begun in France. He considered that the command of the *America* would place him above all other captains and was equivalent to promotion to flag rank.

His statement relative to having in his possession the British sailing and fighting instructions is of historical value, because as already stated, those of the period were lost to the British themselves for over a century.

Jones further remarks that he had copies of the "signals, tactics, and policies that have been adopted under the different Admirals of France and Spain during the war . . ." presented to him, probably, while serving in the *Triomphante*.

CHAPTER XXIII

THE EVOLUTION OF NAVAL TACTICS, 1793-1802

Howe vs. Villaret-Joyeuse; Jervis vs. Cordova; Duncan vs. DeWinter; Nelson vs. Brueys

ADMIRAL HOWE accepted no naval employment after his return from the North American station until the fall of Lord North's Ministry, in March, 1782, but he was still bent on improving the British signal code. In 1779, he had written to Roger Curtis, captain of the *Eagle*,

> . . . I should be glad to know what part of our signals have been adopted. I should then be able to form an opinion of the principle upon which that great machine (the Grand Fleet) is to be put in motion Our signals were adapted rather for a single squadron, and though most of the articles might be applied to a larger force, the necessary continuation of the signals being different, the propriety of their use under different circumstances will vary also. . . . *The choice to be made of the expedients which any set of signals has provided for, will constitute, as we know, the ability of flag officers.*

Howe's sentences are always involved, but the meaning of the one just quoted is clear.

He set himself to create a set of signals which would give flag officers every expedient from which to choose. Corbett credits him with making Kempenfeldt's Grand Fleet sailing and fighting instructions a basis and then, either in collaboration with Kempenfeldt or alone (possibly with the aid of Curtis), compiling a new set in 1782. Corbett thinks he must have had Hoste at his elbow while working.

The Grand Fleet Additional Instructions already, as Kempenfeldt himself wrote, contained many of Howe's signals. Kempenfeldt wanted to use numerals; Howe was still for single flag-hoists.

Howe's services in command of the Grand Fleet and the death of Kempenfeldt have been recounted.

Captain Henry Duncan, who had been his "Adjutant" in the *Eagle*, wrote in his journal that Howe exercised the fleet frequently during the cruise and that he called all captains and admirals on board and explained to them his intention and manner of attacking the enemy if they should find it necessary to engage him.

Ten years of peace followed the Treaty of Paris in 1783.

Howe became First Lord of the Admiralty and spent five years, until 1788, reforming the navy. He was too busy in other directions to devote

much thought to tactics and signals. But some time after his resignation, and when war with Spain was in prospect, he again undertook a revision of the signal book, in collaboration with Sir Roger Curtis, who had made a digest of all existing codes. In 1789, Howe wrote to Curtis:

> The looseness of our present system of tactics in the navy—if any system may be properly said to exist—is such, that I cannot say I have quite made up my mind upon the plan I would recommend for publication.
>
> The digest you have made of those which have yet appeared in practice and your additions to them, invite me to resume that train of thinking. . . . I have deemed it very possible that the country may have to put to sea in a future war with thirty to forty, fifty and even sixty, sail of the line in one collective body. . . . It has not appeared to me that we have any common opinion amongst us how such a force is to be trained and conducted to act with uniformity and effect.

Howe's work with Curtis was completed about the time that difficulties arose over the ejection by the Spaniards of British traders from Nootka Sound on the west coast of Vancouver Island.

England demanded restitution and put Howe in command of a powerful fleet which mobilized in the Channel in June, 1790. He hoisted his flag on the *Queen Charlotte* (100) on June 22, with Sir Roger Curtis as chief of staff.

At its maximum, the Grand Fleet, on this occasion, numbered 35 of the line, 10 frigates, 4 cutters, and 2 fire-ships. There were five other flag officers.

The fleet of 34 of the line with which Howe took Gibraltar in 1782 was divided into three squadrons of two divisions each, and there is reason to believe that the Nootka Sound fleet of 1790 was similarly organized.

Howe issued the signal book which he and Curtis had completed, took the fleet to sea and drilled it in the Channel during August and September. Among his fighting instructions were nine new articles on "Battle Tactics," only one of which need be quoted, Article VIII. It read, in part:

> . . . when signal 42 is made . . . it will be incumbent on captains of the fleet to keep those ships of the enemy to which they are thus separately directed, upon the same constant bearing, if possible, as they advance towards them. . . . They are permitted [and this was Howe's new idea] in bringing up against the enemy to take their station on either part, to windward or to leeward of their opponents, as they see most suitable for closing with them to advantage and to disable them most speedily. . . .

In his signal book, Howe left a blank after the words "against the enemy" and later filled in the permission to bring up to windward or leeward, etc., in manuscript. Permission to bring up to leeward, was

evidently aimed at preventing the French from executing their usual maneuver of firing as the British approached, and then bearing up, as the latter rounded to.

In another order he provided for withdrawing his flagship from the battle line and directing the action from some other position—not specified.

Later, he issued an important order, inaugurating a custom, which in our navy was long honored "in the breach":

> The several flag officers are to have the particular superintendence and conduct of the divisions respectively in which their ships are placed in the order of battle; but subject to the general direction of the commander of the squadron to which they belong.

With slight modifications, this continues to be an important tactical maxim.

Earlier, in 1782, when Kempenfeldt was one of his flag officers in command of a squadron on detached duty, Howe had written to him:

> . . . While you remain on this service you will establish such signals and instructions for the government of the ships under your orders as you may think fit.

This was to give Kempenfeldt an opportunity to try out his own signal system and flags.

Corbett says that Admiral Samuel Hood was now—in 1790—Howe's recognized rival in the service. He was one year older than Howe, but had had fewer independent commands, and if his letters indicate his character, was prone to criticise his seniors and sulk, as was the case at the Chesapeake when under Graves, who was slightly his junior in age but his senior in rank.

Howe, at the age of 64, detached from the Nootka Sound fleet in the fall of 1790, although the occasion for employing the fleet had lapsed, called it his "professional annihilation."

The next year, difficulties with Russia caused the mobilization of another fleet of 36 of the line under Hood.

H. W. Wilson, British naval author and editor of Clowes' *History of the British Navy* covering this period, calls Hood "the most able and capable flag officer then serving in the navy."

All of the junior admirals who had served under Howe were replaced by others in Hood's fleet who were less well known.

McArthur, Hood's secretary, had perfected a signal code which he hoped Hood would adopt but felt some delicacy about trying to supersede Howe's code. So instead of offering his own, he re-arranged Howe's code, indexed it, and added some of his ideas which obtained

Howe's approval. From Kempenfeldt's papers he compiled a set of night signals. His modified day signals and new night signals received Admiralty approval and were issued to Hood.

"From July 10th to August 14th, 1791, Hood was out continually, practicing evolutions, his custom being to fall his flagship out of the line and drill by the amended signals."

Hood kept a record of the evolutions performed and the elapsed time for each and illustrated them by diagrams. He records a division of his fleet as having tacked together in eight minutes. From a retreat formation, at an angle of 158 degrees, he formed line of battle on one wing in twelve minutes.

Wind and sea were controlling factors in evolutions under sail but skill in timing, handling sail, and steering could be compared—both for ships acting singly and in concert.

Hood's fleet seems to have been kept on a war footing until the end of the summer of 1792. He issued some tactical instructions supplementing Howe's amended code, but no copies have been found.

Howe, then 66, was cheered at the end of the year by learning that he would probably be employed again.

The French Revolution, after more than three and a half years of internal and external strife, reached a climax on January 21, 1793, with the execution of King Louis XVI. This brought about a coalition between England, Spain, and Holland as naval powers and the land forces of Prussia, Austria, and others. It was now France against the maritime world instead of England as in the period 1778 to 1783.

According to Clowes, in February, 1793, or soon thereafter, England had available for immediate service 75 of the line and 40 others, built or building, nearly ready. France had at most 76. She began to build feverishly, since England was only one of her opponents. The Dutch had 12 serviceable ships of the line and Spain about 35. Portugal, Sardinia, and the Two Sicilies had a few. In all, the Confederacy against France, by the early summer of 1793, had at its disposal 175 ships of the line.

On February 6, 1793, Howe "kissed hands" on his appointment to the Grand Fleet as Commander-in-Chief. He again chose Sir Roger Curtis as chief of staff and hoisted his flag, at the end of May, on the *Queen Charlotte* (100), Sir Andrew Snape Douglas, captain.

From that date, almost continuously until the end of 1805, the English fleet was at war, or on a war footing.

As soon as he had a hint that he was to command the fleet, Howe

busied himself "with every kind of detail for remedying the defects of the service." He got to sea on July 14, with 15 of the line, some frigates and sloops. After the necessities of other stations were met, the Grand Fleet was augmented to about 30 of the line. Some of these and some of the smaller craft convoyed outbound trade. The main body watched the French in Brest.

Sometime between July and August, Howe and Curtis revised and re-issued the Signal Book. The new Code—according to Corbett—remained, in all its essentials, in force in the British Navy until 1816. The signals were numbered after La Bourdonnais' plan which Kempenfeldt had advocated: flags for units and tens; pennants for hundreds.

Signals were to be hoisted where they could best be seen. This was the final abandonment of the old custom of having the meaning of the flag dependent upon where it was hoisted.

There was a special table for "Private ships" (those not carrying flag officers) to use in communicating with the Admiral.

The Signal Book was not complete in itself. It was accompanied by an Instruction Book and an Additional Instruction Book. The latter related mainly to the performance of evolutions (a tactical book); the former was explanatory of the Signal Book. No copies of either have been found. The new signal book was more conveniently arranged than its predecessors. Numbered blanks were left for important battle signals, and these were entered by hand.

One of them—No. 34—has been called "Howe's signal for breaking the line in all parts" either from the windward or leeward position of his own fleet. Under the signal was a note which read: "The different captains and commanders not being able to effect the specified intention in either case, are at liberty to act as circumstances require."

Howe's fleet was active until December, but failed to bring the French to action, although the Brest fleet of 21 of the line under Vice Admiral Morard de Galles was at sea in August.

Civil war in France between Republicans and Royalists was rife. A mutiny in De Galles' fleet, off Belle Isle, led to its return to port and the dismissal of all officers and men disaffected to the Revolutionary cause or suspected of royalist sympathies. The commander-in-chief and all but one of 26 captains in the Brest fleet were removed.

Their successors were Villaret-Joyeuse, commander-in-chief—a lieutenant up to the time of his elevation to chief command—while 23 captains were created from 4 lieutenants, 10 sub-lieutenants, a petty officer, a seaman, and 7 pilots or masters of coasters.

The re-organized fleet was not ready to sail until the spring of 1794.

The Republican government suffered a further blow in the loss of 13 of the line and 8 frigates from the Toulon fleet in the fall of 1793, resulting from a combined attack by a British fleet under Admiral Samuel Hood and a Spanish fleet under Admiral Langara. The combined fleets numbered 40 of the line with many frigates, store-ships and transports, carrying about 17,000 troops. There were many royalists in Toulon, both afloat and ashore, and it was believed that both the fleet and the city could be held for the royalist cause with a show of force.

Negotiations for the surrender of the fleet and city began August 23, but there was too large a republican party in the fleet and too much fear of the republican troops on shore to bring about a peaceful conclusion.

The French fleet hoisted the white flag when the Allies entered the harbor and the forts surrendered when Hood landed troops. The Convention, however, decreed the death of all the inhabitants of Toulon and the destruction of its buildings. A republican army was collected to re-capture it and deputies of the Convention were sent to enforce the decrees.

The British and Spanish were besieged. Artillery fire from the shore made the harbor untenable for ships and after three months' siege they were forced to evacuate, burning or carrying away as much of the shipping as possible. Eighteen of the line, however, were left to the French.

Fifteen thousand royalists fled with the allied fleet, while 6,000 others were afterwards killed by order of the republican deputies. Toulon was reduced from 28,000 to 7,000 inhabitants.

Napoleon, then 25 years of age and an officer of artillery in the republican army, distinguished himself in directing the attacks which brought about the defeat of the Allies.

Hood and Langara brought off some prizes of which 16 were taken by the British and 3 by the Spanish (a 36-gun frigate and two corvettes). Hood claimed three fine frigates, three 74s, and a 120-gun ship, the *Commerce de Marseille,* acclaimed as the largest and most beautiful ship that had ever been seen. According to Allen, she worked and sailed like a frigate. By the measurement methods then in vogue, she was of 2,742 tons. The British claimed she was unseaworthy and eventually broke her up, but her hull long remained their model.

Much earlier in the year—in fact, not long after war was declared—

an English squadron recaptured from a French privateer the Spanish galleon *San Jago,* with a cargo valued at £200,000, and refused to return her to Spain. Much bad feeling between the two allies ensued and it was probably not abated by the British getting more than the lion's share of the Toulon ships.

When Howe got to sea in the spring of 1794 (May 2) he had 32 of the line under his command with a complement of frigates, supply, and fire-ships.

His battleships were organized into three squadrons of two divisions each, with a flag officer in each division. There was also a formation of two grand divisions or wings; starboard and port (right and left). The starboard grand division comprised the van squadron and one division of the center squadron. It was under the second in command. The Commander-in-Chief commanded the port grand division. There was a detached, or advanced, squadron of four 74s under a flag officer. This was later called the reserve.

The next year, 1795, Howe replaced the division of battleships with two frigate squadrons, and later still, sailed with an advanced squadron and a reserve.

In 1794, engaged in convoying his own trade, and trying to intercept home-coming French trade, Howe permitted Villaret-Joyeuse to get to sea without his knowledge, although the two fleets nearly encountered each other in a fog, on May 17.

The French captured a large part of an in-bound British convoy from the Newfoundland Banks and also took toll of an out-bound Dutch convoy for Lisbon. Howe recaptured these, learned something of the French whereabouts, and began to search for them.

His frigates made contact on May 28 and he sent his advanced squadron of 74s to reconnoiter. They sighted the French approaching and counted 26 of the line and 5 frigates.

When still a long distance to windward, the French formed their line on the port tack. Howe came to the wind on the same tack and endeavored to close. The wind was fresh at south by west, with a rough sea. He signaled his fleet that there would be time for the men to go to dinner.

After nearly three hours (about 1:30 P.M.) the French tacked and showed an inclination to make off. Howe ordered his flying squadron to annoy their rear. He then tacked and made the signal for a general chase; ships to engage as they came up.

Four 74s got up with the enemy and carried on an action with the

Revolutionnaire (120), the rearmost of the French vessels. Both the *Revolutionnaire* and the *Audacious* (British) were badly damaged but eventually reached home ports.

Both fleets carried a press of sail during the night and the British carried lights. Course about E.S.E. In the morning (May 29), the French being to windward, Howe thought by tacking he could reach high enough to break through the French line. He made signal to that effect but could not lay up enough to achieve his object, though it appeared as if he would pass within gun range of the enemy's rear.

The French van, followed by the center, wore to protect its rear, and after passing the rear ship came to the wind on the port tack to windward of the British and parallel.

Between nine and ten o'clock the French decided to accept action and their van kept away until within gun range and then opened fire. Howe persisted in his intention to break through. Once he annulled the signal, feeling he was not far enough ahead. Again smoke obscured the hoist and the signal was not obeyed. Finally after two and a half hours of a parallel and partial engagement, he repeated the signal to tack and break through.

At least two of the British line wore, being unable to tack; others kept on the port tack but in poor column. The French carried single reefed topsails and mainsail and made better weather of it. Howe in the *Queen Charlotte* and two ships in his rear tacked under double-reefed topsails, courses, staysail and jib, passed through, and cut off five ships of the French rear. Then they tacked again to parallel the French to windward. The French van and center again wore to the rescue of their rear.

Howe hoisted the signal for a general chase. The three ships with him wore, and apparently those to leeward. In any case, all came to on the starboard tack and continued a partial engagement with the French to leeward.

About five o'clock, the French wore out of gun range. The British also wore, but made no attempt to close. Instead they lay by during the night to repair damages, and by the middle of the following forenoon all but one ship were ready for action. Their losses were 67 killed and 128 wounded. The losses were confined to 10 ships of the more than 20 British engaged. French casualties are not available, but there were no French ships lost or disabled.

It cannot be said that Howe's determination to bring on a decisive action by breaking through the French line was successful.

The French were in sight to leeward for a short time on the forenoon of the 30th, but were lost to view in a fog which scattered the British themselves until the morning of the 31st when they began to form up. It was two in the afternoon, however, before Howe was ready for action and bore up for the enemy.

In the meantime, the French who were in sight to leeward, edged away. Darkness came on before Howe got within gun range, although he had signalled his van and center to engage the enemy's van and center.

At 7 P.M. the British came to the wind on the port tack. The French did likewise; both fleets standing to the westward, wind at S. by W. Howe stationed two frigates to watch the enemy's movements, but the French, except for sagging more to leeward, kept formation and a westerly course during the night.

At daylight (June 1) the French were in sight about six miles on the starboard (lee) bow. Howe having the wind stood for them until he had closed to about two miles, when he hove to on the port tack for breakfast. While hove to, he signalled that he intended to attack the enemy's center and engage to leeward. He meant to force a decision. The French were not unwilling and also hove to, awaiting the attack.

The British filled at 8:12 and bore up. Both fleets were on the port tack under single reefed topsails. There was a moderate breeze, south by west.

Clowes says that Howe, then 68 years old, had barely quitted the bridge of the *Queen Charlotte* for three days and his men were correspondingly fatigued. No doubt the French were in like condition.

During the approach, Howe made some changes in his battle line, with a view—according to Clowes—of making the combat more equal. Possibly the idea was to bring flagship opposite flagship. Howe was old-fashioned in this respect.

Each ship was then ordered to steer for, and independently engage, the ship opposite to her in the French line. This does not quite agree with Howe's signal that he intended to attack the center, but by this he may have meant that his center squadron which included the *Queen Charlotte* would do this and that van and rear would attack their opposites. All his signals, however, are not at hand.

The important feature is that he wished to try again his plan for breaking through, which had failed on the 29th, and to prevent the French from bearing up after damaging the British during the approach, and thus avoiding a decisive battle.

Howe meant to *force a decision.*

The composition of the two fleets is shown in the accompanying table.

BRITISH	FRENCH
1. *Cæsar* (80)	1. *Trajan* (74)
2. *Bellerophon* (74), flag, Rear Admiral Pasley.	2. *Eole* (74)
3. *Leviathan* (74)	3. *America* (74)
4. *Russell* (74)	4. *Temeraire* (74)
5. *Royal Sovereign* (100), flag, Admiral Thomas Graves	5. *Terrible* (110), flag, Rear Admiral Bouvet
6. *Marlborough* (74)	6. *Impetueux* (74)
7. *Defence* (74)	7. *Mucius* (74)
8. *Impregnable* (98), flag, Rear Admiral Caldwell	8. *Tourville* (74)
9. *Tremendous* (74)	9. *Gasparin* (74)
10. *Barfleur* (98), flag, Rear Admiral Bowyer	10. *Convention* (74)
11. *Invincible* (74)	11. *Trente-Un Mai* (74)
12. *Culloden* (74)	12. *Tyrannicide* (74)
13. *Gibraltar* (80)	13. *Juste* (80)
14. *Queen Charlotte* (100), flag, Admiral Howe	14. *Montagne* (120), flag, Rear Admiral Villaret-Joyeuse
15. *Brunswick* (74)	15. *Jacobin* (80)
16. *Valiant* (74)	16. *Achille* (74)
17. *Orion* (74)	17. *Vengeur* (74)
18. *Queen* (98), flag, Rear Admiral Gardner	18. *Patriote* (74)
19. *Ramillies* (74)	19. *Northumberland* (74)
20. *Alfred* (74)	20. *Entreprenant* (74)
21. *Montague* (74)	21. *Jemappes* (74)
22. *Royal George* (100), flag, Rear Admiral Alexander Hood	22. *Neptune* (74)
23. *Majestic* (74)	23. *Pelletier* (74)
24. *Glory* (98)	24. *Republicain* (110), flag, Rear Admiral Nielly
25. *Thunderer* (74)	25. *Sans Pareil* (80)
	26. *Scipion* (80)

Thus flagship was opposed to flagship in van and center. Howe or Villaret-Joyeuse seems to have held to the old custom in this respect. In the rear, Admiral Hood was opposite a 74, the *Neptune,* but he steered instead for the *Republicain* (110), Admiral Nielly.

According to signal, British ships steered independently, but Hood did not steer for his opposite.

Bearing up at 8:12, the leading British ships crossed the four miles separating the two fleets in little more than an hour. The French van

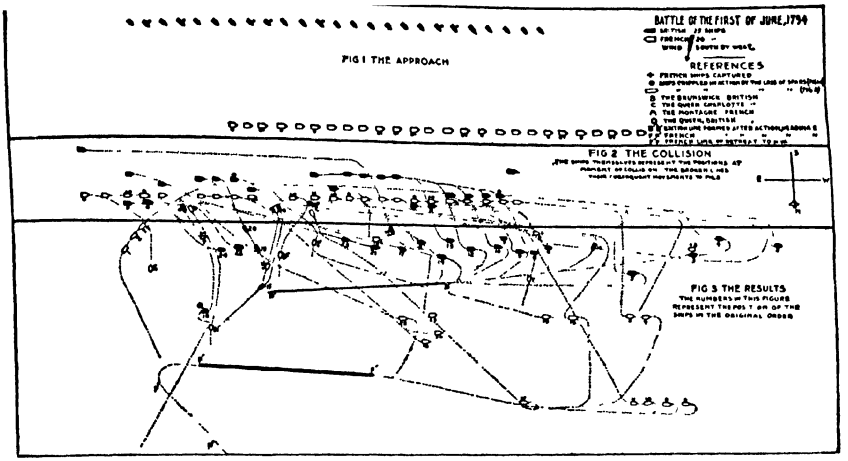


FIG. 63.—(*From Mahan's "The Influence of Sea Power upon the French Revolution and Empire," Little, Brown & Company, Boston*)



FIG. 63a.—Vice-Admiral Villaret-Joyeuse. (*From "Histoire de la Marine Francaise," Librairie Larousse, Paris*)

commenced fire at long range at 9:25. At 9:50, firing was general on both sides. Howe had the signal for close action flying.

Graves, in the *Royal Sovereign,* engaged Bouvet in the *Terrible* to windward. Howe, in the *Queen Charlotte,* broke through and engaged the *Montagne* to leeward. Hood did likewise with the *Royal George* against the *Republicain.*

A few other British broke through, but the majority rounded to, to windward; some at short, and others at long range (Fig. 63).

The ships that broke through and engaged to leeward, were, in their order in column: the *Marlborough* which passed under the stern of her opposite the *Impetueux* and engaged her to leeward, close aboard; the *Defence* which passing between the *Mucius* and *Tourville* was fiercely attacked and quickly disabled. She was taken in tow by a frigate. The *Queen Charlotte* passed close under the stern of the *Montagne* and raked her in passing. A mêlée ensued between the ships supporting the *Montagne* and those supporting the *Queen Charlotte.*

The *Valiant* broke the line ahead of the *Patriote;* the *Royal George* astern of the *Republicain.* The *Glory* passed under the stern of the *Scipion* and engaged her to leeward. In all, six ships obeyed the signal to engage to leeward.

The battle was notable for the number of ships crippled in masts and rigging. None were sunk, nor apparently in danger of sinking, but fully half of all the ships engaged lost one or more masts.

At 10:10, Villaret-Joyeuse attempted to withdraw from the mêlée around the *Queen Charlotte.* He was followed by the *Jacobin* and others. Howe immediately signalled for a general chase.

The *Montagne,* after getting clear, wore, and followed by 11 other French ships stood east. Howe followed, with 6 of his vessels to protect his rear. Five of the French crippled ships joined their admiral and escaped; six surrendered, and one sank, later. Two others appear to have been towed out of action and escaped.

Howe's losses were 700 killed and 1,140 wounded. In the six captured ships, the French losses were about 1,200 killed and wounded.

Whether the signal to engage to leeward made the battle more decisive than it might otherwise have been is conjectural. It is certain that a mêlée was brought on and both fleets were formless.

Villaret-Joyeuse, with his worst cripples in tow, was out of sight, unmolested, by the time darkness fell. Howe remained in the battle area until June 3 before he was able to make sail for port with his entire fleet and prizes.

The prizes, in the order in which they sailed in the French line, were:

No. 3, *America* (74); No. 6, *Impetueux* (74); No. 12, *Juste* (80); No. 16, *Achille* (74); No. 19, *Northumberland* (74); and No. 25, *Sans Pareil* (80). No. 17, *Vengeur* (74), sank on the evening of the battle with 200 of her crew of 600.

James says that mounted in Howe's fleet—names of ships not given—were four 68-pounder and sixty 18-pounder carronades. The French had a total of 112 carronades, all brass 36-pounders. Accounts of the battle contain no mention of them or of their effectiveness.

The French fleet flew the new national ensign—the tri-color—and the French flagship carried a deputy of the National Convention (the existing Government) in the person of Jean Bon Saint-André. It became a custom of the Convention to send one or more of its deputies with each fleet and each army, either to encourage, or terrorize, the officers and men into doing their utmost for the Republic.

The duty of the deputies was to put into effect a decree of the Convention which threatened death to the captain and officers of any ship of the line who should haul down the national colors to any enemy—however numerous—unless the French ship were so damaged as to be in danger of sinking before the crew could be saved. To captains and officers of smaller vessels, death was also decreed, should they surrender to double their force, except under the condition above cited.

Saint André was, to all intents and purposes, the commander of the French fleet. According to James, he assured the French people that the engagement of May 29, "though not decisive, was eminently glorious." He gave no account of the final battle of June 1, known in British annals as "The Glorious First of June."

The scene of the action was approximately in Latitude 47° 48′ N., Longitude 18° 30′ W.

Villaret-Joyeuse reached Bertheaume Bay on June 11. Howe arrived at Spithead with his prizes on June 13, averaging somewhat less than 100 miles per day.

Many promotions and honors came to the victors in this action. Vice Admiral Graves was made Baron Graves of the Irish peerage. Alexander Hood was made a viscount, with the title of Lord Bridport. The other admirals and Curtis, Howe's chief of staff, were made baronets.

Many thrilling single ship actions form part of the history of this battle, but they cannot be recounted here.

One promotion, at least, was made by the Convention. Villaret-Joyeuse was advanced to the rank of Vice Admiral and his flagship was re-named the *Peuple.*

Corbett says that to the end of his life, Howe regarded his signal to

break through the line at all points, as one involving great risks and not to be lightly undertaken. In his last letter to Sir Roger Curtis, written a week or two before his death, he said:

> Some occasions in our profession . . . will justify, if not require, more hazard than can be systematically defended. . . .
>
> In our action on the first of June . . . the time and peculiar circumstances of that period . . . called, in my opinion, for some conclusive issue of the contest.

Corbett thinks that this "was exactly Nelson's frame of mind when he made his risky attack at Trafalgar."

No other engagements of importance took place during 1794. The overwhelming superiority in ships of the line enjoyed by the Coalition against France did not achieve the results that might have been expected. The French navy was not shut up in its ports. Command of the sea by the Coalition was not complete.

In the Mediterranean in March, 1795, and again in July of the same year, Vice Admiral William Hotham in the *Britannia* (100), and with fleets numbering 14 and 23 of the line respectively, fought indecisively against French fleets under Admiral Martin numbering 15 on the first, and 17 on the second occasion. A French Deputy was present with Admiral Martin in both actions.

In the first battle, which covered portions of two days, March 13 and 14, Hotham captured the *Ca Ira* (80) and the *Censeur* (74). He obtained little credit, as it was felt he should have done more.

On the second occasion, July 13, Hotham captured the *Alcide,* but she took fire and was destroyed at the scene of action. Some of the French crews had recently mutinied, but were brought back to their duty by the influence of Deputy Niou, representing the Government.

Hotham's second failure to press pursuit of a fleeing enemy was much criticized and after a few months he was superseded.

On June 16, Vice Admiral Cornwallis, cruising off Ushant with 5 of the British line, was surprised by Villaret-Joyeuse with 12 of the French line, accompanied by 11 frigates.

The British employed every means to escape and carried on a vigorous action in retreat. All 5 ships sacrificed their stern frames and galleries that they might keep up the heaviest possible stern fire. The *Triumph* cut away (with the exception of the timbers) a large part of her stern itself, in order to improvise gun-ports. (All ships of that period were weak in stern and quarter fire—so weak that the quarters were termed "points of impunity" where no gun would bear, and there were no stern ports.)

Two of the squadron cut away their anchors and threw away gear and provisions, but Cornwallis, realizing that he would be overtaken, went about after a chase of twenty-six hours, and attacked the French leaders, to such good effect that he was able to escape.

A gale ensued which drove the French to shelter under Belle Isle. When it subsided and Villaret-Joyeuse was getting under way for Brest, on June 22, he sighted Alexander Hood with 17 of the Channel fleet. Not desirous for battle, Villaret-Joyeuse took up a retreat formation, steering for the French coast.

For 24 hours, Hood chased the erstwhile chaser. His leading ships had orders to harass the French rear and to take stations for mutual support when they got within range.

The first ship to be overtaken was the *Alexander* (74), formerly British, which was being towed by a frigate. The overtaking British ship was the *Sans Pareil* (80), captured by Howe on the First of June.

Villaret-Joyeuse did not go about to attack the enemy's leading ships, with the result that 8 of the British overtook 7 of the French rear and captured 3 of them, the *Alexander, Tigre*—also British built—and the *Formidable.*

Villaret-Joyeuse got into L'Orient on the evening of June 22 about 11 hours after Hood had given up the chase.

Mahan seems to think that Hood might have done more and was unable to account for his failure to keep up the chase. He writes:

> Such was the extreme circumspection characterizing the early naval operations of the British until Jervis and Nelson enkindled their service with the relentless energy and spirit inspired by Bonaparte on land.

Hood's losses were 31 killed and 113 wounded. The French losses on the *Alexander, Tigre,* and *Formidable* were 670 killed and wounded.

The *Alexander* had been captured by the French on November 6, 1794, when, in company with a faster consort, the *Canada,* she encountered 5 French ships of the line under Rear Admiral Neuilly. The *Alexander's* lack of speed made her a victim. The *Canada* escaped. She was commanded by Richard Bligh.

The French having subdued Holland, the Dutch fleet swelled their numbers during the summer of this year.

The next year there were no fleet engagements. Naval warfare spread to the Dutch East Indies.

In August Spain signed a treaty of alliance with France and agreed to furnish 15 sail of the line and 10 frigates when circumstances required. As a result of this alliance, Admiral Jervis, who had suc-

ceeded Hotham, found himself on the defensive and was finally obliged to abandon the Mediterranean.

The Coalition had failed. England alone remained to dispute command of the sea with the Dutch, French, and Spanish fleets, and was obliged to add the watching of Dutch and Spanish ports to the duties of her lookout squadrons.

If Hotham was unable to keep the French in Toulon, Howe failed equally in that respect with regard to Brest. On December 17, 1796, a fleet of 17 of the line, 13 frigates, and transports carrying 17,500 men came out of Brest to make a descent on the Irish coast. The squadron was commanded by Vice Admiral Morard de Galles, who had been restored to his former command, replacing Villaret-Joyeuse. Rear Admirals Bouvet and Nielly retained their positions as second and third in command.

Although some troops were landed in Bantry Bay five days after sailing from Brest and 15 sail of the line reached that port, the expedition was a complete and disastrous failure.

The noteworthy feature from a tactical point of view is that each admiral had two flagships—a ship of the line and a frigate, and that, as a rule, each directed his squadron from his frigate.

On the night after sailing, the French, while trying to evade the British off Ushant, became separated and were never completely reunited. De Galles, in his frigate flagship, with two other frigates and one 74, was separated from his main body. There was a heavy gale on the 23rd and he did not succeed in joining his squadron or his flagship of the line *Indomptable.*

Bouvet was for a time in command of the major part of the expedition. A gale parted him from his command and he returned to Brest alone, in his frigate flagship *Immortalité.* De Galles arrived two weeks later, likewise in his frigate flagship *Fraternité.*

The ships that did reach Ireland accomplished nothing. The ship of the line *Droits de l'Homme,* carrying Bouvet's flag, was wrecked off the Penmarcks, after a running fight with two British frigates.

During the gale Nielly's frigate flagship *Résolue* collided with the *Indomptable* and was completely dismasted.

Clowes' *History* does not tell us how Nielly got back to Brest, nor whether a French Deputy accompanied the fleet.

The reason for the assignments of two flagships—a frigate and a ship of the line—to each admiral has not been made clear. No doubt the French were aware of Howe's attempt to conduct his fleet from the

Apollo in 1778, and of Rodney's efforts to better the position of the commander-in-chief by embarking in a frigate on two occasions, when attempting, without success, to outmaneuver De Guichen in 1780. As far as known, the experiment was not repeated.

De Galles did not lose his command. Later, in 1797, he was to have taken command of a combined French, Dutch, and Spanish fleet intended to clear the way for the unquenched desire and hope of the French—to invade England. Like many others, the attempt did not advance beyond the planning stage.

The Spanish government had agreed to furnish France a fleet of 27 of the line, 12 frigates, and smaller craft under Admiral Don Jose de Cordova. Admiral Jervis, whom the allied Toulon and Spanish fleets had forced out of the Mediterranean, was on watch outside off Cape Vincent to prevent Cordova, after sailing from Cartagena, from getting away northward to join the French and Dutch. Cordova intended to put in at Cadiz (southeast of the Cape) but was driven westward by a gale and into the vicinity of the observing fleet off Cape St. Vincent.

On February 13, 1797, Jervis learned that Cordova was about five leagues to the westward of the British fleet with a fair wind for Cadiz.

Jervis stood south during the night of the 13th, prepared for action, and in the morning he sighted 5 Spanish ships to the southwest (on his port bow) on the same tack as himself (starboard, wind west by south).

Jervis formed his fleet in double column and then detached 6 of his ships to chase the 5 Spaniards.

Jervis had but 15 of the line with the flag that day. Thus his columns numbered only 9 ships in all, after detaching 6 to chase.

Jervis, in the *Victory* (100), had in his fleet Vice Admiral Thompson, *Britannia* (100), Vice Admiral Waldegrave, *Barfleur* (98), Rear Admiral Parker, *Prince George* (98), and Commodore Nelson, *Captain* (74). Rear Admiral Parker commanded the squadron which had been detached in chase.

The weather was hazy until about 11 A.M., when it cleared and disclosed in the northwest the Spanish main body in such numbers that Jervis decided to keep his fleet intact and to cut off the Spanish squadron to the southwest, which apparently, on sighting the main body, changed course to rejoin.

The British remained close-hauled on the starboard tack on course about south by west, intending to pass to windward of the smaller group of Spaniards and to leeward of the main body if the latter kept its course. However, about 11:30, the main body in poor formation

wore to pass on the opposite tack, and in a few minutes the battle was opened by the *Culloden,* Captain Thomas Troubridge, the signal to commence firing having been hoisted and the fleet having changed from double to single column. This was carried out, not according to the rules laid down, but in response to a signal from Jervis for ships to take station ahead or astern of the *Victory,* as most convenient.

One of the leading ships of the Spanish main body stood off to the southward and eastward, nearly before the wind. The leeward group

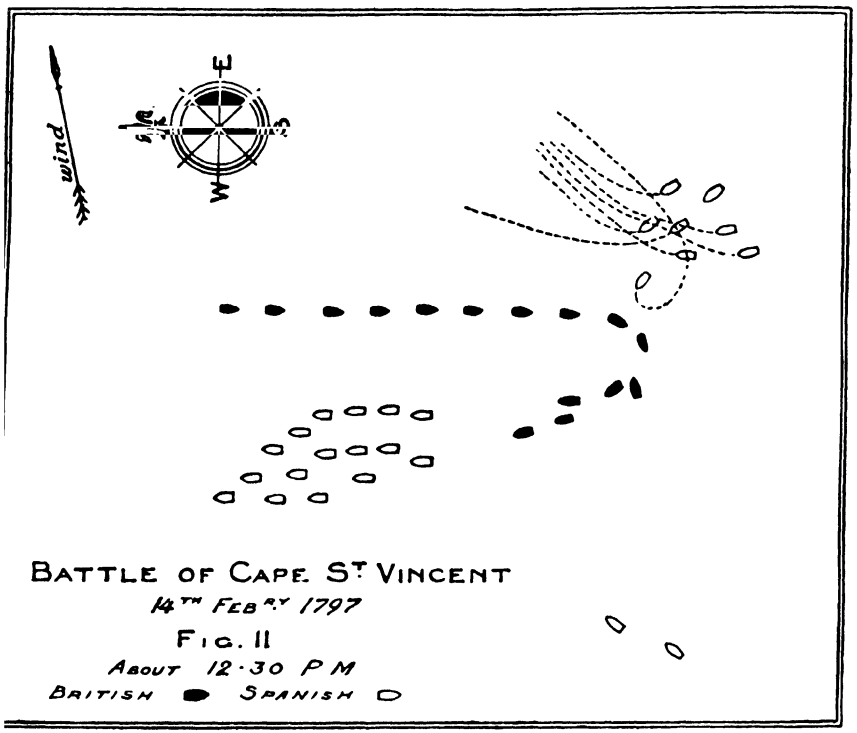


FIG. 64.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

was out of range on the port tack, approaching the British. Two of the main body were far to the rear, so that as the battle opened 15 British met 16 Spaniards on opposite tacks.

When his column was formed, Jervis had signaled to break through the Spanish line, but the signal appears not to have been obeyed. The Spanish line having been badly formed, some of its fire was blanked.

By 12:10, the *Culloden* had passed the last Spaniard and received

the signal to tack. She was followed by the three next astern; but the fourth astern—fifth in column—had lost so much top-hamper (partly from fire from the Spanish leeward group) that she missed stays and was obliged to wear and fill to leeward, and was taken in tow by a frigate.

The Spanish lee division tried to break through the British line to join the main body, but after a heavy fire from the *Victory* and her next ahead, the *Irresistible,* the Spaniards wore and went out of action, except the *Oriente* to rear of the group, which passed down the British line, wore round its stern and joined the main body.

After six ships astern of the *Culloden*—including the *Victory*—had tacked, the head of the Spanish main body ran off the wind to pass astern of the British and join the division in retreat.

Observing this, Commodore Nelson, third from the British rear, wore to head off the Spaniards, and laid his flagship the *Captain* across their bows.

Jervis signalled Collingwood in the *Excellent,* also a 74, and the last ship in column, to tack. About this time, the *Culloden* and *Blenheim* had overtaken and attacked the Spanish rear.

On the approach of the *Captain,* followed by the *Excellent,* the Spaniards came to the wind again on the port tack, after giving the *Captain* their broadsides.

As already observed, the Spanish were badly formed, and being attacked both ahead and astern with other British ships tacking to engage, formation disappeared altogether and a mêlée was the result.

The *Captain* suffered so much damage from the fire of the *Santissima Trinidad* (130) and others, that she hauled off to make repairs. She then returned and entered the thickest of the fight. After losing her foretopmast and having her wheel shot away, she fell foul of the *San Nicolas* (112) which was already foul of one of her companions, the *San Josef,* also a 112. Nelson led the boarding party which swarmed on to the decks of the *San Nicolas,* effecting a quick capture, and thence aboard the *San Josef* which also surrendered. In his own words:

> I was on the quarter-deck [of the *San Josef*] where the captain, with a bow presented me with his sword, and said the Admiral was dying of his wounds. I asked him on his honour if the ship was surrendered. He declared she was; on which I gave him my hand and desired him to call on his officers and ship's company and tell them of it; which he did; and on the quarter deck of a Spanish first rate, extravagant as the story may seem, did I receive the swords of vanquished Spaniards; which as I received, I gave to William Fearney, one of my bargemen, who put them with the greatest sang froid, under his arm.

The British claimed that the *Santissima Trinidad,* the largest ship afloat, was one of those which struck her own, and hoisted British colors, but they did not take possession of her, and other Spanish ships coming to her assistance, including the two laggards of the large group, she managed to get clear. The Spanish lee group, coming by the wind again on the port tack, also joined the large group. Jervis, observing this, ended the battle by a signal to bring to, made at 3:52, in order to protect his prizes and the disabled vessels.

The British loss was 72 killed and about 400 wounded. Only about 14 of the Spanish fleet appear to have been in close action. The prizes *Salvador del Mundo, San Ysidro, San Josef,* and *San Nicolas,* lost 261 killed and 292 wounded. The number of those killed in the *San Nicolas* alone was double that of the whole British fleet. The *Santissima Trinidad* had upwards of 200 killed and wounded.

Clowes speaks of it as a great victory, but not a surprising one, "because Don Jose de Cordova had under his orders little better than a raw, and presently, panic-stricken mob of men."

There were but 60 or 80 seamen per ship, in complements ranging from 530 to 930 men. All the rest were soldiers or green landsmen. The *San Josef,* after her capture, was found to have the tompions still in her guns, and these on the side on which she was mostly hotly engaged. Nothing of this, however, can detract from the thrilling spectacle of Nelson's inspiring gallantry. Writing to his wife from the *Excellent* after the battle, Collingwood said:

> The first ship we engaged was the *San Salvador del Mundo* of 112 guns, a first-rate. We were not further from her when we began than the length of our garden. Her colors soon came down and her fire ceased . . . and I left her to be taken possession of by somebody behind and made sail for the next, the *San Isidro,* 74, so close along side that a man might jump from one ship to the other. Our fire carried all before it and in ten minutes she hauled down her colors . . . made a signal for somebody behind to board him . . . then making all sail passing between our line and the enemy, we came up with the *San Nicolas* of 80 guns which happened at that time to be abreast of the *San Josef* of 112 guns.
>
> We did not touch sides, but you could not put a bodkin between us, so our shot passed through both ships and in attempting to extricate themselves, they got on board each other.

Collingwood reports ending the day by engaging the Spanish flagship, *Santissima Trinidad.*

> . . . the Spanish Admiral Cordova's ship of 132 guns, on four complete decks, such a ship as I never saw before. By this time our masts, sails and rigging were so much shot that we could not get so close as I would have been, but near enough to receive much injury from her, both in my men and ship. We were engaged an hour

with this ship and trimmed her well; she was a complete wreck. Several others of our ships came up and engaged her at the same time, but evening approaching, and the fresh Spaniards coming down upon us, the Admiral made the signal to withdraw, carrying off the four ships that had surrendered to our fleet. . . .

I have got a Spanish double-headed shot fired from the *Santissima Trinidad,* which I intend as a present to your father, to put among his curiosities; it weighs 50 pounds. These are no jokes when they fly about one's head.

Collingwood paid more attention to rapid fire than the majority of his contemporaries and every ship which he commanded was noted for the well aimed broadsides, fired at shorter intervals than other ships could reach. He told his men that if they could fire three well-directed broadsides in five minutes, no ship could resist them.

By constant practice in later years in the *Dreadnaught* he shortened the time for three broadsides to three and one half minutes.

It is hard to understand why, at this period, so little thought was given to the use of sights in navies, even in the line of metal.

Like Rodney and Howe before him, and Collingwood after him, Jervis was criticised for not following up his victory with a vigorous pursuit, which would have prevented the enemy from retaining his ships "to fight another day." He did attempt to capture the *Trinidad,* but though she was chased, and later engaged by one of her pursuers, the *Terpsichore* (32), Captain Bowen, she fell in with a part of the Spanish fleet, some time after March 1, and escaped.

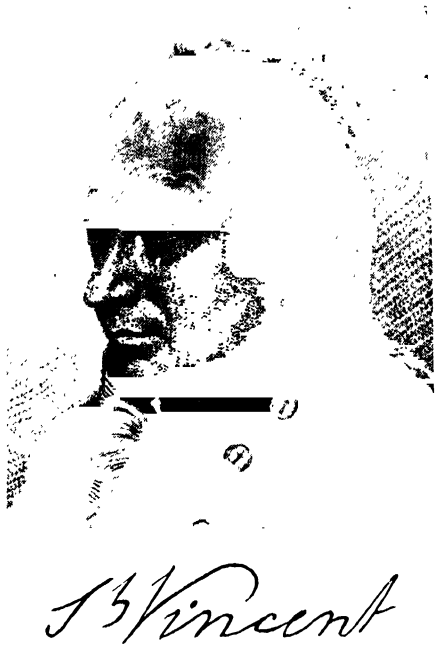


FIG. 65.—Sir John Jervis, Lord St. Vincent. (*From Allen's "Battles of the British Navy," George Bell & Sons, London*)

Jervis reached Lagos Bay with his prizes, two days after the battle. It is to be noted that, due to the irregular way in which he formed his single column from double column, his fleet was not in its normal order of sailing. Both vice admirals were near each other and close in

the rear of the commander-in-chief, Jervis. A rear admiral was in the van and a commodore in the rear.

Among the honors lavishly distributed after this action, Jervis was created Earl of St. Vincent—by which title he is best known. Nelson received the freedom of the city of London and was made a Knight of the Bath, and the Lords and Commons voted their thanks to all. Collingwood refused his gold metal—awarded to all captains—until he had also received one for the First of June, for which action honors seem to have been distributed largely by favor. He got both, with an apology.

Two months after the victory off Cape St. Vincent, as Admiral Hood —now Lord Bridport and in command of the Channel Fleet—was getting under way at Spithead to begin his first cruise as commander-in-chief, the Great Mutiny broke out on the *Queen Charlotte,* Howe's old flagship.

It was not until a month later, through the popularity and tact of Lord Howe himself, that the mutiny was quelled and the Channel Fleet able to leave port. By that time the mutinous spirit had spread to ships in the North Sea engaged in watching the Dutch.

The Great Mutiny had many causes, including inadequate pay and harsh treatment of the men, but primarily it was caused by the revolutionary example set by the French.

It had been foreshadowed by minor outbreaks in the three preceding years. The first of these, in December, 1794, was in the *Culloden,* the same ship under the same captain (Troubridge) that led the column at the battle of Cape St. Vincent.

An almost general state of mutiny in the home fleets lasted throughout the summer of 1797, but the ring-leaders were dealt with severely and after some bloodshed, discipline was restored in the main.

At one time Admiral Duncan's force, watching the Dutch, was reduced to the *Venerable* (flag) and the *Adamant.* By repeated signals to imaginary ships from his station off the Texel, Duncan convinced the Dutch that he had support outside. This caused them to remain in port.

Ships and drafts of men from the Channel fleet brought the virus of insubordination into St. Vincent's Mediterranean command.

When the *Marlborough* (74) joined him, in 1798, with a record of having been concerned in the original outbreak at Spithead, another in Ireland, and a mutiny during the passage out, St. Vincent determined to make an example of her. She was anchored between the columns of the fleet, the principal mutineers were court-martialled, and the immediate execution of the first one sentenced to death was ordered. Further-

more, the Admiral ordained that he be hanged by his shipmates.

The *Marlborough* was required to house her guns and close her gun ports. She was surrounded by armed boats from the other ships in the fleet. Each boat mounted a carronade—a "smasher." The boats' officers were ordered to sink the *Marlborough* if she offered any resistance or refused to haul the condemned mutineer up to the yard-arm.

This first action had a very salutary effect. Order was restored in the *Marlborough.*

Executions took place as the result of mutinies of less general, but more violent character, occurring on other stations, but the number lessened in 1798.

There were a few outbreaks as late as 1801, but by October 1797, discipline had been so far restored in the British North Sea fleet that its commander Admiral Duncan felt able to take the offensive. While at Yarmouth temporarily, re-fitting and re-victualling, he learned that the Dutch, under De Winter, were out. He sailed at once to give battle. French writers assert that De Winter was seeking the British for the same purpose, but when the two fleets sighted each other, on October 11, the Dutch were apparently bound for Brest to join the French.

The Dutch had 16 of the line—so called—but their ships were smaller, both in tonnage and guns, than the British. They had more frigates and small craft, but only four 74s to the British seven. The smallest of the 14 ships of the line under Duncan were 64s. De Winter had four less than 60s. Besides his 14 of the line, Duncan had two 50-gun ships, two frigates, and some smaller craft.

On the morning of October 11, De Winter was about 18 miles south of the Texel when he sighted the enemy fleet bearing about northwest and to windward. He stood in shore and formed his line on the port tack, course about northeast.

Duncan also came by the wind on the port tack, 6 miles to windward. Fearing that the Dutch would escape, he signaled for each ship to engage her opponent in the enemy line in the good old-fashioned way; that is, to bear up and sail large for her opposite.

On the port tack, the British fleet was inverted. The rear led and the van became the rear. Vice Admiral Onslow in the *Monarch* (74) commanded the British van. He was signalled by Duncan to attack the Dutch rear.

Not being well formed before the signal was made to bear up, the British approach straggled. After about 20 minutes Duncan signaled to break the enemy's line at all points (Howe's method) and engage

to leeward. The weather being thick, the signal was not generally made out or understood. Twelve minutes after it had been made, Duncan signaled "close action."

Twenty-five minutes elapsed between the signal for close action and the first clash at 12:30. Onslow in the *Monarch* had covered the 6 miles

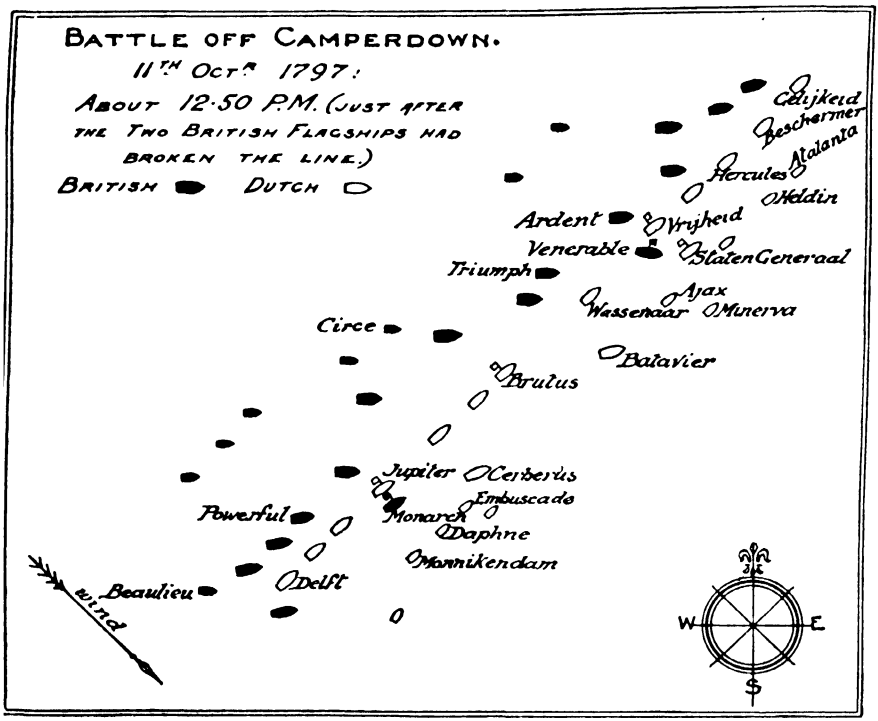


FIG. 66.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

in about an hour. He broke through astern of the 13th Dutch ship, the *Jupiter* (74), and while doing so was raked by two Dutch frigates to leeward of her. Onslow's squadron of 7 was soon hotly engaged with the Dutch rear of 3 ships and the frigates.

Duncan in the *Venerable* (74) steered for De Winter's flag on the *Vryheid* (74), number five in the Dutch column. He found the *States-General* (74) so close to the *Vryheid* that he was forced to break through under her stern to get to leeward of the *Vryheid.*

The *States-General* was soon out of action. Duncan's next astern, the *Triumph* (74), broke through astern of number seven, the *Was-*

senar (64). No other British ships appear to have broken through the Dutch line.

The *Ardent* (74), engaged the *Vryheid* from windward. The *Bedford* (74), once commanded by Graves under Rodney, added to her already honorable record by capturing the *De Vries* (64), next ahead of the *Vryheid*. (Allen says the *Bedford* broke the Dutch line, but the diagram places the *De Vries* as number four in the Dutch column.)

Other ships of Duncan's squadron did not attack. This gave some of the Dutch ships astern of the *States-General* and *Wassenar* an opportunity to come up and engage the *Venerable*. She was severely handled, but other ships coming to her support and attacking the *Vryheid*, the latter was totally dismasted and forced to surrender after an action lasting two hours.

The fates decided for England. Six others of the Dutch line and two frigates surrendered, but the prizes were sieves—fit only for trophies. The British were in no condition to chase.

Clowes says that the thoroughness and pertinacity of the combatants recalled the hot work of the old Dutch Wars.

An aftermath of the battle were three court-martials—two on Dutch ships, the *Brutus* (74) and *Batavier* (50), and the third on the British *Agincourt* (64)—all for not getting into action.

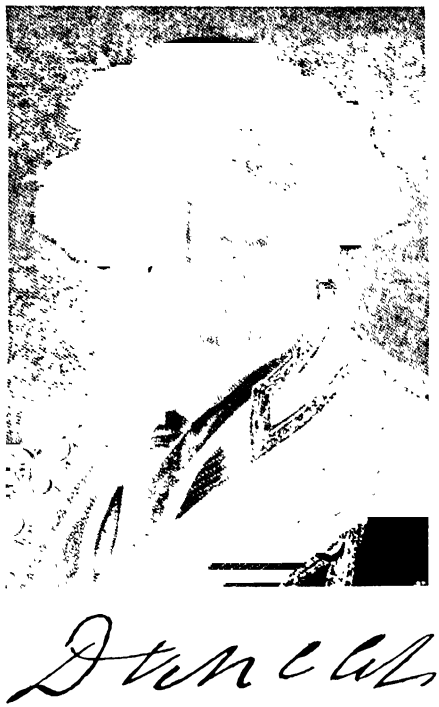


FIG. 67.—Admiral Duncan. (*From Allen's "Battles of the British Navy," George Bell & Sons, London*)

Allen gives British losses as 202 killed and 622 wounded. The Dutch had a much greater number killed and an equal number wounded. Other accounts give the British casualties at 1,040 and the Dutch 1,160.

The Dutch, unlike the French, made the hull their target. Many British ships after the action had to keep their pumps going continuously. The *Ardent* (64) had 98 shot holes in or through her sides, and had 41 killed and 107 wounded.

Duncan came to anchor at the Nore with his shattered ships and still more shattered prizes, losing three of them in a gale en route.

As after the battle of Cape St. Vincent, honors and promotions were freely distributed. Duncan was made Viscount Duncan of Camperdown, the name of the Dutch village off which the battle was fought. The thanks of Parliament were voted to the seamen and marines.

A general attempt to break through the enemy's line from windward in this action resulted as it was bound to do, in a mêlée. The commander-in-chief gave up command when firing began, to resume it after the smoke of battle cleared away, provided his flagship survived. Both the *Queen Charlotte* and the *Venerable* came out of the conflict, battered to be sure, but afloat and able to signal.

It is notable that the year of the Great Mutiny, the worst in England's history, should have witnessed two of her great naval victories. The one, off Cape St. Vincent, was against a larger but inefficient Spanish fleet, and the other against a slightly inferior, but indomitably courageous Dutch force off Camperdown.

Commodore Nelson was not mentioned in Sir John Jervis' despatch to the Admiralty, reporting the victory off Cape St. Vincent, but he participated in the distribution of honors. He was made a Knight of the Bath, and was soon promoted. As a rear admiral he was prominent in two boat engagements within the year after his promotion, in one of which he lost an arm.

Admiral Jervis, now Earl St. Vincent, kept his fleet off Cadiz after the battle of February 14, leaving an in-shore squadron under Nelson to watch the port.

In July, it was determined to bombard the city and make a boat attack on the Spanish ships lying at anchor. Nelson took personal command of the launches of the fleet and, accompanied by the *Thunder,* a bomb-ketch mounting a 13-inch mortar, made the attack on the night of July 3rd.

The *Thunder,* being disabled, hauled off, and the Spaniards made a counter-attack. The crew of Nelson's barge and that of the Spanish commodore engaged in a hand-to-hand fight in which 18 Spaniards were killed and their launch captured. Nelson's life was saved by the coxswain of his boat.

Seventeen days later, Nelson, with three of the line (74s) and three frigates, was off Santa Cruz, Teneriffe, in the Canaries 800 miles from Cadiz. On the night of July 25, he took command of a landing party of 1,100 men for a surprise attack on the town, but the defenders were in overwhelming force, and in the approach Nelson was struck by a

shot in the elbow just as his boat reached the shore. He was at once taken back to his ship. A part of his force landed, with some success.

At daylight, Captain Thomas Troubridge of the *Culloden,* second in command of the expedition, finding himself hopelessly outnumbered, proposed to the Governor that his force should re-embark with their arms and agree not to make any further attack on Teneriffe, or on any other of the Canary Islands.

Some of the attacking party had been obliged to land through heavy surf. Their total loss was 141 killed and drowned, 105 wounded, and 5 missing. Nelson's wound was so serious that it resulted in the amputation of his arm.

No adequate reason for this rash adventure has ever appeared. The next year, in May, 1798, Nelson was sent into the Mediterranean with a small squadron, to watch the French in Toulon. He arrived off the port May 31, where he learned that the French fleet had sailed with a convoy of transports.

On June 7 he was re-enforced by ten 74s, bringing his squadron up to thirteen 74s, one 50, and three frigates. On June 12 he sailed to search for the French.

James tells us that General Bonaparte, in the summer of 1797, took away from the Ambrosian Library in Milan all the books he could find on subjects connected with the East, and on their being brought to Paris, marginal notes were discovered on every page that treated specially of Egypt. In the early months of 1798 he submitted a plan of a campaign in Egypt to the Directory which was approved, and on March 5 he was appointed Commander-in-Chief.

His real object seems to have been to follow Alexander's footsteps to India, as a world conquerer; but to destroy England, under the protection of an invincible French navy, was an almost equal desire.

The English seem to have had no information about the French plans. The main body of Napoleon's expedition sailed from Toulon on May 19. It consisted of 15 of the line, 14 frigates, and many smaller armed ships —a total of 72 armed vessels. These convoyed about 400 transports, carrying 36,000 troops under Napoleon and nine generals of divisions. Vice Admiral Brueys, under Napoleon's orders, commanded the fleet. His squadron commanders were Rear Admirals Villeneuve, Blanquet de Chayla, and Decrès.

On June 7, Napoleon received news—which was, however, erroneous—that he was being closely pursued by Nelson. On June 12, after operations covering three days, he captured Malta and two British 64s lying in the harbor of Valetta.

The French had apparently spent the winter of 1797-8 building gunboats and flat-bottomed craft for the advertised invasion of England. This kept the British Channel fleet on the lookout, while St. Vincent was kept outside the Mediterranean to watch Cordova and prevent him from getting out of Cadiz.

Learning that the Toulon fleet was out, St. Vincent had sent Nelson orders "to proceed in quest" of the French, stating that their object might be an attack on Naples or Sicily, or to convoy an army to some part of the coast of Spain for an attack on Portugal; or again they might intend to pass through the Straits to land troops on the coast of Ireland. He was authorized to follow them anywhere in the Mediterranean, or even into the Black Sea.

This shows in what complete ignorance the British rested as to Napoleon's objective. All that Nelson could learn was that the French had sailed from Toulon with a northwest wind.

Searching to the southward and eastward, he heard on June 20 of the capture of Malta, and on the 22nd that the French had sailed from Malta on June 18, again with a northwest wind.

Nelson steered for Alexandria which he sighted on June 28, but the French were not there. He then headed for Anatolia, and later for Syracuse, to obtain provisions and water. Reaching Syracuse July 19, he sailed again on the 24th for the western Grecian Islands.

On the 28th, he had intelligence that the French had been seen, about a month previous, off the coast of Candia, heading southeast.

On the forenoon of August 1 he sighted Alexandria for the second time. The port was full of ships and the French flag flying on the walls of the city, but the French fleet was not visible.

Napoleon had arrived off Alexandria a month before, landed troops, and captured the city. As the depth of water in the port was not sufficient to permit ships of the line to enter without difficulty, Brueys (by Napoleon's direction, according to the French) anchored 13 of the line, with 4 frigates for lookouts, in the Bay of Aboukir, about 15 miles to the eastward.

By one P.M., the British frigates had sighted the French at their anchorage. Nelson determined to attack at once, having arranged with his subordinates, en route, his plans for giving battle, depending on the circumstances in which he might find the enemy.

He stood eastward, with a fair wind north to N.N.W., and was sighted by the French at 2 P.M., as bearing N.N.W.

The French were lying at single anchor in single column, on a line

of bearing about west by north and east by south. The *Orient* (120) Brueys' flagship, was in the center of the column; the *Franklin* (80) next ahead; the *Tonnant* (80) next astern; and the *Guerrier* (74) at the western (in-shore) end, close to shoal water.

When the British were sighted, Brueys, instead of following D'Estaing's practice at Newport and De Grasse's at the Chesapeake and St

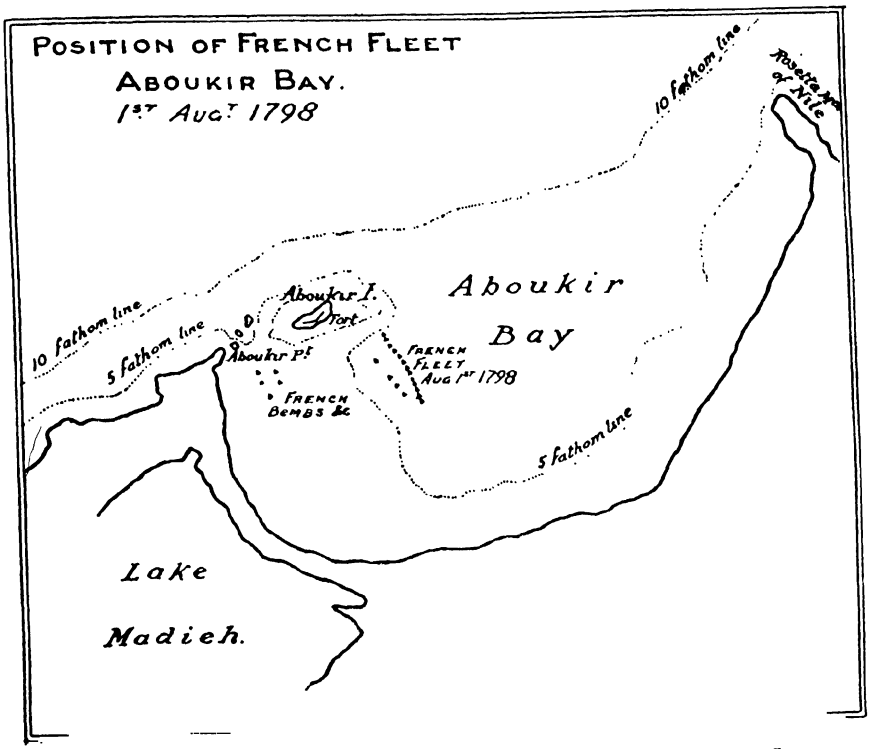


FIG. 68.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Kitts, decided to accept battle at anchor. He ordered each ship to lay out an anchor to S.S.E. and to send a stream cable to the ship next astern of her, making a hawser fast to it. This would keep his starboard broadside bearing northward to eastward, from which direction he believed Nelson must approach.

It appears that Brueys had previously thought of receiving an attack at anchor, if one were made, and had so informed Napoleon. But of this later.

Nelson, with a fair wind, approached from the northward, as close to Aboukir Island as possible, keeping outside of the 4-fathom line, and after rounding the point steered southwest for the head of the French column.

At 3 P.M. he made signal to prepare to anchor by the stern. (A cable was passed out of an after-port, brought forward and bent to a bower anchor. If the bower cable was not unbent before letting go, a ship thus anchored could spring her broadside through a large angle, hauling on one cable and veering on the other.)

At 5:30, Nelson signaled to form his line of battle, "ships falling in ahead or astern of the flagship, as most convenient."

His chart was not accurate, but he knew there was a shoal close aboard of the head of the French column. He hailed the *Zealous* and asked Captain Samuel Hood if he thought they were far enough to the eastward to clear the shoal on the north side of the entrance. Hood answered that he would bear up, if permitted, and sound carefully, and so serve as a guide, to which Nelson agreed.

Nelson here changed the order which the ships had taken by directing the *Theseus,* as she passed, to be his next ahead, and then—apparently —or soon after, sent the *Goliath* ahead of the *Zealous.* Thus his column, in the order of sailing, was the *Goliath, Zealous, Orion, Audacious, Theseus, Vanguard* (flag), *Minotaur, Defence, Bellerophon, Majestic,* and *Leander.* The *Culloden,* Captain Troubridge, originally ahead of the *Leander,* turned to the southwest course too soon, ran aground off the island, and was unable to get off till the next day. The *Alexander* and *Swiftsure* were well astern.

At 6:00, the British mast-headed their colors and displayed jacks in their rigging.

There was a knuckle of about two points in the French column as its 13 ships lay moored in an approximately west and east line. The first seven, headed by the *Guerrier,* headed a little to the south of west; the six in rear a little to the north of west. From the westward, they were, in order: *Guerrier, Conquérant, Spartiate, Aquilon, Peuple Souverain, Franklin, Orient* (flag), *Tonnant, Heureux, Mercure, Guillaume Tell, Généreux,* and *Timoléon.* The *Orient* carried 120 guns. Of the others there were nine 74s and three 80s.

Nelson signaled that he intended to attack the enemy's van and center. His captains were all familiar with his plan for doubling on the van should such signal be made. In the *Vanguard,* Nelson steered for the third in the French line, the *Spartiate.*

The *Goliath* and *Zealous,* some distance in the lead, steered to cross the bows of the *Guerrier.* That ship and her next astern opened fire on them at 6:20 and at that time the French hoisted their colors.

The *Goliath* raked the *Guerrier* and bore up to bring-to alongside, but overreached and fetched up close to the *Conquerant.* The *Zealous,* also raking the *Guerrier,* took the *Goliath's* place alongside her.

The *Orion,* rounding-to after passing the *Guerrier,* overreached on both *Spartiate* and *Aquilon* and came to anchor off the *Peuple Souverain.*

The *Audacious* brought to off the *Conquerant's* bow after steering for the *Guerrier's* stern.

The *Theseus,* number five in the British column, rounded the *Guerrier* and took the Orion's place to leeward of the *Spartiate.*

The four ships astern of Nelson followed the old English custom of selecting "every man, his bird," rounding-to to windward of the *Aquilon, Peuple Souverain, Orient,* and *Tonnant.*

Nelson's fifth astern, the *Leander* (50), broke through the French column and brought up to port of the *Franklin* (80).

The 5 French in the rear were out of action. It was 11 British against 8 French and the latter had not all cleared away their port batteries. The rate of approach was deliberate and all British ships took up their anchorages under the heaviest fire the French could maintain.

As has been said, the French opened fire at 6:20; Nelson reached his anchorage alongside the *Spartiate* at 6:40, and at about that moment, the *Culloden* grounded.

Nelson was wounded early in the action by a splinter which cut into the flesh above his blind right eye. It was believed, at first, that the wound was mortal, but after having it bound up he returned on deck where he remained during the night.

By 7:15, eleven of the British ships were at anchor, engaging the enemy and hoisting their night fighting lights, as had been ordered—four lights in a horizontal line at the mizzen peak.

The *Alexander* and *Swiftsure* were still further delayed by a shift of wind. The latter came into gun range a little after eight o'clock, near the French center, and nearly fired into the *Bellerophon* which was drifting without lights or colors, having been dismasted by the *Orient.*

The captain of the *Swiftsure* anchored her by the stern in the darkness and smoke and found himself off the *Orient's* starboard bow, about a cable's length. The *Alexander,* shortly afterwards, cut through

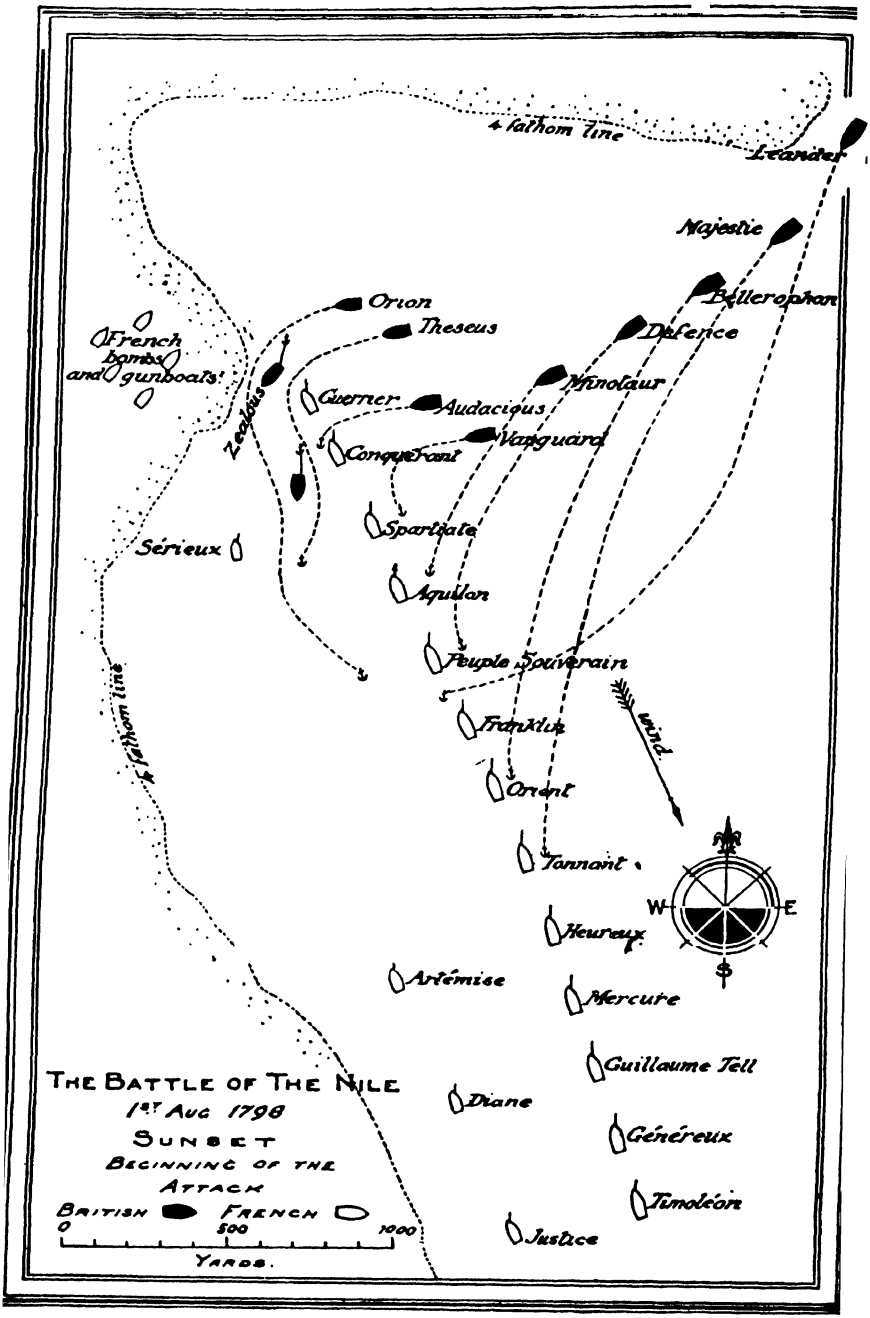


FIG. 68a.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

the French column and anchored by the bow off the *Orient's* port quarter.

Having been somewhat damaged by the *Bellerophon* before she forced that ship to drop clear, the *Orient* was in no condition to take on two 74s. Admiral Brueys had been wounded twice, before 8 P.M. and at that hour received his death blow, a shot almost cutting him in two. He refused to be taken below and died on deck, saying that "Un amiral francais doit mourir sur son banc de quart."

The *Orient's* flag captain, De Casa Bianca, was dangerously wounded. Finally the ship took fire. The flames spread, ships in the vicinity shifted their berths and got fire parties ready. At ten o'clock her magazine exploded, setting the *Franklin* and *Alexander* on fire. Both ships extinguished the flames. The *Franklin* commenced firing again but was soon completely disabled.

Another instance of extraordinary courage must be related. The Captain of the *Tonnant,* DuPetit-Thouars, 38 years of age, lost successively his right arm, left arm, and one of his legs. He refused to be taken below, and directing himself to be placed in a tub of bran which, in some degree, checked the terrible flow of blood from his wounds, continued to give orders until he became insensible. One of his last was "to nail his flag to the mast" and "to sink rather than surrender."

This is an example of heroism which will be an inspiration to men of the sea for all time. May France always have a DuPetit-Thouars on her navy list! Of the sons of this brave officer, one died a Vice Admiral in 1864, and another a Rear Admiral in 1890.

The *Tonnant* did not strike her flag until the morning of August 3. She had been completely dismasted about the time her captain died but continued to fight during the hours of darkness; she finally drifted clear and grounded two miles from the scene of action with colors still flying.

The *Tonnant's* first opponent was the *Majestic,* which anchored within musket shot of the *Tonnant's* starboard side.

When the *Orient* took fire, three French ships astern of her, the *Tonnant, Heureux,* and *Mercure,* cut their cables and drifted clear. The *Majestic* seems to have done likewise, still keeping the *Tonnant* under fire.

The *Alexander* and *Swiftsure,* after clearing their decks of burning fragments from the *Orient,* drifted down and took position to port and starboard of the *Tonnant.* Here they interfered somewhat with each other's fire. The *Tonnant* fought all three opponents until about

three in the morning, when the *Majestic's* main and mizzen masts went over the side. A little later, all three of the *Tonnant's* masts suffered the same fate, the rigging fouling a number of her guns. She then dropped down again, took the *Mercure's* berth ahead of the *Guillaume Tell,* and began firing again.

As an evidence of the quality of the *Tonnant's* fire, the *Majestic,* her principal opponent, lost 50 officers and men killed and 143 wounded. This was more than any other English ship except the *Ballerophon.* Nelson's flagship, the *Vanguard,* was third in casualties—103 in all.

The action of the 13 ships against 8, though so stubbornly contested that it lasted all night, could have but one result.

In the morning, Villeneuve attempted to escape with the *Heureux, Mercure, Guillaume Tell* (flag), and *Généreux;* but the last two were the only ones that succeeded. The *Heureux* and *Mercure* grounded and surrendered. The *Timoleon,* the most eastward ship in the French column, ran ashore and was burned by her own crew.

Ganteaume, Brueys' chief of staff, was one of the few survivors from the *Orient.* His report to the French Minister of Marine, dated Alexandria, 5th Fructidor (August 3) was among the letters in a mail captured by the British and published in London, the same year. He said, in part:

L'Orient took fire. It was by an accident which I cannot yet comprehend that I escaped from the midst of the flames and was taken into a yawl which was lying under the ship's counter. Not being able to reach the vessel of General Villeneuve, I made for this place, from which I now have the mortification of transmitting you these melancholy details.

The *Franklin,* the *Spartiate,* the *Tonnant,* the *Peuple Souverain* and the *Conquérant* were taken and sailed with the enemy's squadron. . . . The *Mercure,* the *Heureux* and the *Guerrier* have been burnt by the enemy. . . . *The Timoléon* . . . was run ashore by Captain Trulet, who set her on fire.

In the situation in which we are, blocked up by a very superior force, I am still ignorant, Citizen Minister, what measures we shall pursue with the feeble maritime resources that yet remain to us in this port; but if I must needs speak the truth, such as it really appears to me, I then say, after so dreadful a disaster, I conceive nothing but a peace can consolidate the establishment of our new colony. May our governors procure us a solid and honorable one.

The Admiral has most assuredly informed you that on our arrival at Alexandria, we learned that an English squadron of 14 sail had been there three days before us. It would have been the most prudent step perhaps, to have quitted the coast the moment the descent had been effected; but the Admiral who waited for the orders of the Commander-in-Chief (whose army naturally derived a great degree of confidence from the presence of the squadron) did not think himself justified in quitting the coast, but took, on the contrary, a strong position in the anchoring

ground of Becquiers. [Aboukir. This anchorage, it seems, enables the fleet to receive supplies, and to replace, with much effort, some of its fresh water.]

It was therefore, unfortunately determined to moor the fleet in one line, in an open situation and which could not be protected from the shore. . . .

The conduct of the fleet [Nelson's] unhappily confirmed us in the opinion that it had no orders to attack us and produced a boundless and fatal security.

The British were sighted at 2 P.M. Sixteen sail were counted.

The signals for stowing the hammocks and making ready for fight; for announcing the resolution of engaging at anchor; and for recalling the men on board their respective ships, were all made at three.

The long boats employed for watering were also recalled . . . and finally the frigates and corvettes were ordered to send as many of their men as possible on board ships of the line.

. . . From the experience you have had, Citizen Minister, in our ports during the course of this war, it will doubtless be easy for you to judge, whether the crews of a fleet so hastily fitted out as ours, could be reasonably expected to be well composed, and whether we could hope to find among men collected at random as it were, almost at the very instant of our departure, able mariners and skillful and experienced cannoneers.

Joubert, Commissary of the Fleet, had written to the Minister of Marine in July:

The general opinion (but this might be influenced in some degree by personal considerations) was, that as soon as the debarkation was effected, we should have sailed for Corfu, where we were to be re-enforced by the ships from Malta, Toulon and Ancona, and thus prepared for all events. The General has decided otherwise. The good fortune which attends all his operations, will not fail to follow this; for the rest, we are under the wind of fatalism and its breath shakes my principles a little.

This letter and Ganteaume's were cited by a British author as a proof that Brueys, when he found he could not enter the harbor, wished to leave the exposed coast. But Clowes says that the determination to fight at anchor was made by Brueys, against the advice of his most experienced officers. Brueys seems to have felt his position was so strong that Nelson would not attack. He had four hours in which he could have put to sea, but "Till the very hour of the onset, he exclaimed, 'They dare not attack us.' "

A battery on Aboukir Island, a shoal ahead of the *Guerrier,* and no water for maneuvering between his column and the beach, were his reliance against doubling, and in this area, near the western end of his column, were his frigates—four in all—two of 46 and two of 36 guns.

Brueys was unquestionably under Napoleon's orders not to leave the vicinity of Alexandria, but those orders certainly did not require

him to accept battle at anchor, where his column was vulnerable in still other ways than the one Nelson so effectively employed.

Allen says that the distance between the French ships was about 160 yards. Assuming this to be from bow to bow, instead of stern to bow, the French column was at least a mile long—too great a range for those days. The French column was convex to the northward with the *Orient* at the knuckle, and either half could be attacked with impunity. The total English losses were 218 killed and 664 wounded, of which 122 killed and 366 wounded were from the *Bellerophon, Majestic,* and *Vanguard.*

Nelson spent 11 days refitting his own ships and his prizes. In the meantime he sent the *Mutine* (16) to Naples with his dispatches for the Admiralty and also sent duplicates by the *Leander* (50).

On the 14th he sent seven of the line to Gibraltar with nine prizes. Three of the latter, *Heureux, Mercure,* and *Guerrier,* were found unseaworthy and were burned. The *Peuple Souverain,* likewise unfit for service, was converted to a guard-ship and re-christened *Guerrier.* Five prizes reached England and were taken into the British navy; the *Tonnant, Spartiate, Aquilon, Conquérant,* and *Franklin.* The *Franklin* was re-named *Canopus,* after the city which had once occupied the peninsula on the west side of Aboukir Bay. As the *Canopus,* she was long the crack ship of the British navy.

Nelson, with three of the line, sailed for Naples August 19, leaving three others and four frigates to cruise off Alexandria. He had transferred Captain Thompson, commanding the *Mutine,* to the *Vanguard,* as the relief of Captain Edward Berry, who sailed in the *Leander* for Naples with duplicate dispatches for the Admiralty.

On August 18 the *Leander,* while becalmed off the west end of Candia, sighted a large ship approaching with a fine breeze. Before this breeze reached the *Leander,* the vessel, which proved to be the *Généreux* (74), was within gun range. After an action lasting five hours, with several attempts by the French to board, the *Leander* surrendered, having lost 93 men and officers killed and wounded, out of a crew of 282. Neither ship having a boat that would float, a French midshipman and the *Généreux's* boatswain swam to the *Leander* and took possession.

Allen claims the *Généreux* lost 100 killed and 180 wounded out of a crew of 936.

The *Leander* was taken to Corfu, where the prisoners were exchanged and finally reached England. They were very bitter over the

inhuman treatment they claimed was dealt them by orders of Commodore Lejoille, commanding the *Généreux,* especially to their wounded captain, Thomas Thompson.

A few months later, Corfu surrendered to a combined Russian and Turkish squadron and the *Leander* was returned to the British navy. Her captain, Thompson, and Captain Berry from *Vanguard*—were among those honored by the Admiralty for services at Aboukir Bay. Both were knighted.

Nelson was made a baron and he and his heirs pensioned at £3,000 per annum by the Parliaments of England and Ireland. Captains received gold medals and first lieutenants were promoted to commanders.

Clowes says:

> The Battle of the Nile may justly be deemed the most splendid and glorious success which the British navy gained up to the end of the eighteenth century . . . [and in addition, Nelson] inflicted the first serious blow upon the colossal schemes of Napoleon.

While searching for the French, Nelson had occupied himself in planning methods of attack and had discussed them with his captains. He had no other flag officer, but had organized his force into three divisions; the largest—six ships—commanded by himself; the other two of four ships each. Two divisions were to attack the convoying fleet; the third to attack the troop transports and sink or destroy as many as it could.

This plan did not meet the situation at Aboukir and there was no division formation. Ships formed, as convenient, ahead or astern of the *Vanguard.*

Nelson had previously explained his plan for doubling on the van, if such signal were made; and *doubling* may have been understood by his captains, when he signaled that he intended to attack the enemy's van and center. But there was no signal for doubling in the book.

His flag captain, Berry, wrote,

> It is almost unnecessary to explain his projected mode of attack at anchor, as that was minutely and precisely executed in the action. . . . These plans, however, were formed two months before . . . and the advantage was now that they were familiar to every captain in the fleet.

Nelson's senior captain, Sir James Saumarez of the *Orion,* regarded doubling as a mistake, and there was a good deal of complaint that the English ships suffered from each other's fire.

However, signals for doubling and instructions for preventing doubling remained in the signal books until the end of the sailing period.

Howe died on August 5, 1799, at the age of 73. He had not been actively employed since 1797, when he was called to help suppress the mutiny.

The Admiralty published a new edition of his Signal Book in 1799 which remained in force with few changes until after Trafalgar.

The "Fighting Instructions" in 31 articles contained little new matter. Their full title was "Instructions for the conduct of the fleet preparatory to their engaging and when engaged with an enemy."

The fighting instructions provided for, though they did not require, equalizing the line. Ships directed to leave the line were told to take station on the unengaged side until needed to assist other ships, or until they received orders by signal. The initial action was to be ship against ship unless the enemy's number was greater, in which case his van and rear were to be engaged, leaving the necessary gaps opposite his center. This was a precaution against doubling.

Flag officers were permitted to change station to engage enemy flags. Concentration of his whole fleet on part of the enemy's was not a maneuver stressed by Howe. Instead he seemed to favor duels—flag against flag to windward or leeward, private ships against private ships of the enemy.

No fleet actions of tactical importance took place after the battle of the Nile until Trafalgar, but it is of some value to include in this chapter brief accounts of the principal naval events until the peace of Amiens between France and England in March, 1802.

In March, 1799, Commodore Sydney Smith, in command of a squadron lying off Alexandria, learned that Napoleon, having invaded Syria, intended to make a combined sea and land attack on Acre, a seaport of Palestine, on the Syrian coast in latitude about 32° 56′ north.

The Commodore was accredited as minister to Turkey. He sent the *Theseus* (74) to Acre and other ships to reconnoiter the coast, and followed himself in the *Tigre* (74), arriving at Acre March 15.

Finding that the Turks were disposed to defend the place, he determined to give them every assistance in his power, and was soon practically in command, directing operations ashore and afloat.

He captured siege guns and ammunition arriving by water, destroyed French gunboats, assisted in building defenses on shore, and inspired the Turks to repulse French storming attacks and attack in return.

These operations continued without interruption, with heavy losses on both sides, until the French troops under General Kléber, with

Napoleon observing, refused to assault, and on the night of May 20 the siege was raised.

On June 12, Commodore Smith sailed from Acre to resume the blockade of the Egyptian coast and prevent supplies from reaching the French army.

Napoleon's Egyptian campaign, checked and frustrated at Acre, had brought Turkey and Russia—with such ships as they possessed—and later Austria, into the war against France. Moreover, the French armies in Europe were being defeated. Napoleon was advised to return to France.

Retreating from Syria, he, with Kléber, defeated a Turkish army at Aboukir on July 25. This victory restored the waning spirits of the French in Egypt.

In France there was no thought that the repulse at Acre had put an end to dreams of conquest in Asia. The capture of Alexandria, the Battle of the Pyramids, and the occupation of Cairo had thrilled the French and continued their belief in the invincibility of Napoleon.

But on August 22 at Alexandria, nearly 14 months after he had landed from the *Orient* as the leader of 40,000 troops, Napoleon with a small staff went on board the *Muiron,* flagship of Rear Admiral Ganteaume, and sailed for Corsica. The *Muiron,* escorted by four frigates and keeping close to the African coast, evaded the British cruisers and after 39 days at sea reached Ajaccio in Corsica. From thence she went to Fréjus on the French coast, about 50 miles east of Toulon, where her illustrious passenger landed on October 9 and began a triumphal journey to Paris. There he was received with ardor as the "indispensable soldier."

With others, he planned the overthrow of the Directory, the establishment of a provisional government under three Consuls, and the appointment of a commission to revise the Constitution. This coup d'état—November 18, 1799—would probably have failed, with Napoleon's death or exile as one of its results, had it not been for the intervention and coolness of his brother Lucien, President of the Council of the Five Hundred and a party to the plot.

Napoleon, Siéyès, and Duclos were the three Consuls chosen. Napoleon was then in his 31st year. Two months after landing in France from Egypt, he had made himself First Consul and had started to reorganize the government of France and the French navy. Practically he was dictator.

While he was at sea in the *Muiron,* a combined English and Russian

sea and land expedition under Admiral Duncan appeared off the Texel and summoned the Dutch squadron lying inside to surrender. Holland was still an ally of France. The squadron in the Texel comprised her entire naval force, totaling 7 of the line—the largest, the *Washington* (70)—12 large frigates, and some smaller vessels.

The Dutch admiral, Storey, surrendered without firing a shot. There had been mutinies in his fleet. The force against him was seven British and two Russian ships of the line and two 50s, with transports carrying 17,000 troops under General Ralph Abercromby.

This reduced Napoleon's sea forces to his own ships and those of the not too co-operative Spanish, while it added to the enemy forces most of the ships taken from the Dutch.

One of Napoleon's first acts as Chief Consul, in the last year of the old century, was to propose a general peace, but the British, feeling that all he desired was a breathing space, turned a deaf ear and continued the war.

England kept up her established practice of frequently recruiting her own navy by captures from the French.

While the French were in Egypt, a continuous blockade of the African coast was maintained to prevent the landing of troops and supplies. Another squadron blockaded Malta.

An evil fate pursued all but one of the ships that escaped from the battle of the Nile with Villeneuve. In February, 1800, the *Généreux* (74) was captured by the blockading squadron off Malta, while she was attempting to supply Valetta. In March the *Guillaume Tell* was taken while trying to escape from the same port. In August, the *Diane* and *Justice* 40-gun frigates made a similar attempt. The *Diane* was captured and taken into the British navy under the name of *Niobe*. The *Justice*, the last of the ships from Aboukir, escaped.

The *Guillaume Tell* was re-named *Malta*. She was a sister to the *Canopus* (ex-*Franklin*) and shared her fine sailing qualities.

Early in 1801, the British dispatched a fleet of 70 sail, including 7 of the line, frigates, transports and supply ships under Admiral Keith, carrying 16,000 troops under General Ralph Abercromby for the taking of Alexandria. The troops included a battalion of marines.

The fleet anchored in Aboukir Bay on March 2. Northerly gales prevented landing for a week, thus giving the French ample time to plan their opposition. The British anchored two mortar-boats to cover the area inshore of the landing beach, and three sloops close in, to clear the immediate vicinity. Commodore Sydney Smith, still captain

of the *Tigre* (74), commanded the launches carrying the field artillery.

The signal for embarking troops and artillery was made at 3 A.M. March 8. All boats were loaded and in formation for pulling ashore in six hours.

The first division of the army was carried in 320 boats, commanded by Captain Cochrane of the *Ajax*. The boats were formed in double line and started ashore at 9:00 A.M.

A force of 7,000 French soldiers under General Friant was stationed to oppose the landing with heavy and light artillery. The troops were protected by sand-hills.

General Friant attempted to sweep the landing beaches with musketry and artillery, but without success.

The French did not charge as the boats landed. The English, on the contrary, formed as they landed, charged, and drove the French from their positions, while the boats returned for the second division. Here the defending force was practically equal in number to the attacking force and should—if even *fairly* well directed—have repulsed the British with great losses.

(The tactics of preparing for, and landing on exposed beaches against opposition, was, is, and will continue to be, a most necessary study.)

By the evening of the following day, March 9, the army with all of its stores was landed.

Commodore Smith, with a naval brigade of 1,000 men, accompanied the army, ranking as a brigadier general.

The losses in landing were: navy, 22 killed and 63 wounded. Army, 124 killed and 585 wounded.

The French continued to oppose the British advance. An engagement on March 13 caused a British loss of nearly 1,500 killed and wounded—sailors, marines, and soldiers.

Before dawn on the 21st, General Menow with a force of 20,000 attacked the British, numbering 14,000, but was defeated. General Abercromby died of a wound received during this battle.

The British right flank was protected and supported by gun-boats, and Commodore Smith's men, on shore, mounted one heavy naval gun with which they did much execution.

General Kléber, French commander-in-chief, was assassinated in Cairo in June. The city which he had twice captured surrendered to the British in July. Alexandria surrendered in August, and what remained of the French army of conquest and occupation was given free passage home.

In March of the same year another British expedition had been sent to the Baltic under Admiral Hyde Parker, with Admiral Nelson as second in command.

By unreasonable insistence on the right of search, Britain had so incensed her ally, Russia, as well as Prussia, Sweden, and Denmark, that they formed a protective confederation, which Portugal later joined.

Great Britain, mistress of the seas, determined to negotiate with the states of the Confederation under the muzzles of her ships' batteries. Admiral Parker, in the *London* (98), had with him 18 of the line, two 50s, 5 frigates and 14 other craft, including 7 mortar-boats and 2 fire-ships. A small landing force of one regiment of troops and a detachment of artillery accompanied the fleet.

The British anchored in the Sound on March 21, to await the reply of the Danes to the demand that Denmark withdraw from the Confederation. A refusal was received two days later and it was resolved to attack the capital.

Since the strongest fort defending Copenhagen was north of the city, Nelson suggested that he be given command of the principal attacking force, to approach from the south; the remainder of the fleet to attack the northern fort, simultaneously with his attack on the Danish ships and other shore batteries.

Nelson's flagship, the *St. George* (98), drew too much water for the depth off the city. He transferred to the *Elephant* (74).

He spent two nights sounding out the passages his ships must take. The Danes made no attempt to molest the sounding boats.

On April 1 Nelson brought his ships through the passage lying east of the Middle Ground, and on the morning of April 2, with a south-east wind, approached the south end of the Danish line of defense. This, exclusive of shore batteries, included 18 ships, hulks, gun-boats, and mortar-boats.

Afloat, the Danes had guns equal to the broadsides of ten 74s. Nelson had twelve 74s and some small craft. Not all the guns of either side could be brought into action until Nelson's column was within gun range of the northern fort; and here also, were the heaviest Danish ships. Nelson attacked at the weakest point, but at a disadvantage, for although special preparations to clear grounded ships had been wisely made, at least three of the line grounded. None were lost, but their fighting positions were.

Rear Admiral Thomas Graves—owner of the "Graves Collection"—

led the column in his flagship *Defiance* (74). The approach began at 9:30 in the morning; fire opened at 10:00 and by 11:30 the action reached its height.

Admiral Parker from his anchorage could not make the northern forts with a southeast wind, so his battleships were out of the action.

Four frigates, under Captain Henry Riou, in the *Amazon* (38), engaged the northern batteries to the best of their ability.

After three hours, no Danish ship had ceased firing. Admiral Parker sent his flag captain, Ottaway, in a row-boat, to authorize Nelson to withdraw if he saw fit, but before he could get alongside the *Elephant,* Parker hoisted the recall. This was the occasion when Nelson, putting his glass to his blind eye, remarked that he could not "read the signal."

In any case, with a southeast wind, he would have been obliged to run the northern batteries to get clear. The action continued.

The frigates obeyed the signal. As they headed away, their gallant commanding officer, Riou, was killed by a shot from one of the forts. His name has been immortalized by Campbell in his stirring poem, "The Battle of the Baltic."

By 2 P.M., the Danes had ceased fire from their ships, but the forts still fired at British boats which approached to take possession. Nelson sent a boat ashore with a flag of truce, while firing, to some extent, continued. The Danish Adjutant-General came out under a flag of truce and terms were arranged to be submitted to Admiral Parker. They included the carrying off of such prizes as the British thought fit.

While awaiting Parker's decision, Nelson sailed out through the northern passage, past the strongest forts—a prudent move. Had the Danes, on this occasion, shown the average persistence of the Dutch, the result would have been a Danish victory.

Nelson's aplomb was evidenced in his letter *assuming* that he had won a victory and that firing should cease in the name of humanity.

The British losses were 255 killed and 688 wounded. All grounded ships got off and joined the fleet, which carried away three prizes only, as considered seaworthy.

On April 12, the British having lightened their heaviest ships by putting their guns on merchant vessels, passed over shoal water and entered the Baltic—all but the *St. George,* Nelson's flagship, which was delayed by a shift of wind.

A possible brush with the Swedes in his absence was more than Nelson could bear. Manning a boat, he had himself rowed 24 miles to the *Elephant,* which he boarded at midnight, having been six hours en

route, in March weather, without a boat cloak. The expedition had been planned for early spring with the expectation that the Russian fleet would still be ice-bound and unable to asist either the Danes or Swedes.

The Swedes, having 11 of the line, kept their ships in port. The Russian Czar, Paul, had been assassinated on March 24 and the British were assured that the new Czar, Alexander I, would not be hostile to England. Nevertheless, Nelson, who early in May succeeded Parker in command, hastened to Reval, but found the Russians there had cut a passage through the harbor ice and sailed for Kronstadt.

Nelson returned to the Eastern Baltic and, in the middle of June, was relieved at his own request. His favorite captain, Thomas Hardy, served with him in this campaign as flag captain and commanding officer of the *St. George*. He accompanied Nelson to the *Elephant* (Captain Foley).

The principal honor conferred for the Battle of Copenhagen was on Admiral Thomas Graves who led the attack. He was made a Knight of the Bath. He was then about 54 years old and had a long record of excellent service to his credit. So also had Sir Hyde Parker, but on this occasion he had shown lack of diligence and determination, especially about taking his fleet over the shoals and into the Baltic. For these reasons he was relieved of his command.

It is well, at times, to set down the actual and relative ages of the principal actors in these wars. Nelson was about 11 years older than Napoleon, and at this time was nearing 43. Hardy had just turned 31. Admiral Parker was 62.

A peace of short duration was concluded at Amiens, France, on March 25, 1802, and proclaimed in London April 29, after more than nine years of war.

British losses in ships of the line, during the war, were 5 captured and 9 wrecked; of frigates, 37 captured, 9 destroyed, and 73 wrecked.

The French, Dutch, Spanish, and Danish losses in ships of the line were 59 captured, 16 destroyed, and 9 wrecked. Of this the French loss was 34 captured, 11 destroyed, and 9 wrecked. Of frigates, France and her forced allies lost 126 by capture, 18 destroyed, and 6 wrecked. Of those captured, 50 battleships (28 of them French) and 94 frigates were added to the British navy.

Considering the ships wrecked, it would appear that British navigators were either less skillful, or more daring, than those of other navies.

CHAPTER XXIV

THE NEW AMERICAN NAVY

TWO YEARS after the War of the Revolution our last naval vessel had been sold and our navy lapsed.

The Articles of Confederation empowered Congress to appoint a "Committee of the States," consisting of one delegate from each state, to sit in the recess of Congress to manage the general affairs of the United States, and among other powers the Committee could build and equip a navy and agree on the number of land forces. But only Congress could commission officers; it was empowered to appoint all officers of the land forces above the rank of colonel and all naval officers of whatsoever rank, and to make rules for the government of these forces and direct their services.

Congress, however, could not engage in war, nor make treaties, nor coin money, nor borrow nor appropriate it, nor fix the number of ships of the navy to be built or purchased, nor set the complement of the army or navy, nor appoint a commander-in-chief of either "unless nine States assent to the same."

The Constitution, adopted in 1787, which replaced the Articles of Confederation, gave Congress power without any restriction "to provide and maintain a navy." Congress took no action, however, until forced by circumstances.

Beginning in 1785, the Barbary corsairs had been, at intervals, cruising against our commerce in the Mediterranean; imprisoning crews and passengers of captured ships and holding them for ransom. The situation became so acute in 1792 that Secretary of State Thomas Jefferson, with the President's approval, obtained through Congress the appointment of Paul Jones as Commissioner to treat with the Dey of Algiers for peace and the return of American captives. In one of his letters to Jefferson from Paris, in 1791, Jones had written,

> I continue to be sensibly affected by the situation of our poor countrymen in Algiers, the more so, as I hear from the pirate now there, who took the greatest part of them, that if they are not soon redeemed, they will be treated with no more leniency than is shown to other slaves.

At Jefferson's suggestion, Jones visited Holland to see if that country could be induced to join the United States in an effort to suppress

Barbary piracies. He reported that Holland would not be at liberty to assist and that little could be expected from France. He recommended that the United States should act singly and said that with two frigates equal to the *Alliance* and two or three 20-gun sloops of war, an enterprising commander ought to bring the Dey to terms without firing a shot, other than sinking two or three of his corsairs.

Jefferson had intimated to Jones that President Washington would appoint him to command "should the United States be able to fit out a squadron of magnitude suitable to form a command for an officer of high rank and extraordinary distinction."

The *Alliance,* which had been in the East India trade since her sale in 1785, was purchased by the Government, but there were no funds to fit her out, and the plans for a punitive expedition fell through.

Jones was never to learn of his selection as special commissioner. He died on July 18, 1792, just before the arrival of Jefferson's letter informing him of his appointment.

The next year Washington asked Congress to authorize the building of six frigates. His request was approved and on March 27, 1794, the "Act to provide a Naval Armament" was passed. Thus our second, and present navy was founded.

The Act authorized the President to provide, by purchase or otherwise, equip, and employ four ships to carry 44 guns each, and two to carry 36 each. The Act included a proviso that if peace were made with the countries on the Barbary coast, the ships should not be built.

Treaties of a humiliating character were made with Morocco and Algiers in 1795 and with Tripoli in 1796. All provided for tribute as the price of peace. None of the ships was completed at this date. Work on three was suspended, but was continued, on the President's recommendation, on the three farthest along—The *Constitution* and *United States* (44s), and the *Constellation* (36).

In June of the year the ships were authorized, Washington appointed six captains to superintend their building and fitting out, and to command them when commissioned. They ranked in the order here named: John Barry, Samuel Nicholson, Elias Talbot, Joshua Barney, Richard Dale, and Thomas Truxtun. All except Truxtun had seen service in the Continental Navy and had distinguished themselves.

Truxtun had been a noted privateersman during the Revolutionary War. Afterward, and at the time of his appointment as a captain in the navy, he was a well known captain in the merchant service. Born on Long Island, N.Y., in 1755, Truxtun went to sea at the age of 12

in the ship *Pitt* for Bristol, England. The next year, at his own request, he was placed as an apprentice under a celebrated captain of ships in the London trade, James Chambers. In 1770, at the age of 15, he was impressed on board the *Prudent* (64) of the British Navy, but was later released, though his captain had assured him if he remained in the service he would interest himself in the young American's promotion.

The opening of the Revolutionary War found him at 20 in command of a merchant vessel, bringing in powder for the use of the Continental Army. Later in the same year, he was captured with his ship and cargo off St. Kitts. After his release, he returned to Philadelphia, and entered as a lieutenant in the *Congress* (28), built in 1776 at Poughkeepsie, and one of the first privateers fitted out. He returned from his first cruise in command of a prize, captured off Havana in the winter of 1776.



FIG. 69.—Thomas Truxtun.

The next year, he fitted out and commanded the privateer *Independence* and escaped to sea through Long Island Sound, whose eastern entrance Howe had failed to blockade closely.

After a most successful cruise in the *Independence,* he fitted out and commanded the *Mars* (20). He continued to prosper as a privateer, sending prizes into Quiberon Bay after our alliance with France. At different times, he commanded, and owned in part, several other Philadelphia privateers. While in command of one of these, the *St. James,* he carried our Consul-General to France and brought back the most valuable cargo of the war. Subsequent to the peace of 1783, he commanded ships in the Atlantic and East India trade.

Truxtun was 39 when appointed a captain and assigned to superintend the building of the *Constellation,* laid down in Baltimore. He had earlier advocated a regular navy, as distinct from privateering, and was the author of a treatise on navigation.

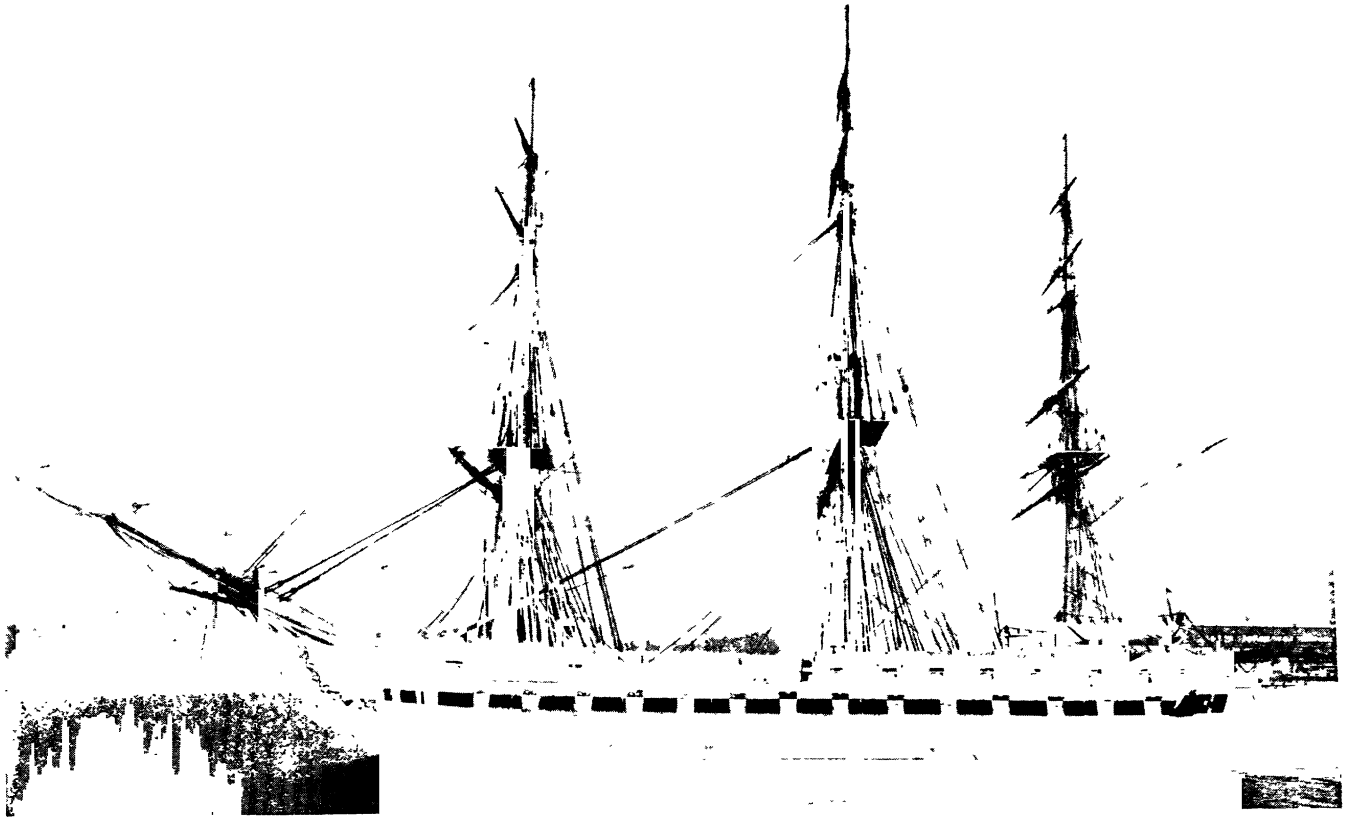


FIG 69a —U S S *Constitution* (*Official Photograph, U S Navy*)

Like Paul Jones before him, his appointment caused Truxtun to meditate on the best means to organize and launch an infant navy. He wrote and submitted to the Secretary of War, General Knox, who had charge of naval affairs, "A short account of the several General Duties of Officers of Ships of War, from an Admiral down to the most Inferior Officers."

Because of its similarity in sea customs and manners to our own Truxtun selected the English system with additions and alterations for his outline of the duties of officers. His thoughts on the rank and duties of an admiral are well worth reading, but too long to quote here.

In addition to his plan of organization, he later submitted a complete battle signal book: "Instructions, Signals and Explanations Offered for the *United States Fleet,* by Thomas Truxtun, a Captain in the Navy, Baltimore, printed by John Hayes in Public Alley, 1797."

That Truxtun had access to British signal books and was a keen follower of the naval events of the war of the French Revolution is shown by the fact that his book contains signals for all the accepted British methods of attack included in Lord Howe's signal book which he used on the "Glorious First of June." Thus, before any ships of our new navy were launched, our Government had at hand the latest British tactics.

There is nothing to show that Truxtun's book was officially recognized. It appears to have been published at his own expense and but one copy is known to exist. Following the British custom of the time, the day of issue is entered:

> Given under my hand and seal on board the United States ship (in print) and in script, *Constellation,* this third day of April, 1797, Thomas Truxtun.

This antedates the launching of his ship, September 7, 1797, and of the two 44s, *Constitution,* July 10, and *United States,* October 21.

In his text we find many interesting and valuable reflections. Their character is indicated by the following quotations: Evolutions and signals are

> the very sinews of marine duty, and without a proper knowledge and attention to them ships had better be kept at home.
>
> Naval tactics being a science and not so easily attained as may be imagined, a marine academy, ought under the protection of our government to be established, otherwise we shall find that well informed and capable officers will always be scarce and insufficient to answer the purpose of conducting the various business of a fleet, and a society to improve naval architecture would be no less laudable in our government to promote.

He commented on the difficulty of organizing a navy in an infant country:

> Notwithstanding there are authors to be found on the various subjects of naval science, yet they are so lame, that there are many particulars essential in the extreme, that will be found impracticable to get . . . from such authors or the commanders of any old maritime country. . . . Nations frequently in the habit of quarreling or going to war . . . are "tenacious of communicating improvements they make, lest their enemies . . . learn and take advantage of them.

He acknowledges that it is quite natural that officers should wish to retain for their own country the benefit of whatever new tactics their genius and industry invented.

> [By] . . . a competent knowledge of tactics and seamanship . . . advantages are frequently gained at sea by very inferior forces over superior ones. . . . As for instance, Admiral Cornwallis' escape in 1795 with a few ships from a French fleet; as also Sir John Jervis's victory over a Spanish fleet of double his force in February last.

This reference to the battle off Cape St. Vincent shows that news, even in the days of sailing ships, crossed the ocean with a rapidity scarcely credible. This battle, fought on February 14, was referred to in a Signal Book issued in Baltimore April 3.

Truxtun was cognizant, not only of the progress of the Great War, but also of the contents of British signal books. He cites almost verbatim, British orders for ascertaining relative rates of sailing under various circumstances of weather; not only how to maintain station, but to keep company night and day in all weathers.

In his instructions relative to boarding and to prevent being boarded, he says:

> Experience and steady application to approved authors on naval science are essential to that duty being well performed and properly understood.

This shows that he was familiar with the French authors on tactics, or the translation in the *Maneuverer*.

In his Signal Book, the numerals, which like the British, at that time, he terms "numerary signals," are designated by pennants of solid and mixed colors—red, white, blue, and yellow. The only square flags are: duplicate (repeater), answering, preparatory, affirmation, and comma. He said:

> Care must be taken to reserve for the signals of action the numbers which are formed with such figures that they may be indicated with no more than two, or at the most, three pendants.

His day signals, 287 in number, provided for every form of attack

in Howe's signal book, including "breaking the line"; also for an advance, or flying squadron, and a "corps de réserve" and for doubling on the enemy, ahead and in the rear. Of doubling, he said:

> To double or prevent being doubled in a line, is a great secret of naval science which Admiral Herbert proved in his action with the French off Beachy Head in the year 1690; to detail it here would take up too much room and too much of my time; in fact it is better calculated for a place in a treatise under the head of evolutions and general maneuvers.

Truxtun left blanks to be filled in by the officer in command and to permit changes of code, which he advised should be made when "any part of the fleet should separate or one of a convoy be lost." He also directed that each ship should be provided with an orderly book, such as was required by Howe in 1776.

Some of his signals are grim reminders of the time:

(187) Mutiny.
(188) Mutiny quelled and ring-leaders secured.
(226) Execute the condemned criminal.
(224) Are your dead buried and the ship well washed?
(239) Burn devils below and wash with hot vinegar, the apartments being closed.

A more cheerful note was expressed by a signal taken from Howe:

(245) To go to a regular meal before an evolution or battle.

In addition to day signals, Truxtun's book included tables of night and fog signals and the means of making them.

Signal No. 29. "Attack the enemy" was the only night battle signal.

Truxtun pays tribute to the celebrated French admiral and administrator, Mahe La Bourdonnais:

> To Monsieur La Bordonnays whose genius, it is said always prompted him to write out new and useful inventions and whose system of naval tactics I have long studied with strictest attention, labour and reflection, I am principally indebted for the ground-work of these sheets.

In the winter of 1798, a French privateer took possession of two American ships off Charleston, South Carolina, and then entered the harbor and attempted to burn a British ship lying there. This aroused the Congress. Money was appropriated in February to complete and equip the three frigates "with all convenient speed."

In April, steps were taken to purchase, build or hire additional ships. On April 30 a Navy Department was established, and on May 28 John Adams, President, issued from Philadelphia, the seat of government, the first instructions to the "commanders of the armed

vessels of the United States." On the same day Congress authorized the capture of armed vessels of France, hovering on our coast.

In June, Truxtun got to sea in the *Constellation,* the first of the frigates to be in active service.

On July 9 an act was passed authorizing the capture of any armed vessel of France. Two days later the Marine Corps was established and again the Navy became an entity, in all respects as at present.

The war with France was never formally declared. It began, in effect on May 28, 1798 and continued until the end of Adams' administration, in 1801; a period of nearly three years' active warfare at sea, during which the navy increased to a total of 42 ships, manned by 8,000 men.

The scenes of action were all in the West Indies. Our ships operated singly, or by squadrons, under the command of captains flying broad pennants who carried the title of commodore. Truxtun was one of these. He commanded, at times, squadrons of from 9 to 13 ships. His flagships were first the *Constellation* (36), and later the *President* (44).

His two famous single ship actions with the *Insurgente* and the *Vengeance* made his name a household word. There were no squadron actions.

It is probable—though not certain—that British signal books were used. While there was no alliance and no concerted action between the two governments, recognition signals were exchanged with British men-of-war and possibly signal books obtained from them.

It is unlikely that Truxtun should have had but one copy of his book printed, but there is no record of its being adopted by the Navy Department, or issued to other ships, and no copy is extant save the one now in the Navy Department.

Our new navy was a small, but effective addition to the great British fleet, fighting against France and her allies.

No more suitable place than in this chapter can be found to set forth some of Paul Jones' reflections on French tactical practices up to the time of the French Revolution.

It will be remembered that Jones had served for a short time under Vaudreuil in the West India fleet before the close of the Revolutionary War. He was well known to—and by—the senior French naval officers. Buell says that in 1791 the Assembly was looking for "admirals to take the places of the aristocrats who filled the higher grades" and some of the leaders wished to make Jones senior admiral of a reorganized high command. To this, Jones was not averse, having re-

signed his admiral's commission in the Russian navy at the expiration of his two years' leave in July, 1791. In the fall of that year, he published a pamphlet, anonymously, on the state of the French navy which contained much good advice and which so impressed Napoleon eight years later that he ordered it to be reprinted. In the pamphlet, Jones warned the French that their crusade against caste and class would bring on them the resentment of their hereditary foes, and that "their neighbors across the Channel were already counting the piles of cannon balls in their arsenals and sending their cutlasses to the grindstone." Before extending their reforms (?) to their navy, he warned them they should consider well any scheme of change that might cripple it, even for a moment, "because in that moment, believe me, the ever-watchful and always-ready foe will be upon you."

His prophecy was fulfilled.

In a letter to a friend, Vice-Admiral Kersaint, a moderate reformer like Lafayette, who was later guillotined for denouncing the vote to put the king to death, Jones wrote some frank criticism of naval tactics.

Kersaint had congratulated Jones on his pamphlet and hoped that France could secure his services afloat. After thanking Admiral Kersaint, Jones wrote, in part:

> I have noticed that the underlying principle of operation and rule of action in the French Navy have always been calculated to subordinate immediate—or instant—opportunities, to ulterior if not distant, objects. . . . It has been the policy . . . to neutralize the power of their adversaries, if possible, by grand maneuvers, rather than to destroy it by grand attack. . . .
>
> In my judgment there has never been an occasion in all the naval war between France and England when the opportunity was so distinctly and so overwhelmingly on the side of France as in those few autumn days in 1781, off the Capes of the Chesapeake, when France actually had for the moment, command of the sea. . . .
>
> De Grasse had more ships, more men, and more guns than Graves had. His ships were better found and sailed faster, either ship for ship, or measuring the maneuvering of the fleet by the slowest and dullest of all, than the ships of Graves. . . . I confess that under similar conditions, the temptation to destroy, as well as repulse, the fleet of the enemy, would have been resistless, had I been the commander. . . .
>
> Success in naval warfare is measured more perfectly by the extent to which you can capture or sink the ships and kill the seamen of the enemy, than by the promptness with which you can force him, by skilful maneuver or distant cannonade to sheer off, and thereby, with your consent, avoid a conflict that could hardly result otherwise than in conquest for you and destruction to him.

Jones assured his correspondent that he admired the skill of Toulouse when he drove Rooke from the Mediterranean in 1704; of Galissonnière when he foiled Byng off Minorca, in 1756, and especially that of D'Orvilliers, in 1778, when he out-maneuvered Keppel.

. . . and yet, my dear Kersaint, one reflection persecutes me, to mar all my memories and baffle all my admiration. This is the undeniable fact that the English ships and English sailors whom La Galissonière maneuvered away from Minorca, remained intact and lived to ruin Conflans in Quiberon Bay, three years after, under Sir Edward Hawke; and that the ships and seamen of Graves, whom De Grasse permitted to escape from his clutches off the Chesapeake, in October 1781, were left intact and lived to discomfort De Grasse, himself off Santa Lucia in Dominica, April, 1782, under Rodney.

Thus, from my point of view, it has been the besetting weakness of French naval tactics to consider the evolutions of certain masters of the art of naval warfare, as the art itself. Their evolutions, as such, have been magnificent, their combinations superb; but as I look at them, they have not been harmful enough; they have not been calculated to do as much capturing, or sinking of ships and as much crippling or killing of seamen, as true and lasting success in naval warfare seems to me to demand.

This may be a rude—even a cruel—view, but I cannot help it. . . . To me, war is the sternest and gloomiest of all human realities and battle, the cruelest and most forbidding of all human practices. Therefore, I think that the true duty of every one concerned in them is to make them the most destructive while they last, in order that the cause of real humanity may be gained by making them the soonest ended. I have never been able to contemplate with composure the theory of the purely defensive in naval tactics.

Thus Paul Jones set forth his philosophy of war on the sea. That he had resolved to accept a commission in the navy of France, if offered, is plain. In the last paragraph of his letter, he said:

But my friend, I fear I may weary you. . . . I hope that France, in her struggle for Liberty, may, as America did, find use for me, no matter in what capacity, or what grade of my profession—from a sloop-of-war to a fleet—on the high seas. But should France thus honor me, it must be with the unqualified understanding that I am not to be restricted by the traditions of her naval tactics. . . .

Jones, at this time, was 44 years of age; Kersaint, 50. As already chronicled, Jones died the next year, 1792, and Kersaint was guillotined in 1793.

CHAPTER XXV

RAMATUELLE ON TACTICS, 1802

IN THE YEAR of the Peace, "An X" (1802), a former officer of the French navy, Audibert Ramatuelle, dedicated to Bonaparte, and published by permission, a book of over 500 pages of text with a large volume of plates, which he called *An Elementary Course in Naval Tactics*. Ramatuelle said that he put into his book the results of 20 years of work, experience, and meditation.

Decrès, Minister of Marine, who by Napoleon's consent authorized the publication, wrote under date of "29 Frimaire, an X."

> . . . the favorable opinion that has been expressed, citizen, by the different committees which have examined your work, and the favorable statement that has just recently been made by Vice Admiral Rosily, caused me to propose to the First Consul, in accordance with your wishes that he should accept its dedication to him.

Ramatuelle appreciated the advantage of one-flag battle signals, and in order to make this possible, his numeral flags are twenty in number, instead of the usual ten.

His colors for numeral flags, 1 to 10, are red and white; for 11 to 20 black and yellow. Zero had all four colors. He advances this argument in favor of his new system:

> . . . there are colors which though very different, are, nevertheless, likely to be confused by the position of the sun or the state of the atmosphere. White and blue are particularly so. I have often seen a white flag taken for a blue one. I have seen it questioned whether a blue flag were not a white one. . . . It is in America, particularly, that I have seen such mistakes made. . . .

He emphasizes the importance of design to render the colors distinguishable. His plan was, that if red is seen in a flag, the other color must be white, no matter what it appears to be, and if yellow is seen, the other color must be black.

The differences between flags 1-11 and 2-12 were in colors only. The designs were the same.

As an indication of the great distances he expected flags to be recognized, he recommended a hoist of 12 feet and a fly of 18 feet. He also claimed for his numerals and flags, that even in calms and light airs they could be recognized, if only half of either the horizontal or vertical part could be made out.

His twenty single flag battle signals included the principal methods of attack.

In forming his battle line, Ramatuelle provided for the ordinary close-hauled column, in natural and inverted order, and also for the following:

"Prompte ligne de bataille." Like St. Vincent, without regard to the regular order. Ships falling in where they can.

"Ligne de bataille par vitesse de Marche." The fastest sailer leads eventually and the slowest brings up the rear.

"Ligne de Force." With the heaviest armed ships in the van.

"Ligne de Contre-Force." Heavy ships in rear.

For what we call "next ahead, or astern" and the British "second ahead or astern," Ramatuelle used "Matelot d'avant" and "matelot d'arrière." For the van and rear ships, he employed the terms, "chef de file" or "vaisseau de tete" and "serre de file" or "vaisseau de queue."

He was not a believer in the British head-on method of attack, nor of engaging on opposite tacks if to windward. Of the approach, he said, in effect, that running free to approach the enemy always broke the regularity of the battle line, because if abeam of the enemy, the windward fleet had to run so many points off the wind that the ships could not lay any sails aback to regulate their speed. He considered, therefore, that unless there was reason to fear a shift of wind, the approach should begin from abaft the enemy's beam, and should be gradual (lasking), in order that all attacking ships might be kept on the same bearing from each other, by being able to lay sails aback.

He called attention to the evil of windward ships, due to lack of control or excessive ardor, instead of approaching together, coming down singly or irregularly, as did Byng's in the battle of Minorca. To avoid this, he recommended that the attacking fleet come to the wind when within long cannon shot, rectify the battle order, and then edge in, with broadsides bearing. He was all the time keenly alive to the desirability of this method of approach.

He also recommended that ships making the approach should close up, leave vacancies opposite the enemy's strongest ships, and endeavor to use two ships against his weakest ones.

He discussed every form of attack in detail. Apparently not daunted by the very unfortunate experiences of admirals in frigates, he advocated that in chasing, the admiral embark in a frigate and get to the head of his column to give any necessary orders. He believed that the admiral of the windward fleet in a battle would be able to direct it better from a frigate than from his flagship in the center, but not

so the admiral of the lee fleet, who, if in a frigate, would be lost in the smoke of the conflict.

It would appear probable that a comprehensive book on naval tactics, such as Ramatuelle's, having been approved by Admiral Rosily and brought to Napoleon's personal attention, would by his order be furnished to all ships and especially to admirals, and that Villeneuve, Ganteaume and others of the French high command would have had ample time to study it, and to impress its principles on their captains and junior officers. Was this done?

In a footnote to his *Tactics* (page 322) Ramatuelle approved the French doctrine, so fatal to success upon the sea. He said:

> If forces are relative, success is not less so. In general, there is a success every time the object of the movement is achieved. Thus, a weak ship which permits herself to be taken to save several others; the inferior fleet which draws off the pursuit in order to save a convoy or revictual a blockaded port, or effectuate a descent, etc., has obtained a true success by reason of the fact that it has fulfilled its mission, even though it has been obliged to purchase it by the loss of a few ships. . . . It is more glorious (because more useful) to let oneself be taken to save a convoy, than to capture a ship in battle, yard-arm to yard-arm.
>
> I know not whether a well directed but unsuccessful devotion to an object is not more worthy of our admiration than brilliant actions that have no other principle than good luck and courage.

An order of sailing in three columns was then common to both French and British fleets. Differences in relative bearings of leaders were advocated and practiced by different admirals.

Ramatuelle considered that leaders of columns should be always abeam of each other, or on specified bearings; but when battle was not imminent he recommended that other ships should be permitted to sail in groups (*peletons*) in rear of their respective leaders without keeping any regular station—a sort of route march. This "group" idea persisted, but not in the sense advocated by its author. For Ramatuelle, groups were merely a means of easing the continuous care and vigilance required to maintain a prescribed station in a formation.

About half a century later peletons of three to six or seven ships began to be examined as possible battle units. The forms these took and the advantages (mostly imaginary) claimed for them will appear in subsequent chapters. Groups as battle units were at the height of their favor about 1875. Belief in them declined and disappeared not long after the end of the century.

One of Ramatuelle's practical suggestions, not generally adopted until the days of steam, was the use of masthead lights and octants to measure distance.

CHAPTER XXVI

THE TRAFALGAR CAMPAIGN AND CONTEMPORARY EVENTS

THE PEACE of Amiens lasted but little over a year, from March 25, 1802 to May 16, 1803. Only an excuse was needed for England again to declare war on France, and this was supplied by Napoleon's demand that Malta—which by the Treaty of Amiens had been guaranteed independence—should be governed by Russia.

Nelson at once accepted chief command in the Mediterranean, hoisted his flag on the *Victory* (100) at Portsmouth the day war was declared, and sailed for his station two days later. Hardy came from the *Amphion* soon after to join as captain of the ship and flag captain.

Both French and English had been preparing their fleets in anticipation of the event. By June 1, two weeks after the formal declaration of war, each had not less than 60 ships of the line in commission. But no major engagement took place in any of the sea theatres of war for more than two years. There was, however, much activity in European, Eastern, and West Indian waters. Allen chronicles 23 engagements by single ships and small squadrons in 1803, and 29 in 1804.

Considerable interest surrounds one of these engagements, which took place in February, 1804, between a fleet of armed East Indiamen and a French squadron under Admiral Linois, consisting of one 74, two frigates, and two smaller craft, which had sailed from Batavia to intercept the merchant fleet.

The Company fleet consisted of 16 ships of from 1,200 to 1,500 tons, "lofty, well-rigged, and painted with two tiers of ports." At a distance they strongly resembled ships of the line. Each mounted from 30 to 36 short 18-pounders and carried white crews of 100 men, in addition to the lascars who worked the ships.

The 16 East Indiamen convoyed 13 unarmed ships and sailed in man-of-war fashion under the command of the senior captain, Nathaniel Dance of the *Earl Camden*. On falling in with the French squadron, Dance formed line of battle in close order, with his convoy to leeward, and waited for the attack. His bold actions so intimidated the French squadron commander, Rear Admiral Linois, that he drew off, after an ineffective attack lasting 45 minutes.

On his arrival in England, Dance was knighted for this service and the captain of each ship was presented with a sword.

During two years, Nelson never left the *Victory*. He watched the French in Toulon and planned how to attack them if they came out.

Other British fleets watched Brest and Rochefort and anxiously observed Napoleon's great preparations for crossing the Channel to invade England. His fleet commanders were La Touche-Treville in Toulon (succeeded on his death by Villeneuve) and Ganteaume in Brest. In command of the floating equipment for the English invasion he had Vice Admiral Bruix and Rear Admiral La Crosse (formerly captain of the ill-fated *Droits de l'Homme*).

Bruix's armada, at its maximum in 1804, comprised nearly 2,300 vessels of all classes. Headquarters were at Boulogne. Other channel ports, new and old, were headquarters of divisions.

By Napoleon's orders, practice in embarking and debarking troops, horses, and equipage was undertaken, to perfect arrangements and determine the minimum time required for these operations.

He finally concluded—in his own mind—that command of the Channel for 24 hours would enable him to land in England an army of 160,000 men, with artillery equipment and supplies.

The British endeavored to maintain a close blockade of every French Channel port and made preparations on their own coast to oppose a landing, realizing, even better than the French, that the initiative of where and when to land lay with Napoleon—as in later times with the Germans.

These were tense times, especially in England. Each country was trying to outbuild and outguess the other. By the end of 1804, the British had 105 of the line in commission and 83 of these at sea, or ready for sea. Napoleon had half a dozen Dutch ships to add to his own and by the end of 1804 had brought Spain, with her fleet, into the war, which brought his total of the line nearly up to that of the British. But his ships were very largely bottled up in port.

In the days of the Directory, the now celebrated American, Robert Fulton, arrived in France from England, and began work on the plans and a model of what he called a mechanical *Nautilus,* or in modern parlance a "submarine," which was to navigate submerged, tow a torpedo into contact with the hulls of British ships, and thus destroy them. He hoped to persuade the Directory to furnish funds for the construction of his novel vessel. His plans and model were favorably reported upon, in 1798, but on reconsideration were rejected. He tried to interest the Dutch government, and later appealed to Napoleon in person, but without success.

In the meantime the work of building his vessel proceeded, and in July, 1800, it was launched at Rouen, where he had received official permission to build. With two companions, Fulton successfully submerged the *Nautilus* first for 5, and later for 17 minutes. He then carried the same crew with the *Nautilus* to Havre, where, in one test, he remained submerged for six hours. After this success, he obtained an audience with Napoleon, then First Consul, who directed a further examination of his projects, but they were adversely reported upon by the French Minister of Marine. The *Nautilus* was re-constructed and tested at Brest in 1801, but finally rejected in 1802.

The ever watchful British Admiralty had been following Fulton's experiments with great interest and the British Secret Service reported:

> Mr. Fulton, an American resident at Paris, has constructed a Vessel in which he has gone down to the bottom of the Water and has remained thereunder for the space of *seven* Hours, at one time—that he has navigated the said Vessel, under water, at the rate of two miles and an half per Hour; that the said sub-marine Vessel is uncommonly managable and the whole plan to be effected by means thereof, may be easily executed, and without much risk; That the Ships and Vessels in the port of London are liable to be destroyed with ease, and that the Channel of the River Thames may be ruined; and that it has been proved that only twenty-five pounds of weight of Gunpowder was sufficient to have dashed a Vessel to pieces off Brest, tho' *externally* applied.

The British determined, and with success, to secure the services of this dangerous inventor and employ his inventions against the French. He was engaged to destroy the Boulogne Flotilla. His success in destroying a ship with a gunpowder mine, and his failure against the Flotilla, are well known.

His final conclusions, before he sailed from England for America, are of major interest here. They are quoted from Parsons' *History of Robert Fulton and the Submarine.*

> As gunpowder, cannon, muskets, gun-locks and even flints, all had opponents' prejudices and established habits to encounter, yet having in time totally changed the art of war and the relative strength of nations, so these inventions of submarine navigation and attack may now be considered as the embryo of a total change in the military marine system and the existing relative power of states. . . .
>
> The moment this System or any other reduces the British marine to Boat fighting, the revered Sovereignty of the Seas will be forever lost; Colonies must be Abandoned and the whole influence which England holds in the scale of nations will Vanish. This is the natural and obvious consequence of this system when reduced to practice and prosecuted by a powerful nation with energy and Spirit. The Wealth of England and the existence of her fleets depend on her immense and uninterrupted commerce, But should France ever possess a means to cut off or interrupt such trade, England would be obliged to submit to any terms which Bonaparte might think proper to dictate.
>
> . . . Suppose the French boats were to anchor five hundred bombs in one night

in the waters before Boulogne where the blockading squadron usually cruise, some of the cruising squadron would most certainly be blown up, the fleet would be obliged to keep at a greater distance. . . . How would it affect the commerce and marine of England had the French the means of anchoring twenty or thirty thousand such bombs in the channels of the Thames, in the bays, harbors, roadsteads, and along the coasts of England, Scotland and Ireland. . . . In fact twelve hundred bombs would lay a whole line from Calais to Dover allowing an interval of only thirty yards between each and twelve thousand . . . would lay ten lines from Dover to Calais which would render it impossible for any vessel to pass without certain destruction and thus a blockade of the whole channel would be formed. . . .

Ships of war could not prevent them (the French from laying the bombs) because they dare not approach where the bombs are anchored. British boats could not prevent them because they could not always be on the watch.

Fulton's clear vision of the possibilities of mines and submarines in naval warfare proved its accuracy somewhat more than a century after he put his ideas on paper. As Parsons says, the substitution of only one word was necessary; namely, that of Germany for France.

Contemporaneously with the year of Fulton's work in France and England, our navy was active in the "Middle Sea." Congress, on March 3, 1801, after the close of our undeclared war with France, directed that the Navy be put on a peace footing, but scarcely had this been done, when, in June, 1801, the Bashaw of Tripoli declared war against us. This war lasted for four years, during which the majority of the ships of our small navy cruised and fought in the Mediterranean.

During these years all hands attended a great school of war, as observers of the French and English, and as actors against the Tripolitans and the other piratical sea rovers from the Barbary coast.

On October 31, 1803, the *Philadelphia* (36), Captain William Bainbridge, blockading the city of Tripoli, was wrecked about five miles eastward of the harbor, and her officers and men were captured and imprisoned.

The *Philadelphia's* executive officer was Lieutenant David Porter, who had begun his naval career as a midshipman in the *Constellation* under Commodore Truxtun and had distinguished himself in the action with the *Insurgente*. After that action he was detailed for duty with Lieutenant John Rodgers, who with a small prize crew kept the *Insurgente's* men under hatches during a gale and brought the ship into Port Royal, Jamaica.

Captain Bainbridge was imprisoned separately; Porter was confined with other officers of the *Philadelphia*.

Turnbull, Porter's biographer, relates that the young prisoner, then 23 years of age, far from lying idle during his imprisonment, started a school for his juniors.

. . . most of each day was spent in studying seamanship, navigation and gunnery. In the evenings, small blocks were laid upon the stone floors to represent frigates, and each officer must take his turn at handling the model battle fleet against an imaginary enemy of equal or greater force.

In this early War College, Porter acted both as preceptor and umpire, yet he found time to read history, to learn French, to rub up his English grammar, arithmetic and mechanical drawing.

For amusement, he took to sketching landscapes; upon paper, when it was available, otherwise on the very walls themselves.

Though nineteen months were thus cut out of his life, he proposed that the time should finally prove to have been not wholly lost.

When the *Philadelphia's* officers and men emerged from their African prison, the momentous plans were maturing which finally resulted in crushing the naval power of France and Spain at Trafalgar.

Napoleon's strategy was to unite his fleets in the West Indies, draw the major portion of the British after them, and then by a sudden and unheralded return, secure command of the Channel—if not permanently, yet long enough to transport his army to England.

In January, February, March, and part of April, 1805, Nelson as in 1798 was frantically searching the Mediterranean for a French fleet escaped from Toulon. Villeneuve had got out in January; put back on account of damages in a gale; got out again in April, without Nelson's knowledge; reached Cadiz, April 9th, where he was joined by six Spanish ships of the line; and sailed the next day for Martinique, with a total of 17 of the line and 7 frigates.

Nelson had intelligence of Villeneuve's movements by April 9, but did not get out of the Mediterranean until the end of the month. Without orders, he decided to follow.

Admiral Missiessy, in Rochefort, carried out his part of the plan by taking advantage of the absence of Admiral Graves' blockading squadron and getting out of Rochefort for the West Indies, on January 11, with 5 of the line and 3 frigates.

Ganteaume, who with 21 of the line was blockaded in Brest by Admiral Cornwallis, with 15 only, asked permission in March to go out and fight.

Napoleon's reply was, ". . . a naval victory, at this time, would produce no results. Keep a single object before you. Fulfil your commission. Go to sea without fighting." (French sea doctrine. Ulterior motives govern.)

Ganteaume tried to get out of Brest on April 14, but found the British waiting with 24 of the line. Later, Admiral Gravina joined him with 5 Spanish ships of the line and one frigate. But Ganteaume did not make

another attempt. He was senior to Villeneuve. Whether he was more resolute, was not determined. His Grand Fleet, if united as Napoleon planned, would have included not less than 37 French and 11 Spanish ships of the line.

It does not appear that the British divined Napoleon's plans. They worked entirely in the dark.

While crossing the Atlantic, Nelson issued orders for the attack, as he had done seven years before, while searching the Mediterranean for Brueys. They read:

The business of an English commander-in-chief being first to bring an enemy's fleet to battle on the most advantageous terms to himself (I mean, that of laying his ships close on board those of the enemy as expeditiously as possible) and secondly to continue them there without separating until the business is decided, I am sensible beyond this object, it is not necessary I should say a word, being fully assured that the admirals and captains of the fleet I have the honour to command will, knowing my precise object—that of a close and decisive battle—supply any deficiency in my not making signals; which may, if extended beyond these objects, either be misunderstood, or, if waited for, very probably from various causes be impossible for the commander-in-chief to make. Therefore it will only be requisite for me to state, in as few words as possible, the various modes by which it may be necessary for me to obtain my object, on which depends not only the honour and glory of our country, but possibly its safety, and, with it, that of all Europe, from French tyranny and oppression.

If the two fleets are both willing to fight, but little manoeuvring is necessary. The less the better. A day is soon lost in that business. Therefore I will only suppose that, the enemy's fleet being to leeward, standing close upon a wind on the starboard tack, and that I am nearly ahead of them, standing on the larboard tack; of course I should weather them. The weather must be supposed to be moderate; for, if it be a gale of wind, the manoeuvring of both fleets is but of little avail, and probably no decisive action would take place with the whole fleet. Two modes present themselves; one, to stand on just out of gunshot until the van ship of my line would be abreast of the centre ship of the enemy; then make the signal to wear together; then bear up; [and] engage with all our force the five or six van ships of the enemy, passing certainly, if opportunity offered, through their line. This would prevent their bearing up; and the action, from the known bravery and conduct of the admirals and captains, would certainly be decisive. The center or rear ships of the enemy would act as they pleased; and our ships would give a good account of them, should they persist in mixing with our ships. The other mode would be, to stand under an easy but commanding sail directly for their headmost ship, so as to prevent the enemy from knowing whether I should pass to leeward or to windward of him. In that situation, I would make the signal to engage the enemy to leeward, and to cut through their fleet about the sixth ship from the van, passing very close. They being on a wind, you, going large, could cut their line when you please. The van ships of the enemy would, by the time our rear came abreast of the van ship, be severely cut up, and our van could not expect to escape damage. I would then have our rear ship, and every ship in succession, wear, [and] continue the action with either the van ship or second ship, as it might appear most eligible from her crippled state; and this mode pursued, I see nothing to prevent

the capture of the five or six ships of the enemy's van. The two or three ships of the enemy's rear must either bear up or wear; and in either case, although they would be in a better plight probably than our two van ships (now in the rear), yet they would be separated, and at a distance to leeward, so as to give our ships time to refit; and by that time, I believe, the battle would, from the judgment of the admirals and captains, be over with the rest of them. Signals, from these moments, are useless, when every man is disposed to do his duty. The great object is for us to support each other, and to keep close to the enemy, and to leeward of him. If the enemy are running away, then the only signals necessary will be to engage the enemy as arriving up with them and the other ships to pass on for the second, third etc., giving, if possible, a close fire into the enemy in passing, taking care to give our ships engaged, notice of your intention.

Corbett says that this plan dates from the first week in November, 1803, when Nelson was blockading the French in Toulon and believed that they had 8 or 9 of the line in harbor.

However, it could apply to attack on a larger number. Nelson had 11 of the line. His plans are easy to comprehend, except the instruction to wear in succession from the rear, when his rear ship, attacking from leeward, was abreast the enemy van ship. Assuming that he cut the enemy line astern of the sixth ship, it would mean that five of his ships had passed through and kept on the same tack. Whereas the usual rule for ships breaking through, was to tack at once to parallel those of the enemy and endeavor to gain on the enemy's ships ahead.

Villeneuve's instructions did not convey the confidence which pervades the words of Nelson. He had orders to avoid battle until the junction with Ganteaume. But foreseeing a situation beyond his control, he wrote to his captains:

I do not propose to go in search of the enemy; I even wish to avoid him, in order to arrive at my destination; but if we should meet him, let there be no shameful maneuvering; it would discourage our ships' companies and bring about our defeat.

If the enemy be to leeward of us, we, being masters of our movements, will form our order of battle and bear down upon him together in line abreast. Each one of our ships will engage the one opposite to her in the enemy's line and must not hesitate to board her if the circumstances be favorable. . . . Every captain who is not under fire will not be in his proper station, and a signal to recall him thither will be a dishonoring blot upon him.

The frigates must equally take part in the action; I do not want them for signalling purposes. They should select the point at which their cooperation may be useful, either to complete the discomfiture of an enemy's ship, or to aid a French ship that is too hotly pressed, and to help her by towing, or otherwise, as may be necessary.

He said nothing about his plans if he were to leeward. French custom was to lay-to, with steerage way and await the attack, punishing the British as they approached.

Nelson's blind voyage to the West Indies might have contributed to the success of Napoleon's plans. The former did not know positively that Villeneuve was in the West Indies until June 4, when he anchored in Carlisle Bay, Barbados. He then spent nine days searching neighboring islands and the north coast of South America and finally sailed for Antigua where he arrived June 13. There he learned that a week earlier Villeneuve had captured a valuable British convoy, bound home from that port.

Believing that Villeneuve had sailed for France, Nelson did not spend even the night in port, but sailed at once for the Spanish coast. He also despatched the *Curieux* (18) to inform the Admiralty of his own and Villeneuve's probable movements.

Villeneuve was to remain in the West Indies for 40 days, waiting for Ganteaume, and in the meantime doing all the damage he could.

He apparently received new orders which directed him, 35 days after their receipt, to sail for Ferrol, a port on the northwest corner of Spain about 300 miles south-southwest of Brest. However, he learned at Antigua, probably for the first time, that Nelson was actually in the West Indies, and sailed at once, arriving off Cape Finisterre July 9. As for Nelson, he arrived off Cape St. Vincent July 18, about 350 miles south of Cape Finisterre and 390 from Ferrol.

Collingwood was on watch off Cape St. Vincent, with a small squadron. He had heard nothing of Villeneuve, so Nelson went on to Gibraltar, arriving July 19, and the next day set foot on shore for the first time since June 16, 1803. (Collingwood, himself, in earlier days, on the blockade off Brest, had been on board his ships even a longer time.)

Villeneuve seems to have had baffling winds, or bad weather off Cape Finisterre, because on the forenoon of July 22, thirteen days after sighting the Cape, he was sighted about 150 miles westward of his port, by Admiral Calder's frigate scouts.

The *Curieux* had reached an English port and the Admiralty had received Nelson's despatch. Admiral Sir Robert Calder, in the *Prince of Wales* (98) with 15 of the line, was ordered to cruise off Finisterre, and Admiral Sir William Cornwallis to cruise between the Cape and Ushant, with the object of intercepting Villeneuve. When he was sighted the wind was fair for his port. The British counted 20 of the line and 7 frigates, bearing about S.S.W., running free on the port tack, with a light breeze about W.N.W., and approaching them. The British were standing to the southward on the starboard tack.

At noon, about an hour after sighting the French, Calder formed his

line in close order on the starboard tack. At 3:20 he made the signal to attack. At 4:20 he tacked his fleet in succession and signaled to engage the enemy center. At 4:45 he signaled to preserve close order, and at 5:09, to engage as close as possible.

About the time the British came to the port tack, Villeneuve wore, in succession, to the starboard tack and the two fleets passed within range on opposite tacks. Firing began about 5:45. At 5:50, Calder made the signal to tack in succession. Some of his leading ships, when they saw the French go about, had tacked without signal.

The engagement was general, but more of a mêlée than anything else on account of smoke and mist.

About 8:00, a French 74 struck, and later a Spanish 80 did the same. At 8:25, the British Admiral, unable to discern what was going on, signaled to discontinue the action. But owing again to mist and smoke interfering with vision, there was some firing until 9:30.

Ships spent the night repairing damages. On the morning of the 23d the two fleets, both much scattered, were estimated to be—in the main—about 17 miles apart. The French were to windward. Calder was on the port tack, standing northeast, with his crippled ships and his two prizes to leeward.

Villeneuve signaled his intention to resume the action. He formed his line and bore up for the British, rounding-to on the port tack outside of gun range. This was no doubt to correct his alignment before edging in to open fire. But the wind—a light breeze—hauled ahead, bringing the English van well forward on the bow of Villeneuve's van.

Calder could have tacked and gained the wind, but he made no attempt to do so. Nor did Villeneuve wear to attack Calder's rear. During the night he passed astern of the British, steering for Vigo, about 55 miles south of Cape Finisterre, and later, made Ferrol, about 65 miles northeast of the Cape. Calder continued to the northeast to join Cornwallis.

Allen gave the losses in this indecisive battle: British, 41 killed and 162 wounded; French and Spanish, 149 killed and 327 wounded. Losses on the two prizes *San Rafael* and *Firme* accounted for nearly two-thirds of the Allied total.

The battle carries no tactical lessons. Calder was governed by much the same reasoning as Jellicoe at Jutland, and, in a manner, by French logic: "Had I been defeated, it is impossible to say what the consequences would have been." Therefore, he deliberately decided not to risk his fleet too far.

As for Villeneuve, he had been ordered to effect a junction with Ganteaume; and to do so without fighting, if possible.

In neither case, did the cautious policy of the two admirals meet with the approval of their seniors. Calder was not relieved of his command, but some months later he was court-martialled and severely reprimanded for not having done his utmost to renew the action on the 23rd.

Napoleon decided to replace Villeneuve, but delayed too long in appointing his successor.

Nelson learned of Villeneuve's movements on July 25. He sailed from Gibraltar and on August 15 joined Cornwallis off Ushant. There he received a full account of all that had happened and decided to go ashore in England for a rest. He anchored the *Victory* at Spithead, August 18.

Clowes says that a few days after Nelson sailed for Spithead, Cornwallis, having 34 of the line, sent Calder off to watch Villeneuve in Ferrol, with half the fleet, and himself, with the other half, off Ushant, watched Ganteaume in Brest.

Ganteaume was ready to sail with 21 of the French line, and possibly 5 Spanish ships of the line under Admiral Gravina who had made Brest in April. He had expected Villeneuve to leave Ferrol and raise the blockade of Brest. Their united fleets would have been not less than 50 of the line, while Villeneuve, with 27, was—or should have been—much superior to either Calder or Cornwallis, who had only 17 each.

But when Calder arrived off Ferrol, Villeneuve was not there. He had sailed August 9, with the intention of going to Brest, or entering the Channel. Instead, he steered south, for no adequate reason that has ever been offered. Five more of the French line, from Rochefort, were at sea hoping to join him, and he would have been in position, with 35 of the line, to meet the combined fleets of Cornwallis and Calder, if he did not have the opportunity of attacking them separately. Cornwallis was tied to Brest as long as Ganteaume was there.

On August 20, two days after Nelson arrived at Spithead, Villeneuve entered Cadiz. Neither Napoleon nor Ganteaume knew of his whereabouts until some days after his arrival.

Ganteaume came out of Brest on August 21, with 21 of the line and 8 frigates, and anchored in Bertheaume Bay. Cornwallis determined to attack him, but he moved close to shore under shelter of the batteries and the attempt was abandoned.

All that Ganteaume achieved in leaving Brest was to shift the scene of Cornwallis' "watchful waiting."

Villeneuve found five of the Spanish line at Cadiz under Rear Admiral Alava. With this addition he could have put to sea to accomplish his orders, but he did not.

Calder had followed Villeneuve from Ferrol, arriving off Cadiz August 31, where he joined Collingwood, who had been watching Alava with a small squadron (at first of only 3 of the line, but afterwards increased to 7). Joined by Calder, Collingwood, in the *Royal Sovereign* (100), had 25 of the line at his command.

When the word reached England that Villeneuve was blockaded in Cadiz, Nelson, dissatisfied after his long, fruitless chase, and feeling that his work was unfinished, offered his services to the Admiralty. The offer was promptly accepted.

Nelson sailed from Spithead in the *Victory,* with two 74s, on September 15th, and joined Collingwood off Cadiz on September 28. He had sent word ahead by a frigate that no salutes were to be fired on his arrival, as he wished the enemy to remain in ignorance of the change in command and also of the addition of three ships to the blockading fleet.

After joining, he stood to sea to tempt Villeneuve to come out, stationing cruisers in such fashion that he could not fail to be informed if this should happen.

Napoleon, with his fleets immobilized in Bertheaume Bay and Cadiz, was forced to give up his cherished plan of invasion. He used the 130,000 troops assembled at Boulogne, and the 25,000 at Calais, for the campaign that brought on the battle of Austerlitz. He ordered Vice Admiral Rosily to relieve Villeneuve, and then to enter the Mediterranean, to further the Napoleonic plans there.

Villeneuve, learning that he was to be superseded, and that Rosily had reached Madrid, saw that for him action must be now or never, and put to sea on October 19 to "win, or lose it all." He had been ready to put to sea on the 10th, but westerly gales prevented.

CHAPTER XXVII

THE BATTLE OF TRAFALGAR

VILLENEUVE's delay in Cadiz gave Nelson time to perfect his plans. Before leaving England, he had a conversation with Admiral Keats, who was fortunately able to remember and record it.

One morning, walking with Lord Nelson in the grounds of Merton, talking on naval matters, he said to me, "No day can be long enough to arrange a couple of fleets and fight a decisive battle according to the old system. When *we* meet them" (I was to have been with him) "for meet them we shall, I'll tell you how I shall fight them. I shall form the fleet into three divisions in three lines [columns]; one division shall be composed of twelve or fourteen of the fastest two-decked ships, which I shall keep always to windward or in a situation of advantage, and I shall put them under an officer who, I am sure will employ them in the manner I wish, if possible. I consider it will always be in my power to throw them into battle in any part I choose; but if circumstances prevent their being carried against the enemy where I desire, I shall feel certain he will employ them effectually and perhaps in a more advantageous manner than if he could have followed my orders" (he never mentioned or gave any hint by which I could understand who it was he intended for this distinguished service). He continued, "With the remaining part of the fleet, formed in two lines, I shall go at them at once if I can, about one third of their line from their leading ship." He then said, "What do you think of it?" Such a question I felt required consideration. I paused. Seeing it he said, "But I will tell you what *I* think of it. I think it will surprise and confound the enemy. They won't know what I am about. It will bring forward a pell-mell battle, and that is what I want."

After joining Collingwood, Nelson wrote in his diary, October 9, this entry: "Sent Admiral Collingwood the Nelson touch." This undoubtedly refers to the following Memorandum:—

Secret. Victory, off Cadiz, 9th October, 1805.

Thinking it almost impossible to bring a fleet of forty sail of the line into line of battle in variable winds, thick weather, and other circumstances which must occur, without such a loss of time that the opportunity would probably be lost of bringing the enemy to battle in such a manner as to make the business decisive; I have therefore made up my mind to keep the fleet in that position of sailing (with the exception of the first and second in command), that the order of sailing is to be the order of battle; placing the fleet in two lines of sixteen ships each, with an advance squadron of eight of the fastest sailing two-decked ships, *which* will always make if wanted, a line of twenty-four sail on whichever line the commander-in-chief may direct.

The second in command will, after my intentions are made known to him, have the entire direction of his line; to make the attack upon the enemy, and to follow up the blow until they are captured or destroyed.



FIG. 70 (*left*).—Nelson. This portrait is dated 1802. There are several similar drawings from the same hand, one is in the collection of Earl Nelson, and another in that of Mr. Nelson Ward. (From the Pencil Drawing in the National Portrait Gallery.) *Right:* Nelson. (From the last portrait of him ever made—at Merton, September 5th, 1805, nine days before he left England.) (*Left: From Beresford and Wilson's "Nelson and His Times," Harmsworth Bros., Ltd., London. Right: From Fraser's "The Enemy at Trafalgar," published by Hodder & Stoughton, Ltd., London*)

If the enemy's fleet should be seen to windward in line of battle, and that the two lines and the advanced squadron can fetch them, they will probably be so extended that their van could not succour their rear.

I should therefore probably make the second in command's signal, to lead through about the twelfth ship from the rear (or wherever he could fetch, if not able to get as far advanced). My line would lead through about their centre; and the advanced squadron to cut two, three, or four ships ahead of their centre, so far as to ensure getting at their commander-in-chief, on whom every effort must be made to capture.

The whole impression of the British fleet must be to overpower from two to three ships ahead of their commander-in-chief, supposed to be in the centre, to the rear of their fleet. I will suppose twenty sail of the enemy's line to be untouched; it must be some time before they could perform a manoeuvre to bring their force compact to attack any part of the British fleet engaged, or to succour their own ships; which indeed would be impossible without mixing with the ships engaged

Something must be left to chance; nothing is sure in a sea fight beyond all others. Shots will carry away the masts and yards of friends as well as foes; but I look with confidence to a victory before the van of the enemy could succour their rear; and then the British fleet would most of them be ready to receive their twenty sail of the line, or to pursue them, should they endeavour to make off.

If the van of the enemy tacks, the captured ships must run to leeward of the British fleet; if the enemy wears, the British must place themselves between the enemy and the captured and disabled British ships; and should the enemy close, I have no fears as to the result.

The second in command, will, in all possible things, direct the movements of his line, by keeping them as compact as the nature of the circumstances will permit. Captains are to look to their particular line as their rallying point. But in case signals can neither be seen nor perfectly understood, no captain can do very wrong if he places his ship alongside that of an enemy.

* * * * *

Of the intended attack from to windward, the enemy in the line of battle ready to attack.

The divisions of the British fleet will be brought nearly within gunshot of the enemy's centre. The signal will most probably be made for the lee line to bear up together, to set all their sails, even steering sails in order to get as quickly as possible to the enemy's line and to cut through, beginning from the twelfth ship from the enemy's rear. Some ships may not get through their exact place; but they will always be at hand to assist their friends; and if any are thrown round the rear of the enemy, they will effectually complete the business of twelve sail of the enemy.

Should the enemy wear together, or bear up and sail large, still the twelve ships composing in the first position the enemy's rear, are to be *the* object of attack of the lee line, unless otherwise directed by the commander-in-chief; which is scarcely to be expected, as the entire management of the lee line, after the intention of the commander-in-chief is signified, is intended to be left to the judgment of the admiral commanding that line.

The remainder of the enemy's fleet, thirty-four sail, are to be left to the management of the commander-in-chief, who will endeavour to take care that the movements of the second in command are as little interrupted as possible.

NELSON AND BRONTE

On the eventful 19th of October, then, the watchful frigates at once



FIG 70a —Cuthbert, Lord Collingwood (*Courtesy Naval War College*) Vice-Admiral Villeneuve (*From Fraser's "The Enemy at Trafalgar," published by Hodder & Stoughton, Ltd , London*) Admiral Gravina (*From Fraser's "The Enemy at Trafalgar," published by Hodder & Stoughton, Ltd , London*)

informed Nelson that the Allies had come out of port, though on the first day only 12 succeeded in getting to sea. Nelson, who was about 50 miles to the W.S.W., at once made sail to the southeast, with a light S.S.W. wind. Early on October 20 the remainder of Villeneuve's fleet cleared the harbor, but were unable to join the squadron of 12 on account of thick weather. On the same day, Nelson, having made the Straits and satisfied himself that none of the enemy vessels were in that neighborhood, made sail to the northwest, with the wind still S.S.W.

Clearing weather at last enabled Villeneuve's squadrons to unite. His formation was van, center, and rear, of 7 ships each, 4 French and 3 Spanish. The van was under the Spanish Vice Admiral Alava in the *Santa Ana* (112); the center was commanded by Villeneuve himself, in the *Bucentaure* (80), with his next ahead Rear Admiral Cisneros in the *Santissima Trinidad* (130) and his next astern the *Neptune* (84), Commodore Maistral. The rear was under Rear Admiral Dumanoir Le Pelley in the *Formidable* (80).

Villeneuve also had a reserve squadron of 12 ships under Gravina, who had been with him during the West Indies cruise. This command consisted of two divisions of 6 ships each. Gravina had with him in the *Principe de Asturias,* (112) Rear Admiral Ascano, as chief of staff and also in command of the ship and the division she headed, while Rear Admiral Magon de Médine in the *Algeciras* (74) commanded the other division of 6.

In all, Villeneuve had 33 of the line and 7 frigates.

Nelson's own squadron consisted of 12 of the line, with one other flag officer, the Earl of Northesk, in the *Britannia* (100).

Collingwood had 15 of the line, with his flag flying on the *Royal Sovereign* (100). He had no other flag officer in his squadron.

In all, there were 27 of the line in the British fleet, 4 frigates, a 10-gun schooner, and an 8-gun craft, the *Entreprenante.*

Clowes says that "Villeneuve comprehended perfectly the kind of tactics Nelson was likely to employ against him" but had no riposte at his command. He told his captains,

> . . . the enemy will not content himself with forming a line of battle parallel with ours and with engaging us with his guns, a business wherein not necessarily the most skilful, but rather the most lucky is commonly successful. He will seek to surround our rear and to pierce our line; and he will endeavour to concentrate upon, and overpower with groups of his own vessels, such of our ships as he may manage to cut off.

Villeneuve's plan, if to windward, was to bear down together and

each ship to engage her opponent in the British column, with the object of ultimately boarding; if to leeward, to await the attack in close order. If the British tried to cut through the French column and overwhelm its rear, by doubling and concentrating upon it, the only suggestion he had to offer was that "a captain will do better to look to his own courage and thirst for glory, than to the signals of the commander-in-chief,

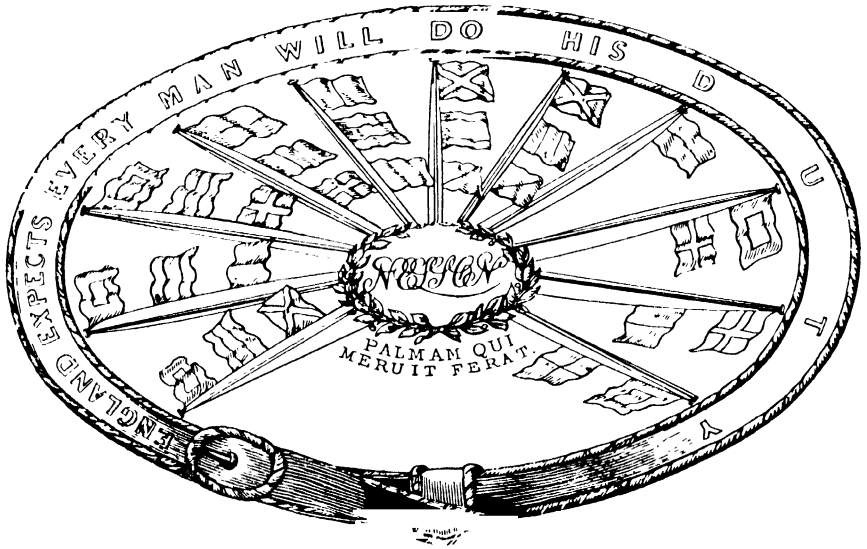


FIG. 70b.—(*From Allen's "Battles of the British Navy," George Bell & Sons, London*)

who, himself in the thick of the fight, and shrouded in smoke, may perhaps be unable to make signals."

Villeneuve, after forming in five columns, received word from his frigates that the British were in sight. Both fleets maneuvered for position during the afternoon and evening.

Early in the morning of October 21, the British wore to a course north by east, the wind apparently at W.N.W., which would put them on the port tack. Villeneuve found himself to leeward, whereas he had expected to be to windward. He formed on the starboard tack, heading southwest, with his squadron of observation ahead. Not having kept formation during the night his ships were not required to be in order in their own squadrons.

When daylight came, the two fleets were on opposite tacks, about 11 miles apart and nearly on each other's beam. The nearest land was

Cape Trafalgar, which was to leeward, about 21 miles from the British and 10 miles from the Allies. The Cape and the two flagships were on a line about west by north; the wind—a light breeze—W.N.W., with a heavy westerly swell. Both fleets had a fair wind for Cadiz.

Nelson at 6:40 made the signal for battle; to form the order of sailing in two columns; and to follow the course steered by the Admiral himself, nearly east, he leading the port column and bearing down on the Allies. Nelson's fleet, as well as Villeneuve's, had not kept formation during the night, and, in consequence, both his columns were rather straggling.

At 8:30 Villeneuve signaled to wear to the port tack, which brought Cadiz on his lee bow, thus affording him a line of retreat. This reversed his battle formation, making his rear the van, and his advanced squadron the rear. Owing to the light wind and the swell, it took the Allies an hour and a half to get on the port tack, and in the meantime, Nelson and Collingwood were slowly approaching, each at the head of his own column.

Villeneuve's ships were badly formed on the port tack. The centre apparently wore more slowly and was set to the eastward. In the end, when all were on the new tack, the formation of the Allied fleet was that of a shallow crescent, concave to the enemy, and instead of being nearly in each other's wakes, in this crescent, the ships were staggered irregularly on each other's bows and quarters, and not well closed up. So pronounced was the irregularity that some writers believe it was deliberately planned, to make breaking through more dangerous, if not more difficult.

Gravina, whether by order, or lack of orders, kept station in the rear, with his 12 ships.

The whole allied fleet, after wearing, lay with barely steerage way, awaiting the attack. Clowes says that their courses were clewed up, their topsails and topgallant sails set, but the main topsails shivering, while the British were carrying all sail even to studding-sails—or as Nelson calls them, "steering sails"—but on account of the light wind, moving very slowly through the water.

Volumes have been written on Nelson's approach. Before the battle, although his fleet was considerably smaller than the one referred to in his memorandum, he had formed his advanced, or containing squadron, but as soon as the Allies were sighted on the morning of the 21st, he made the signal to form the line of battle in two columns, and all the ships except two of the advanced squadron resumed their regular

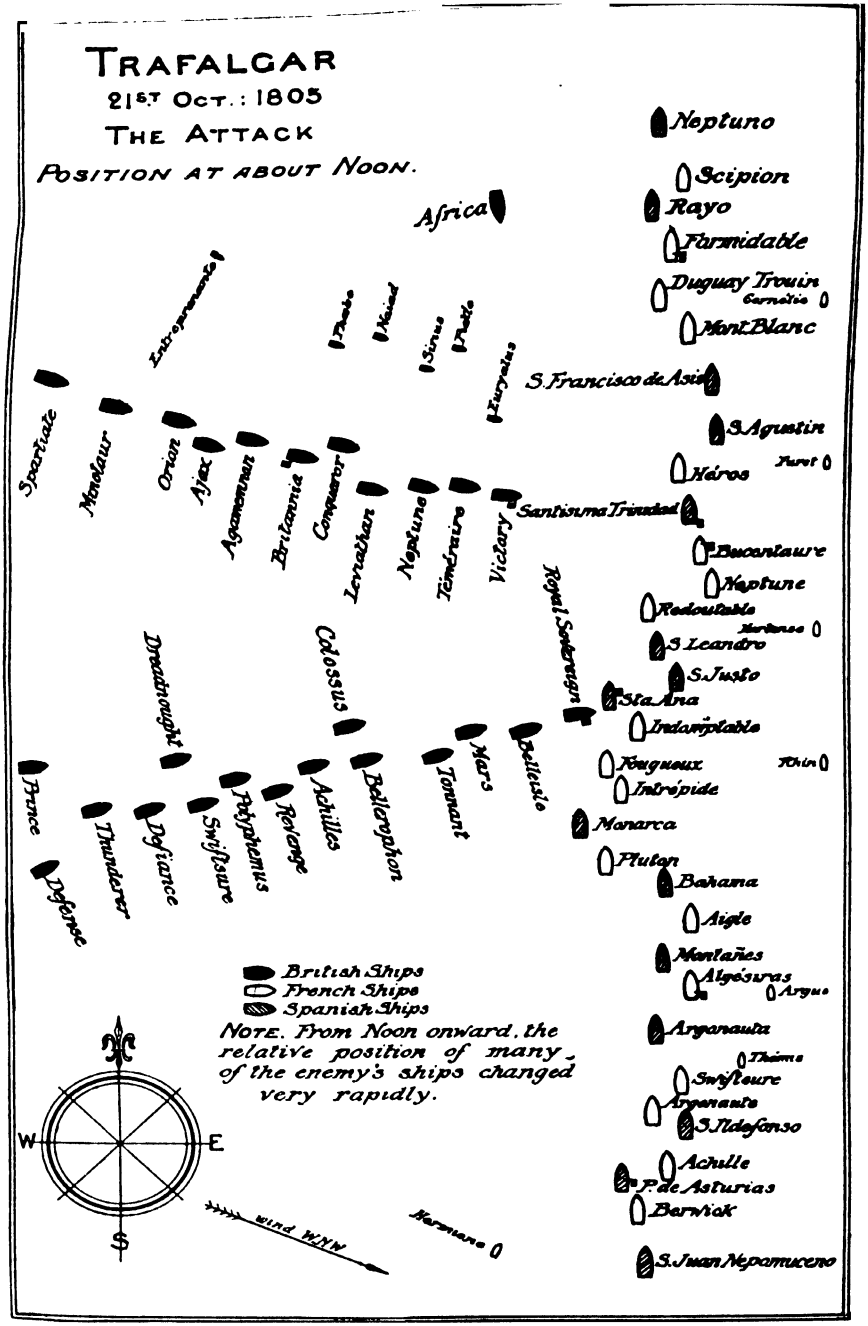


FIG. 70c.—(*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

stations under Collingwood. The exceptions were the *Leviathan* and *Orion,* which fell in as the fifth and eighth ships, respectively, in Nelson's column. The ships of the advanced squadron were the *Mars, Orion, Belleisle, Leviathan, Bellerophon, Polyphemus, Colossus,* and *Agamemnon.* Without the return of six of these vessels to their stations, Collingwood would have had but nine ships in his column.

So long sustained has been the discussion of this battle, that on April 2, 1913, more than 106 years after it had been fought, the British Admiralty, at the request or suggestion of Parliament, appointed a committee, with Admiral Sir Cyprian A. G. Bridge, R.N., as chairman, to "examine and consider the evidence relating to the tactics employed by Nelson at the Battle of Trafalgar." The Committee made its report to the Admiralty on June 17, 1913. Admiral Bridge was associated on the committee with Admiral Reginald Custance and Mr. C. H. Firth. Mr. W. G. Perrin was its secretary. Their report is the final authority and will be freely drawn upon. It was accompanied by a chart, showing as nearly as they could ascertain, the positions of all ships except three of the British and Allied fleets, at the moment—noon, October 21—when the battle was opened by Collingwood, in the *Royal Sovereign* (100), engaging the *Santa Ana* (112).

Three British ships, *Thunderer, Defiance,* and *Defence*—all 74s—are not located at noon, because the Committee could find no evidence as to their relative positions in Collingwood's column. However, all were engaged and the combined casualties of the three were 28 killed and 94 wounded.

The Committee's report reads, in part:

> The sun rose behind the Franco-Spanish fleet which, in the earlier hours of daylight was in a very favourable position for observing the British. Several officers whose rank and quarters or station in their own ships gave them exceptional facilities for seeing the British fleet during those hours, officially reported their belief that the British fleet was not in regular order when sighted. . . . The evidence of the British logs and the French reports is indirectly confirmed by the great variety in the diagrams drawn by the French and Spanish officers present at the battle, with the object of showing what they believed to be the positions of the British ships. . . . These reasons seem to prove conclusively that the British fleet was not in precise order or formation at the time when the Franco-Spanish fleet was distinctly made out on the morning of October 21. Unless this is recognised, the subsequent proceedings of the British fleet leading up to the battle cannot be understood.
>
> At 6:10 A.M., according to the Log of the *Victory,* that is, as soon as the light permitted the flags to be distinguished, Nelson made the general signal (No. 72) to form the order of sailing in two columns. . . .
>
> Signal number 76, E.N.E.—"Bear up and sail large on East-North-East course" followed very shortly after the signal just mentioned. . . . .

The intention and effect of this signal have been much discussed, and it has been disputed whether the ships bore up "in succession" or "together." As to the effect there is only one piece of direct contemporary testimony. The Log of James Keith, Master of the *Neptune* says plainly "bore up in succession" not defining the time very precisely, but fixing it as before 6:30 A.M. . . .

As to the intention, the history of signal 76 can be traced in the Sailing Instructions and Signal Books from 1673 to 1816 and supports the conclusion that it meant "bear up in succession."

As the British fleet was not regularly formed when the signal was made the practical importance of the disputed point has been exaggerated. Those ships which were in station would bear up in succession; those which were not, probably bore up together. The two signals mark the time when the movement of the British fleet against the Franco-Spanish fleet began, and the direction which that movement took. But soon after the advance commenced the combined fleet, which had been heading to the southward, changed its course.

. . . Perceiving or being informed that the whole British fleet seemed to be directed against the rear of the combined fleet Villeneuve signalled to his ships to wear together and to reverse their order. . . .

One result of the manoeuvre was the curve which was the characteristic feature of the Franco-Spanish line during the battle. "It formed," wrote Collingwood, "a crescent converging to leeward." . . . The lightness and fickleness of the wind and the operation of wearing are sufficient to account for the form which the Franco-Spanish line had assumed three or four hours later. As the ships wore together and came to in succession on the port tack, the line of necessity had a curve in it. This was accentuated by the fact that a little later the wind veered more to the west, and the speed of the ships was not sufficient to enable the Allied fleet to get into line before it was attacked.

After wearing, the Franco-Spanish fleet continued to move slowly ahead at a rate of half a knot, or possibly a little more. Villeneuve more than once signalled to his van to make more sail, and as a whole the Allied line was in continuous motion, though several of the ships were hove to for a time. The direction of its course was northerly.

The effect of Villeneuve's change of course on Nelson's dispositions is not easy to determine, since the question how the attack would have been conducted if the change had not taken place is a matter of conjecture.

From seven o'clock, Nelson had been under the impression that the enemy were in process of changing their course from a southerly one, leading to the Straits to a northerly one leading back to Cadiz. He wrote in his private diary, "At seven the enemy wearing in succession," it was the last observation he noted down. . . .

The fact that the combined fleet had wore became evident in the British fleet, generally, by 10 A.M. "At ten their fleet formed their line and laid their heads to the northward," says Collingwood's Journal. . . .

The two divisions of the British fleet were brought into more regular formation while the advance was in progress. . . .

. . . Eight only of the Logs of the vessels engaged mention the order of the fleet. Collingwood's Journal, and the Logs of the *Britannia, Mars* and *Sirius* speak of two "columns"; the *Ajax* and the *Spartiate* speak of two "divisions," the *Euralyus* and the *Orion* of two "lines." . . . "Column" is, as a rule, the term used in the majority of British official reports and private letters.

Employed in its technical sense "column" at that time signified "line ahead," as the Instructions and the other evidence prove. But like other technical terms

it was not always so used, even by officers, in its strict and special sense, and while some used it as a synonym for "division," others used it as a synonym for "line." Allowing for this lack of precision in the use of technical terms, the impression contemporary documents produce is that the formation of the columns resembled a line ahead more nearly than any other formation. And this impression is strengthened by the French accounts, which as we have seen note the gradual development of the British fleet from a mass into groups and from groups into columns in which the ships were in something like line ahead, and illustrate the process by diagrams which leave no doubt of their meaning.

Ships of a fleet, not in regular order, some being nearly or exactly in station and others a long way out of station—when running on a new course with a wind fair, but variable in force and, within certain limits, in direction, could only get into a prescribed formation if the leaders of lines or columns shortened sail to allow consorts astern to come up. The evidence that the leaders did not do so is conclusive. In the endeavour which was made to get as quickly as possible to the enemy's lines, it was necessary to carry a crowd of sail; and, so far as the Logs refer to it, they show that the ships during the forenoon set their studding sails. Ships under practically the same sail, and steering an identical or nearly identical course, progressed through the water in accordance with their individual rate of sailing, as affected by form of hull, load-immersion, trim, or foulness of bottom. Some inevitably dropped astern if the others did not shorten sail to wait for them. This helps to account for the late hour at which several ships got into action at Trafalgar.

The irregularity in the formation of the two columns necessarily resulted from the disparity between the speed of the different vessels and the difference in their positions when the advance began. It is visible in the diagrams drawn by French officers to elucidate their accounts of the battle. But the two divisions were not, during the latter part of the advance, in the same formation, though they might seem so, when viewed from the French fleet. The difference in their formation resulted from the difference in the tasks assigned to them by Nelson.

The functions of the two divisions were thus defined in Nelson's Memorandum of 9th October:

"The 12 ships composing . . . the enemy's rear are to be the object of attack of the lee line, unless otherwise directed by the Commander-in-Chief."

"The remainder of the enemy's fleet are to be left to the management of the Commander-in-Chief, who will endeavour to take care that the movements of the Second in Command are as little interrupted as possible."

Collingwood assumed in accordance with the general power given by Instruction No. I and the special authority conferred by the Memorandum the entire direction of his own line from a very early stage in the advance. He changed the formation of his division from an irregular line ahead to an irregular line of bearing. In his Journal he writes "made the signal for the Lee Division to form the larboard line of bearing and to make more sail," not fixing the hour precisely, but mentioning it, just after he has mentioned the wearing of the Franco-Spanish fleet. The two signals referred to, numbers 42 and 88, were made at 8:50 according to the Log of the *Victory* and this is confirmed by the Logs of the *Téméraire* and the *Defence*. They were made, therefore, about two hours after the signals by which Nelson ordered the advance to begin.

The object of this [Collingwood's] signal was to bring the Lee Division into a line nearly parallel with that portion of the enemy's fleet which Collingwood was charged to attack. The concavity in the Franco-Spanish line, caused by wearing,

had placed Gravina's squadron in such a position that the manoeuvre now ordered would practically produce this result. A line of bearing was never completely formed, because Collingwood, instead of shortening sail himself to permit it, merely directed particular ships in his division (as for instance the *Dreadnought*, the *Belleisle* and the *Revenge*) to make more sail. But if some ships were too far behind to reach their proper positions then, most of them succeeded in doing so by the time the attack was delivered.

This is shown first of all by Captain Tizard's plan Number 3, and, secondly, by the fact that 6 of the 15 ships forming the Lee Division were engaged within about twenty minutes after the *Royal Sovereign*. . . .

That division was ordered to "cut through, beginning from the twelfth ship from the enemy's rear." Collingwood stated in his despatch that he had cut off 12 of the enemy's ships. If the list of the French and Spanish ships with the stations assigned to them in the line be accepted, it will be found that he cut off 15. A glance at Colonel Desbrière's diagram explains this discrepancy. Three of these allied ships were to the leeward of their line and could not have been clearly seen by Collingwood, or, if visible, could not have been distinguished from the frigates and small craft. . . .

Twenty-five minutes after the *Royal Sovereign* commenced the action, Nelson's division engaged. Unlike the Lee division it had retained the formation it assumed in the early part of the advance, that is, the form of a somewhat irregular line ahead. But according to Captain Tizard's memorandum and plan, the *Orion*, which was the eighth ship in the weather column, was "apparently the first vessel in Nelson's line that did not follow immediately after him." "The lee line were in much more open order than ours," wrote Captain Codrington of the *Orion* on October 30th. "Our line pressed so much upon each other as to be obliged to go bow and quarter instead of a-head." This probably refers to the last stage of the advance, and may be illustrated by Nelson's signal to the *Téméraire*.

Nelson's reason for maintaining this formation was the nature of the task he had set himself. He had undertaken to take care that the movements of his Second in Command were as little interrupted as possible. For that purpose it was desirable to keep his division in the most flexible formation, so that he might be able to prevent the van of the enemy from coming to the support of the centre or rear. It also enabled him to threaten the van of the enemy's line, while concealing his intention of attacking its centre.

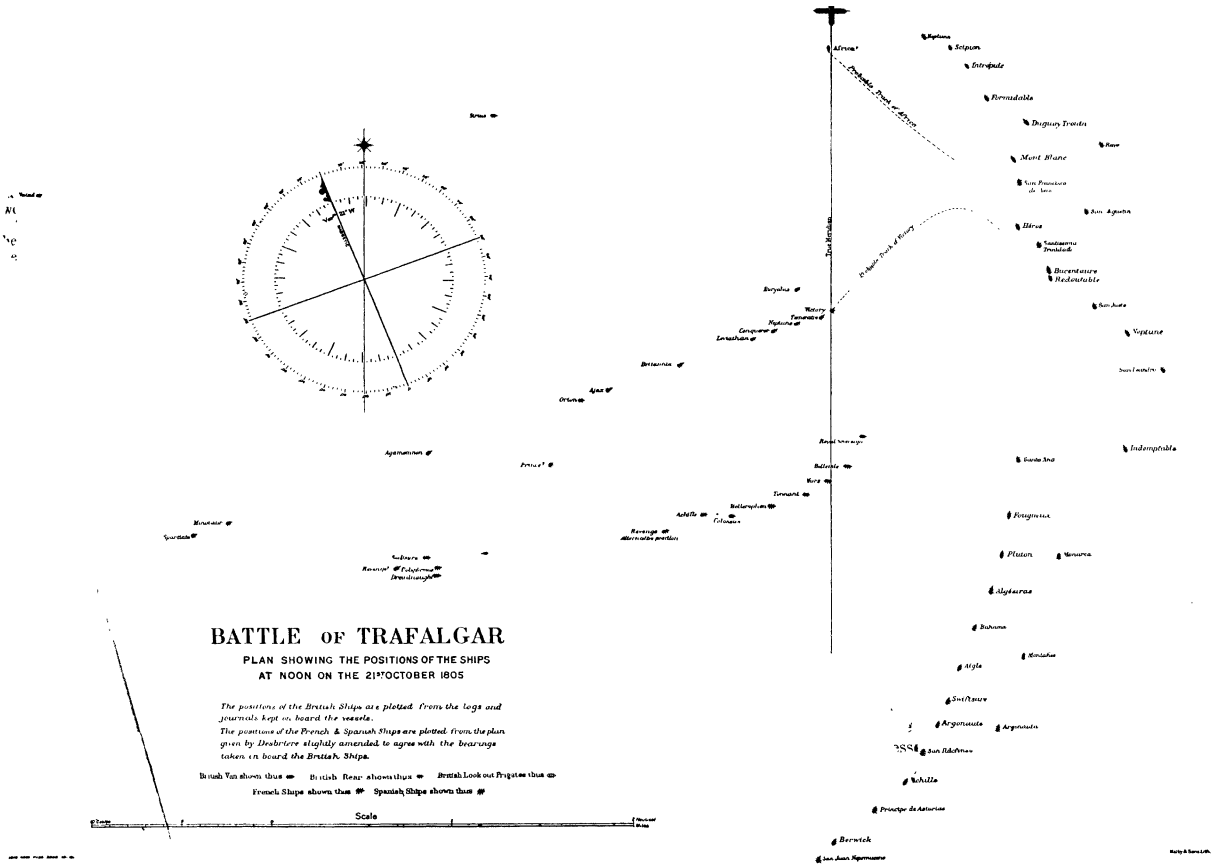
The mean direction of Nelson's course from 6:46 to noon on October 21 was E. by N.

It threatened the van of the combined fleet, rather than the centre. "Still standing for the enemy's van" is the entry in the Log of the Master of the *Victory*. . . .

Nelson, it is clear, bore a little to port and then bore up to starboard, and passed down the line almost immediately after the enemy's van opened fire upon him, and did not reply to their fire until after his turn to starboard. . . .

Nelson entered the enemy's line astern of the *Bucentaure*, Admiral Villeneuve's flagship, which was not far from its exact centre, while the enemy's van continued to stand on and was for some time out of action. . . .

At the last moment, and while the head of Nelson's column was under fire, a slight deployment took place. According to the evidence of the French and Spanish ships attacked, the *Victory*, the *Téméraire*, and the *Neptune* were almost abreast of each other, the *Victory* being somewhat ahead of the other two, with the *Téméraire* to starboard and the *Neptune* to port. The *Conqueror* and *Leviathan* were close behind, and both to port.


BATTLE OF TRAFALGAR
PLAN SHOWING THE POSITIONS OF THE SHIPS
AT NOON ON THE 21ST OCTOBER 1805
The positions of the British Ships are plotted from the logs and journals kept on board the vessels.
The positions of the French & Spanish Ships are plotted from the plan given by Desbriere slightly amended to agree with the bearings taken on board the British Ships.
British Van shown thus
British Rear shown thus
British Look out Frigates thus
French Ships shown thus
Spanish Ships shown thus
Scale
Africa
Neptune
Leviathan
Conqueror
Britannia
Ajax
Orion
Agamemnon
Prince
Minotaur
Spartiate
Colossus
Revenge
Defiance
Swiftsure
Achille
Bellerophon
Polyphemus
Ramillies
Victory
Temeraire

This completes the statement of the tactical proceedings of Nelson's fleet on the 21st October 1805, bringing the narrative down to the commencement of the action in compliance with the directions given to us

The track of the *Victory,* marked on the Committee's chart, shows that from 6 A.M. till noon she sailed approximately 27 knots, an average of less than 5 knots per hour, with a stern swell. That the *Victory* was not the fastest sailer in the division she led, is remarked by Clowes, who writes:

Although the *Victory* was one of the fastest line-of-battle ships of her day, and although moreover, she went into action with studding sails set, the *Téméraire,* her next astern, being very light, had no difficulty in keeping close to the flagship, and when the latter began to suffer aloft from the enemy's fire, had some difficulty in avoiding passing her. To keep station in fact, she had to cut away her own studding sails, and later to yaw repeatedly. . . .

While they were slowly nearing the enemy, Nelson was approached by some of the officers . . . to allow the *Téméraire,* which was then close astern, to pass the *Victory,* it being felt by them that the Commander-in-Chief, upon whom so much depended, ought not unnecessarily to expose himself in the van of the attack. "Oh, yes; let her go ahead," said the Vice Admiral significantly: and the next astern was accordingly desired to take her station ahead; but wnen shortly before 10 A.M., the *Téméraire* ranged upon the *Victory's* quarter in order to assume the lead, Nelson, who had in vain tried to crack on sail with a view to preventing her, bluntly hailed her with, "I'll thank you Captain Harvey, to keep in your proper station, which is astern of the *Victory.*"

Another evidence of the slow rate of sailing that day is the fact that from 6 A.M. Nelson had the commanding officers of the frigates with him on board the flagship, and did not dismiss the captains of the *Euryalus* and *Sirius* until the enemy's shot were already passing over the *Victory.*

Between ten and eleven, Nelson sent a telegraphic signal to Collingwood, "I intend to pass through the enemy's line to prevent him from getting into Cadiz."

Nelson's memorandum provided for his squadron to lead through "about their centers" and for the "advanced Squadron to cut two, or three, or four ships ahead of their center."

Nelson, personally, was looking for Villeneuve. He recognized the *Bucentaure* and, although she carried no admiral's flag (Villeneuve's flag was on a frigate), he guessed rightly that Villeneuve was on board. The *Bucentaure* was the 12th ship in the Allied column and the 6th ship ahead of the *Santa Ana.*

At 11:30, the signal was made to prepare to anchor at the close of the day. At 11:40, came the signal most quoted in naval history, "England expects every man will do his duty," which as soon as it was

understood, was received with a general shout of enthusiasm throughout the fleet.

At 11:50, the *Fougeux,* next astern of the *Santa Ana* fired a shot: "upon which," says Allen, "the *Victory* and all the British ships hoisted their colours." Both divisions of the fleet wore the St. George's ensign, the better to distinguish them from the enemy, together with a Union Jack on the fore-topmast stay and many on the main topmast stay also.

Shortly after, the Allies hoisted their colors, and the *Santa Ana* and the ships ahead and astern of her opened fire on the *Royal Sovereign.* Collingwood held his fire until 12:10, when he led through astern of the *Santa Ana,* raking her with each broadside gun as it bore, and firing his starboard battery into the *Fougeux.* He came to the wind off the *Santa Ana's* starboard bow.

No other ship of his column was engaged until nearly 20 minutes after the attack began on his flagship. The *Bellisle,* next astern of him, followed through about 12:15 and gave her double-shotted port broadside to the *Santa Ana.*

The *Bucentaure* tried the range on the *Victory* at 12:20. The shot fell short. Nelson was at this time steering for the Allied van.

In a few minutes the *Bucentaure* landed a shot alongside, and then all the guns that would bear from the Allied column opened fire. The *Victory* had at least 50 killed and wounded before she fired a shot. One of her first casualties was Nelson's secretary, who was killed while talking with Captain Hardy.

Nelson held on until about one o'clock when, having the *Bucentaure* abeam, or a little abaft the beam, he wore round, gave her his port broadside, then steered close under her stern and raked her in passing. While luffing to engage the *Bucentaure* to leeward, the *Victory* ran foul of the *Redoubtable,* the third ship astern of the *Bucentaure,* and evidently well ahead of her position.

And so the great battle was on. It cannot be followed here, save in a few individual cases. After close action began, no signals were made, nor were there any concerted maneuvers. It was the mêlée Nelson had hoped for. To repeat what he wrote in his plan: "It will bring forward a pell-mell battle and that is what I want."

At 1:25, he was mortally wounded and carried below. He died at 4:30, but not until he knew that he had won a great victory.

It is desirable to follow through the action, at least one ship of each squadron.

Beginning with the squadron first engaged, Collingwood's, we have

selected, without prejudice, a ship already famous, the former French *Tonnant* (Captain Charles Tyler), which, now under the British flag, added laurels to her already glorious record at the Nile. On this occasion, she was the fourth ship in Collingwood's column, which in obedience to his signal broke through the Allied rear at all points.

The *Tonnant* (80) steered for the French *Algesiras* (74), flagship of Admiral Magon de Médine, but, the *Algesiras* throwing everything aback, Captain Tyler ultimately cut through astern of the Spanish *Monarca* (74), which he raked in passing. He then rounded to and engaged yard-arm to yard-arm with the *Monarca* until 1:07, when the Spaniard dropped astern and struck her colors, although she later rehoisted them. As the colors came down, the *Algesiras* filled, as if to cross the *Tonnant's* stern, but Captain Tyler, putting his helm hard a-port, succeeded in running aboard his opponent, and became fast entangled on her port bow.

The two ships engaged furiously for nearly an hour and the French ship did not strike until she had made a very determined attempt to board.

She was taken possession of by Lieutenant Charles Bennett at about 2:15 P.M.; and at 2:30 the *San Juan Nepomuceno,* which for some time previously had suffered from the fire of the *Tonnant's* foreward port guns, also surrendered. The boat sent to board her was swamped.

In Nelson's column, the *Victory* had found a very formidable antagonist in the *Redoubtable* and her valiant commander, Captain Lucas. A few minutes after Nelson had been carried below, the crew of the French ship attempted to board the *Victory,* but the "tumble-home" of the two vessels prevented this. Captain Lucas then endeavored to lower his main yard to make a bridge, but before this could be effected the *Téméraire,* Captain Eliab Harvey, fouled the *Redoubtable's* starboard side. Harvey lashed the French ship's bowsprit to his own port side, thus—as Clowes well says—distracting Lucas' attention from boarding the *Victory.*

The *Redoubtable* took fire and finally ceased to resist. She was boarded by a boat from the *Victory,* whose crew helped to extinguish the flames. At about this time, her main-mast fell on board the *Téméraire* and enabled Harvey to send a party across to take possession. On the starboard side, the *Téméraire* was lashed to the *Fougeux* which had fallen foul of her. The four ships, *Victory, Redoubtable, Téméraire,* and *Fougeux,* drifted on together until the *Victory* got clear of the *Redoubtable.*

The *Fougeux's* captain was mortally wounded and her men were driven below by a boarding party from the *Téméraire,* which took possession. There was only a light breeze stirring, but the swell brought down weakened masts.

Harvey, having got clear of his two prizes, engaged the French *Neptune;* helped to return the fire of five of the French van, as they passed to windward; and finally fell foul of the Spanish *Neptuno* (74), which was disabled and surrendered towards the end of the battle.

The *Téméraire's* loss of 47 killed was equalled only by that of the *Royal Sovereign,* and exceeded only by the *Victory,* whose loss numbered 57.

It is an extraordinary fact that Allen makes no mention of any honors to Captain Eliab Harvey of the *Téméraire,* among the list of those bestowed.

The *Bucentaure*—and ahead of her, the world's greatest ship, the *Santissima Trinidad*—lay helpless almost from the time that Nelson cut the line. The entire Allied fleet, on the wind, had barely more than steerage way.

During the approach, the *Téméraire* was well up on the *Victory's* starboard quarter, and in action almost as soon as the flagship herself, but the third ship in Nelson's column, the *Neptune,* Captain Fremantle, was well astern of her position. Evidently she was a poor sailer, as, like all the others, she was under full sail to studding sails. She was nearly becalmed within gun range and did not get up to the French line until 1:45, fully 35 minutes later than the *Victory* and *Téméraire,* which during those 35 minutes were subjected to all of the Allied fire.

The *Neptune* was closely followed by the *Leviathan* and *Conqueror,* all three raking the *Bucentaure* as they passed under her stern.

The *Neptune* and *Leviathan* came to the wind and attacked the *Santissima Trinidad.* The *Conqueror* hove to close on the *Bucentaure's* quarter and kept up her fire until her victim was completely dismasted and surrendered.

Captain Pellew then sent his marine officer, Captain Atcherly, in a small boat to take possession, while he closed on the *Trinidad.* Villeneuve and his flag and ship captains offered their swords to Captain Atcherly, but he declined to receive them and took the admiral and the two captains in his boat to the *Mars.*

How the *Mars* reached the vicinity of the French flagship is not clear. She was third ship in Collingwood's column. Her captain, George Duff, had his head shot off early in the action, and his ship, on the way to

engage her opposite, the *Pluton,* had suffered severely from the fire of the Allied rear. She appears to have followed the *Fougeux* when that ship stood north.

The *Santissima Trinidad,* with three 74s besetting her, and occasional broadsides from the *Victory* and *Téméraire,* was soon a hapless and dismasted wreck, rolling in the westerly swell. About 5:30 she was taken in tow by the *Prince* (98), the last ship of Collingwood's squadron and the only British ship that suffered no casualties.

Mahan says that "distinguished ships have a personality only less vivid than those who fought them." While the names *Victory* and Nelson will be forever associated, the great *Santissima Trinidad* is better known than any of the captains who commanded her, or the admirals whose flags she carried in her long career, not excluding Admiral Cisneros, who suffered defeat on this occasion. The British almost had her in their grasp after the battle of St. Vincent, but she escaped. Nelson, then a commodore in the *Captain,* had fought against her in that battle.

She was built in Havana, Cuba, under the superintendence of Mateo Mullins, an Irishman in the Spanish service. Launched in 1769, four years later than the *Victory,* she was larger than that ship, and the world's only four-decker, with a length over-all of 229 feet and beam of 58 feet. She was called "The Glory of Spain." Her stern was spendidly ornamented with a colossal group of figures, painted white, representing the Holy Trinity from which she took her name. At Trafalgar, she was easily the most conspicuous ship of the Allied column, her sides being painted with four distinct lines of red, with a ribbon of white between them. Fraser, in his narrative, "The Enemy at Trafalgar," says:

> From all accounts there was hardly a British officer among those in the leading ships, who did not earnestly pray that morning that the fortune of battle would take his ship alongside the *Santissima Trinidad.*

By great effort she was kept afloat for three days, but was finally lost to the victors.

Trafalgar was the *Victory's* last battle and also the last great battle between sailing ships. She was finally retired from service in 1812, but was kept afloat in Portsmouth harbor for one hundred and ten years thereafter, thus surpassing in years the preservation of the *Golden Hind.* In 1922, she was enshrined permanently in the oldest dry-dock in the world, at Portsmouth, and her restoration was undertaken by the Society of Nautical Research, in co-operation with the British Admiralty. The work, in 1928, was so far advanced that a tablet with the following inscription was unveiled on board:

H.M.S. VICTORY. LAID DOWN 1759 LAUNCHED
1765 WAS AFTER 157 YEARS OF SERVICE
PLACED 1922 IN HER PRESENT BERTH THE
OLDEST DOCK IN THE WORLD AND RESTORED
TO HER CONDITION AS AT TRAFALGAR
UNDER THE SUPERINTENDENCE OF THE
SOCIETY FOR NAUTICAL RESEARCH.
TO COMMEMORATE THE COMPLETION
OF THE WORK THIS TABLET WAS UNVEILED
ON 17th JULY 1928 BY
H.M. KING GEORGE V.

It has been remarked that in the minds of British seamen a figurehead has its own personality as the ship's guardian angel; and that of the *Victory* is described as follows:

> Beneath the *Victory's* beakhead rails, winged cupids rode on dolphins, blew lustily upon trumpets, or held aloft for admiration, Britannia's spear and shield.

The *Trinidad's* losses during the battle were between 300 and 500 men. The total British losses were 449 killed and 1,241 wounded. No estimate of the total Allied loss is available.

Immediately after Admiral Nelson's death, Captain Hardy and Captain Blackwood of the *Euryalus* went on board the *Royal Sovereign* with the sad news, and conveyed to Collingwood Nelson's wish that he should anchor the fleet, which was then about eight miles northwest of Trafalgar, and on soundings.

When firing ceased, 18 Allied ships had surrendered—9 Spanish and 9 French. Of these, 8 were dismasted and the others badly cut up.

Admiral Gravina with 11 of the rear, and Dumanoir with 4 of the van had escaped. Gravina reached port. Dumanoir did not. A few days later, he was sighted, pursued, brought to action, and after a fierce engagement, all 4 of his ships were captured by a British squadron of 5 of the line, under Captain Richard Strachan, and taken into the British Navy. These prizes were the *Formidable* (flag), *Duguay-Trouin, Heros,* and *Scipion* (74s).

Collingwood, after taking command, prepared to anchor, but the wind shifted, first from W.N.W. to W.S.W., and then to S.S.W. There was a nasty swell, 13 fathoms of water, and a lee shore not far away. The shift of wind enabled Collingwood to get off shore, so he stood to the westward with his whole fleet, except four, which had already anchored and were fortunate enough to have their ground tackle hold. His flag he shifted to the *Euryalus* (36), the *Royal Sovereign* having suffered severely during the action.

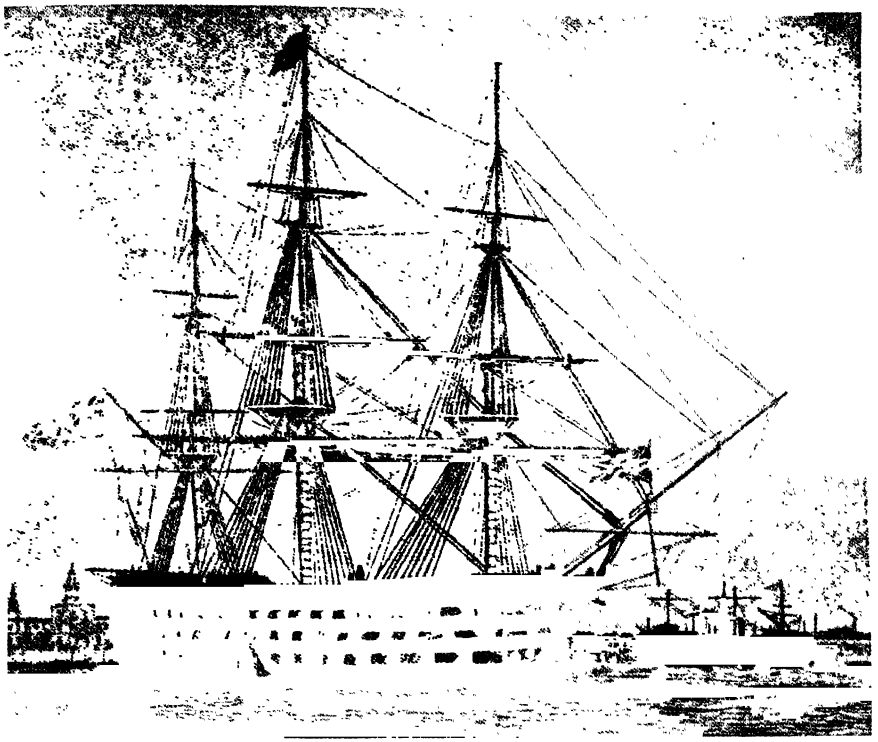


FIG. 70d.—H. M. S. Victory, First Rate, 104 guns, lying in Portsmouth Harbour. (*Courtesy Office of Naval Records and Library*)

During the next two days, it blew a gale, which brought many disasters. The *Redoubtable* sank while in tow. The *Fougeux* was wrecked, with the loss of nearly all on board. The *Algeciras* was re-taken by her crew. The *Bucentaure* was also re-taken, but went ashore and was wrecked.

A French commodore came out of Cadiz with a squadron of 5 of the line and 5 frigates and re-took the *Neptuno* and *Santa Ana,* but lost one of his own ships, the *Indomptable* (80), by grounding. A Spanish 74, which had escaped, was lost in the same fashion in Cadiz Bay. The *Rayo* was wrecked. The *Monarca* foundered. The *Santissima Trinidad* and the *Argonauta* were scuttled by Collingwood's orders. The *Aigle* was wrecked. The *Intrepide* and *San Augustin* were burnt, as useless. The *Berwick* went to pieces off San Lucas after striking bottom.

Of all the prizes, but four remained, the *San Ildefonso, Bahama, San Juan Nepomucemo,* and *Swiftsure.*

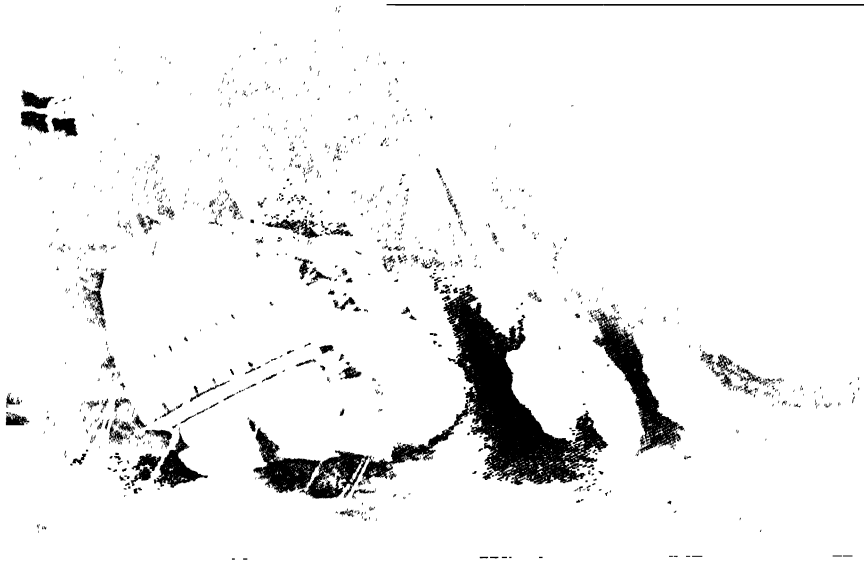


FIG. 70e.—The Last Hours of the *Santissima Trinidad.* (After the painting by R. R. Spencer in the possession of Frederick K. Tate, Esq.; reproduced by permission of the owner of the picture from the "United Service Gazette" Trafalgar Centenary Number.) (*From Fraser's "The Enemy at Trafalgar," published by Hodder & Stoughton, Ltd., London*)

Corbett—and he is not alone in this respect—criticises Nelson's tactics. Admiral Ekins, author of *Naval Battles of Great Britain,* quotes the opinions of an officer supposed to have been on the *Conqueror* (74), the sixth ship of Nelson's column, commanded by Captain Israel Pellew. This officer is supposed to have represented Captain Pellew's views. In relation to Nelson's approach, he said:

> The disadvantage of this mode of attack appears to consist in bringing forward the attacking force in a manner so leisurely and alternately, that an enemy of equal spirit and equal ability in seamanship and gunnery, would have annihilated the ships one after another in detail, carried slowly in as they were by a heavy swell and light airs.
>
> Or should it fall calm or the wind materially decrease at the moment of attack, the van ships must be sacrificed before the rear could possibly come to their assistance.
>
> By the mode of attacking in detail, and the manner in which the combined fleet was drawn up to receive it, instead of doubling on the enemy, the British were on that day, themselves doubled and trebled on.

It is a fact, that the position of the combined fleet, at one time, was precisely that in which the British themselves were desirous of being placed; namely, to have one part of opposing fleet doubled on, and

separated from the main body. Ekins states as his own opinion that

. . . persons of experience in nautical affairs . . . will clearly see by Lord Nelson's first plan of attack that he could not have intended to expose his ships, more particularly in light winds, to be singly beaten in succession. That this was the case, Mr. James, himself, affords ample proof; he says, "The *Royal Sovereign* was in hot action, after having cut through the enemy's line, for upwards of a quarter of an hour, before any ships did, or could, come to her assistance."

It was not until full fifteen minutes after the *Tonnant* had cut through the line that her second a-stern, the *Bellerophon,* owing to her distance from the former, and the lightness of the wind, was enabled to do the same.

The *Victory* and the *Téméraire* were engaged for even a longer period before the three or four ships a-stern of them could get to their support. . . .

Elkins quotes another author, relative to the *Royal Sovereign:*

There is great difference of opinion as to the exact period during which the *Royal Sovereign* was engaged alone. Admiral Collingwood considered it to be 20 minutes, while others believed that it considerably exceeded that time. In the meantime, the English ships were pressing forward with their utmost speed in support of their leader, but doubtful at times of his fate.

Captain Alexander Moorsom, whose father was captain of the *Revenge* at Trafalgar, writes in his *Naval Tactics,* 1845, of Nelson's attack:

There was an entire alteration, both of the scientific principle and of the tactical movements [previously laid down]. . . . Feeling certain that the only maneuver that either could be made, or was intended to be made; that namely of slipping into Cadiz, Nelson resolved at all risks to bring on the battle.

To sum up, it appears that Nelson was eager to oppose Villeneuve in person, in the old manner; that he determined to lead his own column; that the fortunes of war had provided a passive enemy, whom he felt he could afford to despise; that he feared Villeneuve might escape into Cadiz; and that he strongly desired a mêlée. So he abandoned tactics, and the event—at much cost—proved him correct. Corbett says:

The violent polemics of such men as James, the naval chronicler, made it appear profanity, so much as to consider whether Nelson's attack differed in the least from his intended plan, and anyone who ventured to examine the question in the light of general principles, was likely to be shouted down as a presumptuous heretic . . . this attitude had a most evil influence on the service. The last word seemed to have been said on tactics. . . . To no one did it occur to consider how the new method of attack was to be applied, if the enemy adopted Nelson's formation. They simply assumed an endless succession of Trafalgars.

Nelson's body was taken to England in the *Victory.* After lying in state at Greenwich hospital, it was buried in St. Paul's Cathedral.

Villeneuve was taken to England as a prisoner, but was soon exchanged. While en route to his home, in April, 1806, he either committed suicide, or was murdered, at Rennes, France.

Villeneuve was born in 1763. He entered the navy as a midshipman. As a sympathizer with the revolution he was retained in the navy after the overthrow of the monarchy and received rapid promotions.

He was 43 at the time of his death; Nelson 47. Napoleon took great pains to demonstrate that Villeneuve, after a careful study of anatomy, killed himself by driving a pin into his heart, but it was reported that, when found he had five knife wounds in his body. This created the belief that his master considered his death to be a political necessity.

Admiral Rosily arrived in Cadiz too late to supersede Villeneuve. He succeeded to the empty honor of commanding the 11 ships that Admiral Gravina brought into the harbor. There he remained closely blockaded by the British until 1808.

At Trafalgar the attacking columns were led by the commander-in-chief and his second-in-command. Neither gave any specific instructions to his ships as to their procedure after breaking through the Allied column. Each captain was free to act as circumstances permitted, and kept in mind Nelson's own words, "No captain can do very wrong if he places his ship alongside that of an enemy."

Although no major fleet actions took place, Corbett insists that the period after Trafalgar was one of decadence in the British fleet both in tactics and gunnery.

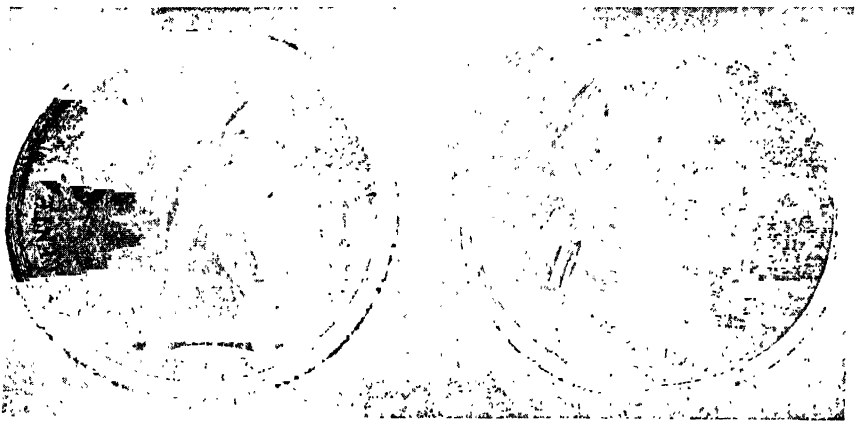


FIG. 70f.—Napoleon's Medal to Commemorate the Conquest of England. (*From Fraser's "The Enemy at Trafalgar," Hodder & Stoughton, Ltd., London*)

AUTHOR'S NOTE.—*Fraser in "The Enemy at Trafalgar" writes: "Napoleon, musing gloomily over the news, asked Berthier how old Paul Jones was when he died. Berthier replied that he thought he was forty-five. 'Then' said Napoleon 'he did not fulfill his destiny. Had he lived France might have had an admiral.'"*

CHAPTER XXVIII

TRUXTUN ON TACTICS. FIRST U. S. SIGNAL BOOKS

IN FEBRUARY 1806, Commodore Truxtun, no longer in the Naval Service, published a small volume which he entitled *Extracts from the Best Authors on Naval Tactics.*

He was probably inspired by what he had learned of Villeneuve's more or less accidental formation at Trafalgar some four months before.

It will be recalled that Truxtun commented on the Battle off Cape St. Vincent less than two months after it took place. He was a keen and able student of war on the sea.

He made some notes "to show the advantages of a curved line of battle and one of the ordinary mode."

He referred to French authors, Hoste, Moroques, Villehuet, and Grenier, and said that England had produced but one writer on naval tactics—Clerk of Eldin. (Clerk's work on *Tactics* was supplied to ship's libraries in our Navy at least to the end of the 19th century.)

Truxtun was impressed by Grenier's plan for preventing doubling on either van or rear by a re-enforcement of each by a few flanking ships bearing from the van and rear, respectively, on the close hauled line opposite to the one on which the battle line was formed. If the battle line was eight points from the wind, the flanking ships were to be abeam of the van and rear and of each other.

Truxtun strove to show that the same result--protection against doubling—could be achieved by a curved battle line like Villeneuve's. At the time he wrote, and for long thereafter, it was believed that the Allied disposition at Trafalgar was intentional.

Truxtun calculated that with the sail usually carried in action (fore and main topsails and jib) the advance of the Allied fleet at Trafalgar was not more than one mile. He said that his studies and experience led him to believe that, as between the windward and leeward positions in battle, there was "no general rule for preferring one before the other." In this statement he overlooked the great advantage of the initiative, which goes with the windward position.

Said Truxtun, "I write to cause emulation among our excellent young navy men and to render them some benefit." At that time, our navy had about 50 commissioned officers and 150 midshipmen.

The Navy Department library has some signal codes, dated 1807-9-12, issued by Commodores John Rodgers and David Porter. These were privately printed, like Truxtun's signal book of 1797, and like his, all flags were colored by hand. Some of the codes are partly in long-hand, and are of interest as showing our efforts towards a Signal Book, but are of no present tactical value.

Our first official Signal Book seems to have been published in August 1813, fourteen months after our declaration of war against England (June 18, 1812). It was entitled "Signals for the use of the United States Navy, as adopted by order of the Navy Department, Washington City." The first page refers to signals formerly in use, but of these, there is no record available.

Some extracts follow:

In obeying signals relating to evolutions, it must be recollected that the maneuver is to commence when the signal is hauled down; except when the course to be afterwards steered is shown, in which case, the maneuver commences when the compass signal is hauled down; or when the execution of the signal has been postponed to some specified time.

When maneuvering, should no particular course be given, it is meant that the ships should haul by the wind.

In forming the different orders, or in changing from one order to another, the ships, columns, or divisions, are to preserve their relative stations, as prescribed by sailing instructions, unless particularly ordered otherwise by signal.

Five orders of sailing were provided:

In forming the Fifth order, or in changing from other orders to the Fifth order, the leading ships of the different columns will always range themselves on a line in the direction of the wind, unless particularly ordered otherwise by signal.

Close order was one cable. Open order was four cables, or half a mile.

For each repetition of the signal to "close the present order" the ships are to close one cable's length, until they arrive at "close order," after which they will close to half a cable's length.

Rules of the road for sailing ships are given and it is provided that "Each vessel will continue to have a separate number, which will be made as formerly, when requisite."

This book was long in use, as is shown by a copy in the Naval Academy Library containing a manuscript list of the ships of the navy, which includes the steamers, *Missouri* and *Mississippi* (Nos. 34 and 35). (The *Missouri* was burned at Gibraltar, during her first cruise.)

Distinguishing pennants are recommended, but not directed.

Numeral signals from 0 to 1143 are provided, a fairly liberal number

of blanks being interspersed. These are followed by a list of 60 fog signals to be made by gun fire, and 194 night signals, to be made by fixed and flashing lights, false fires and blue lights combined, as indicated opposite each signal.

A number of the evolutionary signals are accompanied by brief instructions as to the manner of performing them.

Battle signals are not listed together, but are found throughout the book, signals being arranged alphabetically by the first letter of the principal word in each.

When the book was first printed, single numbers were reserved for urgent signals, such as, "Form line of battle as quick as possible," "Sinking the ship is," "On fire the ship is," "Break the enemy's line," "Board the enemy," etc. Zero meant "I do not understand your signal." This was subsequently changed to mean "Truce. No hostilities while this flag is flying," and a new flag, triangular blue, with a white square next the hoist, was assigned zero's former meaning (interrogatory).

The signals for methods of attack, and some others of interest, appear below.

5. Break the enemy's line.
6. Board the enemy.
100. Attack the van of the enemy.
101. Attack the enemy's center.
102. Attack the enemy's rear.
120. Battle, a signal for.
128. Board the enemy. [See 6 above.]
148. Blue ensigns, to be worn by the fleet.
274. Close action.
295. Cover the ships hard pressed in action, the ships nearest them.
300. Cut together and cast, as will be directed in next signal.
303. Commanders of divisions or columns to manoeuvre their respective divisions or columns in performing evolutions.
386. *Double.* The admiral means that a certain division or number of ships whose signals will be shown are to make sail and double the van of the enemy.
387. *Double* the enemy's rear. When signals are thrown out, for the division or particular ships that are intended for this service, the van ship of this detachment is to tack first and all the ships astern of her are to follow successively the same manoeuvre. She is also to wear first if the United States fleet have the weather gage.
410. Engage, particular ships, the men of war of the enemy, while the rest follow their convoy.
411. Engage as they come up, the squadron being in chase.
412. Engage every ship her opponent in the line.
413. Engage the enemy to leeward. [Coupled with the next above, this is Howe s signal.]
414. Engage the enemy to windward.

415. Engage. The headmost ship to engage the enemy's rear ship, and so on in succession, till the rear ship of the line becomes the van.
416. Engage. The van ship of the United States' fleet to engage the enemy's van, the center is to be exactly opposite that part of the enemy's line, the rear being abreast the enemy's rear; leaving their ships that are disengaged between the several divisions to prevent the enemy's doubling the United States fleet.
417-418-419. Engage the enemy's van, center and rear respectively.
428-429-430. Exercise great guns, small arms and telegraph [signals] respectively.
444. *Fire* upon the enemy's rear; the van ship is then to tack, and fall into the rear of the line again, and this manoeuvre is to be followed by all ships successively, till forbid by signal. [Fire and fall off]
445. [As above, but to wear instead of tack.]
446. *Fire* to be reserved till within point-blank shot.
454. *Form.* The Admiral means to form a detachment of superior sailing ships, whose pendants will be thrown out, to harass the enemy in their movements, that the fleet may sooner come close.
487. Force the enemy's line, particular ships whose flags will be shown.
488. Force the enemy's line, the whole fleet, beginning at the van, each ship raking her opponent as they pass.
489-490. [The same, beginning at center and rear respectively.]
491. Fire ships proceed on service without men-of-war.
691. Lead down, being ahead and to windward of enemy, when every ship is to attack her opponent.
826. Quit the line; certain ships, whose signals will be thrown out, the enemy being inferior. [Equalizing the line.]
831. Rake the van or rear ship of the enemy, the ships disengaged in the van or rear of the line.
838. Red ensigns to be worn by all the Fleet. [Not understood.]
891. Repair on board this ship flag officers, Americans only.
925. Returned; the signal books of the fleet are immediately to be.
1013. Support, a particular ship in action.
1026. Tack, the leading ship of the center division; the rest of the fleet toward the rear to perform the same manoeuvre in succession, while the van is to continue on the same tack as before, engaging the enemy.
1027. Tack, a particular division whose pendant will be shown, the van ship of which is to go about first, the rest are to follow in succession, as far as the rear ship of that division, who is also to get on the other tack to double the rear of the enemy.
1028. Tack, such ships as want opponents, and pass through the most convenient intervals of the enemy's line, then go about again and bring them between two fires.
1029. Tack, the two ships between which the van ship of the enemy has forced the line and bring the enemy between two fires.
1032. Tack, the van division, and lead down the enemy's line to windward, and begin the action, while the center and rear divisions engage the enemy to leeward.
1033. Tack, and lead down the enemy's line to windward all the ships that can weather their order of battle, and engage as well the rest of the fleet, to leeward, in order to bring them between two fires.
1043. Traverse, the enemy, every ship as fast as possible, ahead or astern of your opponent to get the lee or weather gage.

Every method of attack provided in British signal books is found in this book, couched in different language, and in some cases with two signals for the same method of attack.

Column is still called "line ahead." Signals are "thrown out" instead of made, or hoisted.

Up to this time, our battles were practically all single ship actions, and when we had more than one ship, they cruised in company rather than in formation. It is not quite clear whether this is entirely true of all squadrons during our naval war with France. Truxtun, Barry, and others, may have left our ports with enough ships in company to sail in formation to their cruising grounds; but generally ships cruised singly and were in company only in port, or at their West Indian rendezvous.

It is possible that the tactical part of the Signal Book was put into use at once on the Lakes. It did not apply to single ships. Whether it was accompanied by any instructions other than those in the text, does not appear. The exact date of its issue is uncertain. Commodore Perry may have had it before his battle with Commodore Barclay on Lake Erie, September 10, 1813.

A number of celebrated single ship actions took place on the high seas, during the first year of the war, in which our ships were largely successful and which resulted in creating in the British navy a high opinion of the skill and bravery of our captains and their ships' companies. They showed their determination when fighting yard-arm to yard-arm, and their skill in gaining raking positions ahead and astern, and in what was known as the "dead angle" or "position of impunity."

In general, gun ports were small, and did not permit training of broadside guns more than 30 degrees forward and abaft the beam, or sternchasers more than 30 degrees on each quarter. This left a dead angle of 30 degrees on each quarter where no guns would bear.

It was upon altering his mounts to increase train forward and abaft the beam, that Sir Charles Douglas so prided himself. The increase of train had the secondary result of reducing the "dead angle" almost to zero, in those days of square sterns.

CHAPTER XXIX

CHESAPEAKE VS. *SHANNON,* 1813

ALTHOUGH the evolution of fleet tactics—the battle tactics of ships acting in concord—is the subject of this work, some lessons may be learned from a description of at least one celebrated single ship action, and a review of preceding events which were its cause.

The memorable engagement between the *Chesapeake* and *Shannon* is usually referred to as a triumph of good gunnery, but close study reveals other, and more determining factors.

The *Chesapeake* (36) was built at Norfolk in 1799, a sister ship of the *Philadelphia,* lost off Tripoli in 1803, and of the *Constellation,* still on the Navy list.

When en route for the Mediterranean in 1807, under the command of Captain Charles Gordon, and flying the broad pennant of Captain James Barron, she was given a broadside from the British *Leopard* (50), Captain Humphreys, under the pretense of exercising his "right of search." This was a unilateral claim made by Britain, as "Mistress of the Seas." Its assertion and abuse was a principal cause of the war. The British fire killed 3 men and wounded 20, including Captain Barron.

Captain Barron surrendered the *Chesapeake,* as not being in a state to resist. Captain Humphreys refused to accept the surrender, but had the ship searched for alleged British subjects. Four seamen were taken out, one of whom was hanged, as a deserter from the British navy. One died in prison. The other two were returned to the senior U. S. naval officer at Boston, on June 13, 1812, four years after they had been forcibly taken into the British navy, and five days previous to the declaration of war.

The *Chesapeake* was subsequently commanded by Captains Decatur, Hull, and Evans. In the spring of 1813, Captain Evans returned with her to Boston from an uneventful cruise and was detached from command on account of ill health. He was relieved by Captain David Lawrence, on May 20, only 11 days before meeting the *Shannon.* In his letter which reported taking over command, Lawrence wrote that he found the ship ready for sea, with minor exceptions of provisions, stores, and a few men, and later in the same letter, he stated that everything

would be arranged to his satisfaction in a few days and he would proceed to sea at the first favorable opportunity.

Only a few months before—on the 24th of February—Lawrence, in command of the *Hornet* (18), had captured the *Peacock* (20) off the coast of British Guiana, and brought her officers and crew to New York. This exploit gained him promotion to post captain, but he preferred to continue with the ship that had made him famous or to be given command of the *Constitution*. Instead, he received orders to the *Chesapeake,* with which, in company with the *Hornet,* commanded by Master Commandant James Biddle, he was to cruise against British commerce off the St. Lawrence and in the vicinity of the whale fisheries.

The *Life* of Captain Broke rates the *Chesapeake* as carrying 49 guns and 349 men. Clowes lists the *Shannon* as a 32, but American, and other British authors, except James, class her as a 38 and the *Chesapeake* as a 36. James classes the *Shannon* as a 46. These variations in rating are due to sometimes including, and sometimes not including, carronades.

The *Shannon* was completed in 1806, and had been in command of Captain Broke since August 31 of that year. At the time he took command she was described as a very fine frigate of 38 guns, and he was congratulated on his promotion to her. She was newly coppered in 1811 and sailed for the American station, arriving in Halifax on September 24.

During part of the first year of the war, Broke was the senior British naval officer on the American station and commanded the British squadron in the famous chase of the *Constitution* off the New Jersey coast, lasting from the afternoon of July 16, 1812, until the morning of the 19th. Just one month later, the *Guerrière,* having parted with the British squadron in foggy weather, fell in with the *Constitution* and was captured.

In the spring of 1813 Broke's squadron, consisting of the *Shannon* (38), *Africa* (64), *Belvidera* (36), *Aeolus* (32), and *Tenedos* (46), was blockading the port of Boston in which the *President, Congress, Constitution,* and *Chesapeake* were lying. The *President* and *Congress* went to sea in a fog without falling in with the blockaders. The *Constitution* was not ready for sea.

Lawrence, although hoping to get command of the *Constitution,* was pleased with his orders to cruise with the *Chesapeake* in company with the *Hornet*.

In his earlier action with the *Peacock,* carronades, the principal arma-

ment of the *Hornet,* were very effective. A few minutes after the opening broadside, she was secured on the *Peacock's* starboard quarter, where in less than 20 minutes she inflicted so much damage that her antagonist surrendered and shortly afterward sank, despite all efforts to keep her afloat.

The *Peacock* carried 16 carronades, but the position in which the *Hornet* was secured prevented their full use.

About six months previous to the capture of the *Peacock,* the *Hornet* in company with the *Constitution* was blockading the British *Bonne Citoycnne* (20), Captain Green, in Bahia, Brazil. Lawrence, by permission of Captain Bainbridge of the *Constitution,* sent a challenge to Captain Green for a duel between the two ships. Bainbridge pledged himself, if present, not to interfere with the results of the combat, should Captain Green accept. The English captain declined and although Bainbridge absented himself in the *Constitution,* leaving the blockade to the *Hornet* alone, the *Bonne Citoycnne* remained securely in harbor.

The presence of the *Tenedos,* on blockade off Boston must have brought painful recollections to the new captain of the *Chesapeake.* About eight years earlier, June 12, 1805, Lawrence, while commanding U.S. gun-boat *No. 6* on a cruise to the Mediterranean, had fallen in with the English blockading fleet off Cadiz. *No. 6* was unarmed at the time, it being necessary to strike her battery below in order to make her seaworthy for the Atlantic crossing. She was boarded by an officer from the *Tenedos* and one from the *Dreadnaught* (98), Collingwood's flagship. Three alleged British subjects were taken out of *No. 6,* but Collingwood, like Humphreys of the *Leopard,* refused to receive Lawrence's surrender, and the delivery of the gun-boat to him.

This outrage caused Commodore John Rodgers, then in command of the American force in the Mediterranean, to issue a general order from the *Constitution* to the effect that no commanding officer, under any pretense whatever, should suffer his vessel to be detained, or men taken out of her, except by superior force, in which case, having resisted to the utmost, the vessel should be surrendered as to any other enemy, after striking her colors. The commanding officer to go aboard the enemy, deliver his sword, and not return to his own ship unless put aboard by force.

Lawrence could not fail to have a keen recollection of his humiliation at British hands.

Broke, no doubt, had heard of Lawrence's challenge to the *Bonne*

Citoyenne, and, considering the *Shannon* a fair match for the *Chesapeake,* he challenged Lawrence to battle. His letter, dated June, 1813, but not carrying the day of the month, was written apparently the day before, or the *day* of the battle; but it was never received. In it he gave the *Shannon's* complement and her battery, and appointed various rendezvous at which he would be pleased to meet the *Chesapeake.*



FIG. 71.—Sir Philip Broke. (*From Gleaves' "James Lawrence," G. P. Putnam's Sons, New York*) Captain James Lawrence. (*From an engraving of the painting by Alonzo Chappel*)

He assured Captain Lawrence that the *Tenedos* would be sent beyond signal distance, to make certain that they would not be disturbed, and ended by saying if the rendezvous which he proposed were not satisfactory, he was willing to meet at any place within 300 miles of Boston that might be appointed by Captain Lawrence. He closed with these words:

> Favour me with a speedy reply. We are short of provisions and water and cannot stay long here. Choose your terms, but let us meet.

His letter was addressed to the "Commander of the U.S. Frigate *Chesapeake,*" and he signed himself, "Your obedient humble servant

P. B. V. Broke
Captain, H.H.M. *Shannon*"

Lawrence having only recently arrived in Boston, Broke may not have known the name of the commanding officer he was addressing. Whether he believed that Lawrence had received his challenge and left harbor in response to it, has not transpired, since both Lawrence and his first lieutenant, Ludlow, were mortally wounded, and Broke was so seriously wounded that he never again performed active duty, while his first lieutenant, Watt, was killed.

With this background, we quote by permission, from Rear Admiral Albert Gleaves' succinct account of the battle which resulted in the capture of the *Chesapeake,* but which gave our navy its motto, in the great words of her dying captain, "Don't Give Up the Ship."

Lawrence made no attempt to get to sea unobserved. He got under way with a fair wind, on the forenoon of June 1, and stood out.

"Observing the *Chesapeake* under way,

The *Shannon* which had been laying-to about twelve miles S.S.W. from Cape Ann, filled and kept away to gain an offing, as soon as she was certain that the *Chesapeake* was coming out. At 3:30, she hauled up closer to the wind, and at 3:40 took in her top-gallant sails, and hauled down the stay sails. At four o'clock, the *Chesapeake* hauled up, hoisted the jib and fired a gun. The ships were now about seven miles apart, and the *Shannon* at once reefed topsails, and hove to on the starboard tack with her head to the southward and eastward to permit the *Chesapeake* to overtake her. At 4:30, the wind shifted to S.W. blowing fresh. The *Chesapeake* took in her light sails and sent down the royal yards, and at 5 P.M. hove to and discharged the pilot. The crew were then called to general quarters and the battery cast loose. Lawrence went down on the gun deck and personally inspected the preparations, and when in answer to his question, Lieutenant Budd informed him that his guns were loaded with one round shot and grape, Lawrence ordered canister and bar shot to be put in beside.

At 5:30 the *Shannon,* in order to keep under command, that is to keep enough speed to render the ship manageable, filled the main topsail and hoisted the jib, steering close to the wind and heading S.S.E.; in a few minutes having gained way enough, she shivered the main topsail and lay to again under topsails, jib and spanker. . . . At this time the *Chesapeake* was on the *Shannon's* weather quarter, distant about three miles, when she hauled up the courses and stood directly for the *Shannon* under topsails, jib and fore topmast staysail with the yards braced sharp up and the sheets flat aft, closing fast, as if eager for the battle, but being careful to keep abaft the *Shannon's* line of fire.[1]

Broke's position almost dead in the water placed him at a serious disadvantage but Lawrence apparently resolved to fight yard-arm to yard-arm on terms of absolute equality. Both captains, due perhaps to a quixotic sense of honor, failed to handle their ships in the best possible manner. Lawrence with greater way and before the wind could have crossed Broke's stern and raked it. Broke expected him to do so

[1] From *James Lawrence, Captain, United States Navy, Commander of the "Chesapeake,"* by Albert Gleaves, Courtesy G. P. Putnam's Sons.

and gave the order familiar to some of us who are yet living, "Stand by to receive a raking fire from aft." After raking, Lawrence could have luffed up and engaged from leeward, broadside to broadside, or as he had been running free, he could have luffed; passed the *Shannon* to windward, close enough to have exchanged broadsides without losing much headway, and then putting his helm up, have crossed her bow and raked her from ahead. He chose neither course of action, but instead continued to approach in the *Shannon's* dead angle, steering apparently for her stern, until the ships were only about 40 yards apart, when he personally gave the order to his quarter-master at the wheel, "Luff her."

Until that moment, the *Chesapeake's* crew did not know which battery would be engaged, and the *Shannon* was equally uncertain. Gleaves says that as soon as Broke saw that Lawrence intended to luff up on his weather quarter, he gave the order to man the starboard battery and directed the main deck battery not to fire until their guns could bear on the second bow port of the *Chesapeake*. He is said to have passed this order, himself, through the cabin sky-light.

The *Chesapeake* forged abeam of the *Shannon* and "at 5:55, the two ships being within pistol shot, William Windham, the captain of the *Shannon's* after—or 14th—main-deck gun, and the coxswain of the gig, pulled his lock lanyard; a second after, the *Shannon* fired her after quarter-deck carronade, and then her 13th main-deck gun. The *Chesapeake* commenced with musketry, and fired her first great gun immediately after the *Shannon's* three first. Then, one after the other, the guns were fired in rapid succession.

The batteries do not seem to have been discharged simultaneously in broadsides, but "at will," that is, the guns were fired independently, but as rapidly as they could be served. For several minutes the ships were on parallel courses, broadside to broadside, and the *Chesapeake* fired three rounds, but the headway of the *Chesapeake* soon carried her to the bow of the *Shannon*, when the jib sheet, weather fore clew garnet and fore topsail tie having been shot away, and the spanker brails and tiller ropes cut, and three men killed in succession at the wheel and the wheel itself broken, she flew up into the wind; the helm a-lee, her sails caught aback, she gathered stern-board, and with a network of cut rigging trailing out ahead from the head booms as she drifted astern she fell on board the *Shannon*, the poop rail catching the *Shannon's* sheet anchor, which was stowed in the main chains. The ships were thus temporarily locked together, and the *Shannon's* boatswain, Mr. Stephens, a man who had fought in Rodney's action, attempted to pass a lashing around the *Chesapeake's* rail, but in doing so his arm was literally hacked off by a cutlass.

According to the best authority the firing from the great guns ceased in six minutes, and Sir Provo Wallis asserts that the entire action was over in eleven minutes, but while it endured, the effect on both ships was terrific, as they were too close for any shots to miss.

The first fire of the *Shannon* swept the *Chesapeake's* spardeck, killing and wounding one hundred, out of the one hundred and fifty men and converting the

ship into a shambles. Ludlow stated that after the first fire he did not see fifty men on their legs on the upper-deck.[2]

By the loss of his tiller ropes and the sheets of his head sails Lawrence found himself within a very few minutes in exactly the same position in which at the outset he could have placed the *Shannon,* that is, subject to a raking fire at close quarters. On Broke's part there was no necessity to heave to in order to await the *Chesapeake,* thus placing himself at a disadvantage. He could have met the *Chesapeake* by standing towards her, keeping his guns bearing when in range and both ships would have approached on equal terms. Instead, he permitted the *Chesapeake* to make whatever approach she desired, and Lawrence, on his part, refused to take any advantage of the relative position of the two ships. According to Gleaves,

> Broke, who was a very conscientious man, had doubtless felt it was his duty as challenger to give the *Chesapeake* every possible advantage, but he underestimated Lawrence's appreciation of his conduct, for he evidently expected the *Chesapeake* to cross his wake, because, as already stated, he cautioned his crew to stand by to receive a raking fire from aft. Both men acted from the purest and highest motives, but both erred in assuming that war is anything else than a desperate game in which it is the duty of those who conduct it always to strike the hardest blow.[2]

Lawrence, although wounded, when he saw that collision was inevitable, looked across the deck to the port side and ordered the boarders called away, but the British boarded first and the ship was captured, Lawrence being again wounded, the second time mortally.

Gleaves says:

> Allowing the most liberal estimate of the time of the actual firing from the *Chesapeake* to be four minutes, it will be noted that each one of the *Chesapeake's* port guns was discharged at least three times and the two stern guns, which finally were the only guns which could bear, were fired four times, the guns having been loaded when the action began. This allows a little more than one minute for loading and firing the guns except the stern guns which fired at the rate of one shot per minute.[2]

Disregarding other than round shot, the *Shannon* was struck 38 times, and the *Chesapeake* 35 times.

The whole engagement, from the time the first shot was fired until the *Chesapeake* was in possession of the enemy, occupied between 11 and 15 minutes. Materially, the *Shannon* was the more seriously injured.

Gleaves gives the casualties of the *Chesapeake* as 48 killed and 97 wounded, of whom 14 afterwards died, out of a complement of 382. The *Shannon's* loss was 25 killed and 59 wounded, of whom 20 died, out of a complement of 330.

[2] *Ibid.*

The *Shannon* in this battle used round shot, grape, and canister. Lieutenant Provo Wallis, who succeeded to command, said that the *Shannon's* main-deck guns were loaded, alternately, with two round shot and with one round shot. Double shotting for short ranges was not unusual in the British navy at the time.

The *Shannon's* battery had 24 guns on a broadside, nine 18-pounders on the main deck and thirteen 32-pounder carronades on the quarter-deck and forecastle.

The *Chesapeake* had the same number of broadsides, but four more 18-pounders and fewer carronades. The projectiles supplied to her were the ordinary round shot for long guns and carronades, and, in addition, grape, canister, double-headed, and star and bar shot. The last two were for use at short range to cut the enemy's rigging. Bar shot consisted of four or five iron bars, about two feet long, fastened to a strong ring-head and tied together lengthwise by rope yarns, which broke on discharge and allowed the bars to spread out. Chain shot were used for the same purpose.

This battle was fought at such short range that guns could not miss, and other things being equal, the result should have depended on rapidity, rather than accuracy of fire. There is no evidence to show that one set of gunners had any advantage over the other in this respect.

The loss of the *Chesapeake* was due to the fortune of war. Neither Captain Broke nor his officers resolved consciously to disable the *Chesapeake's* steering gear, or shoot away her head sheets. Had the fortune of war brought these injuries to the *Shannon,* for which there were equal chances, the result of the battle would probably have been different, although, as she was to leeward, the *Shannon* would have been less likely to have fouled the *Chesapeake,* and to have been raked and boarded.

Lieutenant Provo Wallis put a prize crew on the *Chesapeake* and sailed for Halifax, where he arrived June 6. Captain Lawrence, after intense suffering, died on the fourth day out; he was only thirty-two. Captain Broke was thirty-seven.

The *Chesapeake* was taken into the British navy, under the same name. She served two short commissions, was placed in ordinary in 1816, and sold in 1820. Some of her timbers were used in building houses in Portsmouth, and others in the construction of a flour mill, known as the "Chesapeake" Mill and in operation as late as 1864.

Lieutenant Wallis, a native of Halifax, and only 22 at the time of the battle, lived to become an admiral of the fleet and died in his

101st year, in 1892, nearly 80 years after the battle in which he so distinguished himself.

Captain Broke's wound prevented further active service. His death occurred in 1841. Nothing that took place in his battle with the *Chesapeake* damped his interest in ordnance and nothing that has been written here is intended to lessen the importance of his training in that respect. He was in advance of his time, preparing for the day when accuracy of fire at long range would be decisive, and his example still lives as one to be emulated. Gleaves sums up his character as follows:

> Broke, however, was a proficient gunner, and he was one of the very few of his contemporaries who appreciated the fact that a ship is built for the purpose of carrying guns, that the guns are in fact the *raison d'être* of the ship.
>
> He knew the necessity of having gun sights, and he was familiar with the advantages of concentration of gun fire. At his own expense he fitted all his guns with dispart sights and quadrants, by which they could be intelligently aimed at any object the distance of which was approximately known, and he caused to be cut upon the decks of the *Shannon* in the rear of the guns, arcs of circles, with degrees of train notched in the deck and filled with putty, whereby all the guns of a broadside could be accurately laid on the same target, and the total weight of broadside delivered simultaneously at the same point, when the guns were fired together. These rude curves on the *Shannon's* decks were prototypes of the finely graduated training circles of modern battleships.
>
> Furthermore Broke kept his men constantly engaged at great gun practice and small arm exercise. This alone was sufficient to distinguish him above his brother officers, most of whom rarely indulged in the luxury of target practice, a neglect which James says prevailed over two-thirds of the British Navy. . . .
>
> Every day in the week except Saturdays and Sundays, forenoon and afternoon, the watch below was exercised at firing at beef casks or pickle barrels thrown overboard as targets, and the ship worked around them at a distance of 300 or 400 yards. On Friday afternoons the guns were manned by the midshipmen.
>
> Battle exercises at night were almost as frequent as the day drills, until in the course of time, Broke's men became simply integral parts of the guns, and no matter when the drum beat to quarters, night or day, every man flew to his station on deck or battery, knowing exactly what to do. Broke knew the truth of Napoleon's maxim that "fire is everything" and he believed what Farragut expressed fifty years afterward, that "the best protection from the enemy's fire is a well directed fire from your own ship." Throughout the service the "Shannons" were famous for their effective gunnery.[3]

Robertson describes, not very clearly, a method of training gun pointers on the *Shannon*. He says,

> A gun was taken onto the quarter deck and secured, a spar was placed in its muzzle with a hand-spike lashed across it, and then two men surged the gun by means of the hand-spike to imitate the roll of the ship, while the captain of the gun crouched behind and looked along his line of sight at the target (a disk placed in the fore part of the ship) and threw in the quoin when he had taken his aim. . . .

[3] *Ibid.*

Broke kept a note-book, in which he recorded many matters of interest. Among other notes published by his biographer, we find, under date of March 6, 1812,

Tried carronades, non-recoil. A breeching broke at short recoil, double-shotted, but stood double-shotted at non-recoil.

June 11. Tried main-deck gun, non-recoil, broke breeching at second round. . . .

1813 May 21. Heard that Chesapeake had bent sails today. . . .

May 22. Midshipmen exercised 12 pounder carronades at target. Tried six and three pound sights. . . . [This indicates that swivel guns were not included in accounts of ships' batteries.]

May 29. Fixed and corrected 9-pounder sights. Practiced at target with musket.

It is fair to presume that no such entries regarding sights could be found in the log of any other British man-of-war at that day.

Broke's biographer also quotes from the *Naval Sketch Book* regarding Broke's attitude towards sights,

To applications made during the past war with *America,* except in the case of two or three favourites at the Board, for "sights" to the guns, the only reply vouchsafed was, that "it was not according to the regulation of the service, and could not be complied with." This innuendo, which, to an officer of no private fortune, was equivalent to a prohibition, luckily, for the honour of both the service and the *British* flag, had no effect on that spirited commander, Sir *Philip Broke,* all of whose guns on board the *Shannon* were sighted on his own responsibility. This officer, who is, perhaps, the best practical naval gunner in the service, not contented with this advantage, had arranged the whole ship's battery by such an admirable adjustment that he had only to call out the number—on what (by his system) is termed the "quadrant" of the gun—to insure every shot on the same deck being thrown on the same level, and by concentration made to strike exactly the same spot: though, from the sheer of the ship, this could never have been accomplished had he not previously elevated or cut down the carriages of his guns by means of a spirit level.

Exactly why these brave and experienced captains failed to handle their ships to the best advantage; one to benefit by his long devotion to gunnery; the other to avail himself of the position in which he found his enemy, will never be known. Suffice it, that the active career of the one ended with the action, and the other sacrificed his life.

From contemporary records, it would seem that Broke, if he had been able to maintain such a range as to make his sights of value, and get the benefit of superior accuracy, would nevertheless not have had the advantage of rapidity of fire.

Luce says:

It was remarked, in 1805, that the English could fire a round with ball every minute, whereas it took the French gunners three minutes to perform the same operation. It is with pardonable pride that we may here pause for a moment to note that if the English gunner at that day was good, the gunner of our infant Navy was even better.

The Continental custom of naming each gun, seems to have ap-

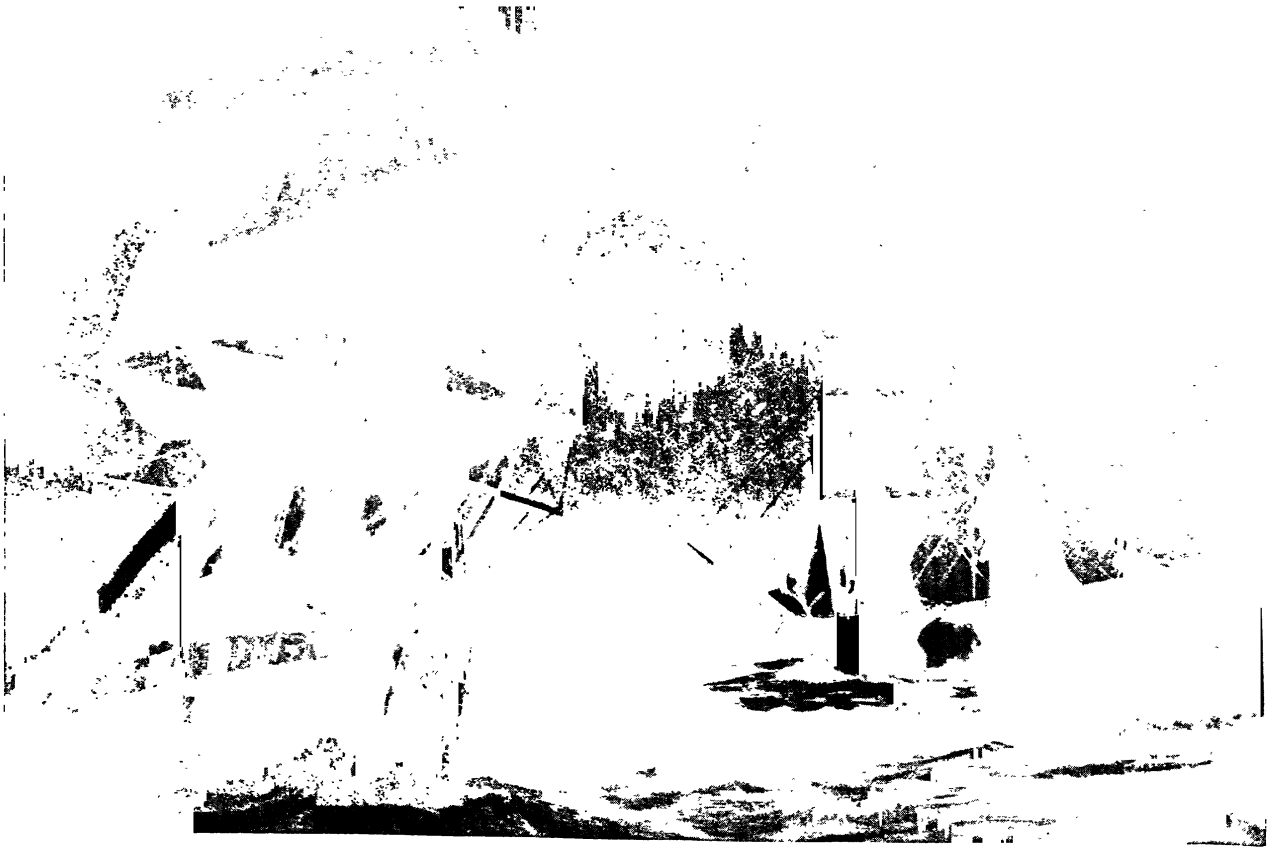


FIG. 71a.—*United States* and *Macedonian,* October 25, 1812, by George Gibbs. (*Courtesy Admiral Farragut Academy*)

plied to armies, rather than navies, but British records inform us that 25 of the *Chesapeake's* guns were named and Gleaves says that the name applied to the gun and its opposite, which would indicate that the entire battery was named. These names were not cast in the guns. One account says that they were engraved on small copper plates; another, that they were painted over the gun ports. They were fanciful, and indicate to some extent the thoughts of the time:

Main Deck

Brother Jonathan	Viper
True Blue	General Warren
Yankee Protection	Mad Anthony
Putnam	America
Raging Eagle	Washington
Liberty Forever	Defiance
Dreadnaught	Liberty or Death

All of these were 18-pounders

Forecastle

United Tars, Jumping Billy, Rattler — 32-pounders (carronades)

Quarterdeck

Bull Dog	Bunker's Hill
Spitfire	Pocahontas
Nancy Dawson	Towser
Revenge	Wilful Murder

All 32-pounders (carronades)

Gleaves gives us a brief summary of naval ordnance at the time of the War of 1812. He says that both the United States and the British had long and intermediate guns and carronades. Of the latter, the United States had 6-, 9-, 12-, 24-, 32-, and 68-pounders, and long guns for the same weights of shot. Under present nomenclature the long gun would be designated as an 18-caliber gun, the carronade, as 7.5 calibers.

English guns were considered stronger, due to better methods or more care in casting. Our methods produced a porous predict, both in guns and shot. Some nominal 32-pound shot weighed but 30 pounds. Further accounts of ordnance and gunnery will be found in chapter XXXIV.

Reviewing the long history of sailing ship actions, it is clear that, full and by, attackers win. Therefore, "attack," or in Lord Dundonald's phrase, "Go at them," was the best tactical maxim.

CHAPTER XXX

THE WAR OF 1812

DURING THE War of 1812, Commodore Oliver Perry, then 28 years of age, was at the head of our naval force on Lake Erie. His British opponent was Commodore Robert Barclay, aged 37. On Lake Ontario, the respective commanders were Commodore Isaac Chauncey and Commodore Sir James Yeo; on Lake Champlain, Commodore Thomas MacDonough and Commodore George Downie.

While ship building was vigorously prosecuted in order to retain

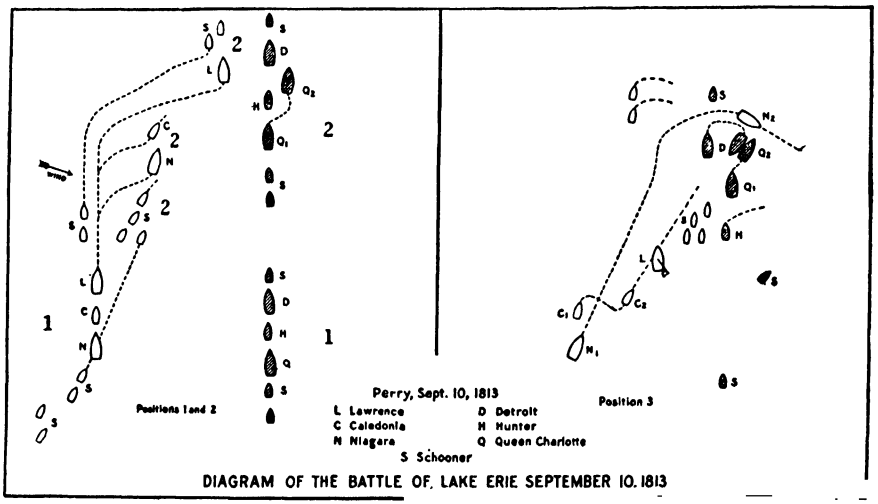


FIG. 72.—(*From Mahan's "Sea Power in Its Relations to the War of 1812," Little, Brown & Company, Boston*)

command of Lake Ontario, our forces worked even harder, if possible, for a like purpose on Lake Erie. By September, 1813, Perry's flotilla comprised 9 vessels, mounting 54 guns in all, as against a British squaddon of 6, mounting 63 guns. Maclay gives the weight of guns as in our favor, while the British had the advantage of larger and more experienced crews.

Perry's flagship, the *Lawrence,* carried 20 guns, as did his second largest ship, the *Niagara.* Perry's other vessels were small and mounted few guns, 14 among seven craft.

Barclay's flagship, the *Detroit,* mounted 19 guns, and his second

largest ship, the *Queen Charlotte*, 17. Two others of Barclay's squadron, *Lady Prevost* and *Hunter*, mounted 13 and 10 guns respectively.

When the issue was joined, September 10, in the Battle of Lake Erie, Perry had gained the weather gage and made an oblique approach on the British column, which was standing about south, close-hauled on the starboard tack. The *Chippewa* (one 9-pounder) was leading, *Detroit* (flag) second, followed by the *Hunter* (10), *Queen Charlotte*

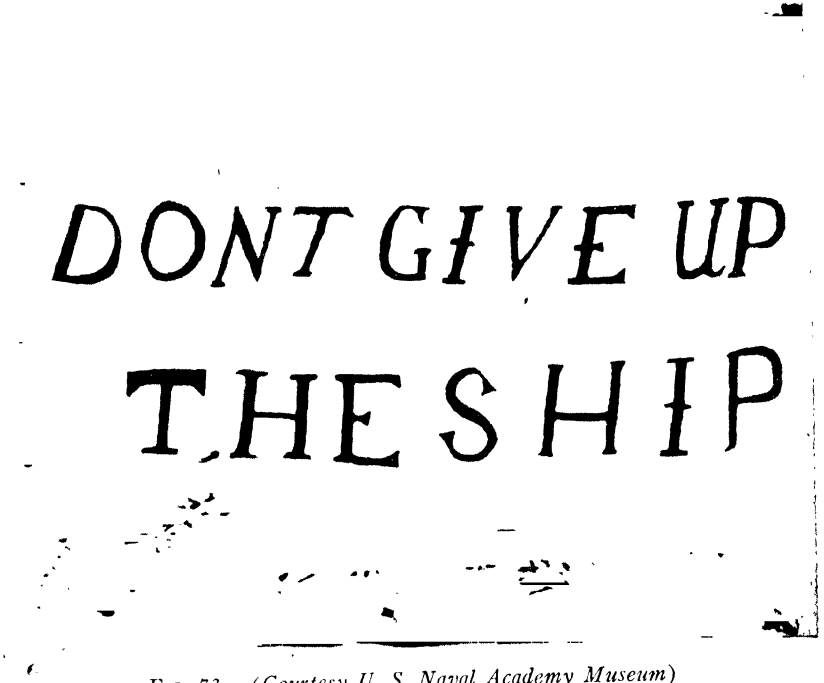


FIG. 73.—(*Courtesy U. S. Naval Academy Museum*)

(17), *Lady Prevost* (13), *Little Belt* (3). Total: 63 long guns and carronades.

Perry's column was led by the *Scorpion* (2), followed by the *Ariel* (4), *Lawrence* (20), *Caledonia* (3), *Somers* (2), *Trippe* (1), *Tigress* (1), *Porcupine* (1), *Niagara* (20). Total: 54 long guns and carronades.

The batteries of both squadrons were far from homogeneous, but except for two 2-pounders on the *Hunter* every projectile fired would, at short range, pierce the hull of any vessel. The *Niagara* and *Lawrence* each carried eighteen 32-pounders and two long 12s.

The battle opened by a shot from the *Detroit* at 11:45 A.M. Perry

passed his order by word of mouth (trumpet): "Keep within half a cable's length of each other," and enjoined his captains to preserve their stations. He had already hoisted his motto, "Don't give up the ship." Food and grog had been served out before reaching battle range.

The *Caledonia*—a slow sailer, next astern of the *Lawrence*—could not keep station. Dropping astern, she opened a gap between herself and the flagship and blocked the ships astern of her. Several of them—especially the *Niagara*—could not get their carronades into action.



FIG. 74.—Commodore Oliver Hazard Perry. (*Courtesy U. S. Naval Academy Museum*)

The leading group, *Scorpion, Ariel,* and *Lawrence,* mounting 26 guns, were opposed to the *Detroit* and *Queen Charlotte,* mounting 36 guns and assisted later by the *Hunter* and *Lady Prevost,* mounting 23. These concentrated on the *Lawrence.* After two hours and a half, she was obliged to haul down her colors, but the British were unable to take possession.

Perry shifted his flag to the *Niagara,* taking with him, and hoisting on that ship, his motto, "Don't give up the ship." An increase of wind enabled him to bring up the *Niagara* and other ships.

The *Queen Charlotte* and *Detroit,* apparently while attempting to wear, fouled each other, and the *Niagara,* skilfully handled, raked them and also the *Lady Prevost.* The *Niagara's* example was followed by the other ships of the squadron, except the disabled *Lawrence,* and in 15 minutes the *Detroit* and *Queen Charlotte* were helpless. From the British flagship *Hunter,* a white handkerchief, on a boarding pike, was waved as a token of surrender.

Perry received Barclay's sword on the deck of the *Lawrence.* Afterward, he wrote his famous despatch, "We have met the enemy and they are ours." The result of this decisive victory was to make our forces masters of Lake Erie.



FIG. 75.—Isaac Chauncey. (*From "Narrative and Critical History of America," Volume VII, Houghton Mifflin Company, Boston*) Captain Sir James Lucas Yeo Kt., K.C.B., R.N. (From H. R. Cook's engraving, after the portrait by A. Buck.) (*From Clowes' "The Royal Navy," published by Sampson Low, Marston & Co., Ltd., London*)

Our losses were 27 killed and 96 wounded from a total personnel of 490; British losses, 41 killed and 94 wounded. Total personnel 502.

On Lake Ontario, a building contest began early in the war, and before its end reached much farther in numbers and sizes of ships than on Lake Erie, but there were no decisive engagements. Commodore Isaac Chauncey commanded our forces and directed our efforts from October, 1812.

His opponent, Captain Sir James Yeo, with a picked force of 37 officers and 450 men, was sent out from England in the spring of 1813. By August, Sir James felt himself sufficiently strong to take the offensive, with a total of 10 vessels, mounting 140 guns. His total personnel numbered somewhat over 700. His largest ships were the *General Wolfe* (24) (flag) and the *Royal George* (22).

Chauncey's largest ships at this time were the *Madison* (24) and the *Oneida* (16). Both ships mounted carronades only. The *Madison* was completed and launched in 63 days. Chauncey had more ships than the British but they mounted fewer guns. Gardner Allen calls attention

to the fact that some of the ships on the Lakes were built without bulwarks on the upper decks and their guns pivoted on the center line, so as to fire on either side—a useful innovation which spread.

When the British appeared, Chauncey was anchored off Niagara, at the western end of the lake. He came out to meet Sir James. Several days were spent in maneuvering for the weather gage.

A partial engagement took place August 11, a second September 11, and a third September 28. These resulted, on the whole, to Chauncey's advantage, although he lost the schooners *Julia* (2) and *Growler* (2) to the British, who carried them into Kingston. He re-captured both the same year, but lost the *Growler* to the British again in 1814.

The *General Pike* (24) also a 63-day ship, joined Chauncey before the engagement of August 11. In the action of September 28, she lost 27 killed and wounded by the explosion of one of her long 24s, of which, on that occasion, she mounted 28.

The larger ships with Chauncey, in all three engagements, were the *Oneida* (14), *General Pike* (25), and *Madison* (20). The schooner-rigged *Sylph* (16), 300 tons, launched in 21 working days after her keel was laid, joined Chauncey in time for the engagements of September 11 and 28. His small craft were *Governor Tompkins* (6), *Pert* (3), *Conquest* (3), *Lady of the Lake* (3), *Fair American* (2), *Ontario* (2), and *Asp* (2). Two others, the schooners *Hamilton* (9) and *Scourge* (10), capsized in a squall on the night of August 10, while cleared for action and under full sail, endeavoring to weather the enemy. All hands, except 16 of the *Scourge,* were drowned.

The designers and superintending constructors of our ships on Lake Ontario were Messrs. Bergh and Eckford; the latter, Henry Eckford, afterward famous as a designer and builder of ships for our own and other navies.

Both countries built feverishly during the winter of 1813-14, at their not very widely separated bases, Sackett's Harbor, N.Y., and Kingston, Ontario, on the northeastern end of the lake.

Chauncey emerged in the summer of 1814 with a squadron of 8 ships, mounting nominally 186 guns, but actually 228.

Two frigates had been built, the *Superior* (58) (nominally a 44) in 80 days, and the *Mohawk* (32) in 34 days, and two brigs the *Jefferson* and *Jones* of 18 guns each. Three other large ships were laid down, but not completed. Chauncey could cut ship timber and fashion it, but he was delayed in getting to sea by the late arrival of guns and rigging.

Maclay describes how the *Superior's* anchor cable, weighing over

four tons, was carried overland 15 miles by 200 men because they could get no set of wheels that would bear the burden.

On his part, Sir James Yeo also had a new flagship, the *Prince Regent* (58), matching Chauncey's. He got his squadron out ahead of Chauncey's but his guns numbered only 208. He hoped to overpower the Americans with the *St. Lawrence* (112), which was building. In the meantime, he refused battle and returned to Kingston, where after July he was blockaded by Chauncey, and our command of Lake Ontario was complete without further fighting for it.

Chauncey intended to match the *St. Lawrence* with the *New Orleans*, nominally a 74, but pierced for 100 guns. The *St. Lawrence* was not completed until the end of November. The *New Orleans* was never launched, but was kept in good condition on the stocks in Sackett's Harbor until some time after 1850.

In 1812, our government had in commission on Lake Champlain three sloops, the *Eagle* (11), *Growler* (11), and *President* (6), as well as some small galleys mounting one gun each.

The *Eagle* and *Growler* were captured by a British flotilla in June 1813, and added to their force, making a flotilla of five, which gave them command of the lake.

Our force later consisted of four galleys and the *President,* to which was added the sloops *Preble* (7), and *Montgomery* (6), purchased in 1813.

Thomas Macdonough, then in command on Lake Champlain, was a year younger than Oliver Perry. Through his efforts, the *Saratoga* (26), *Eagle* (20), and 6 large galleys to mount two guns each, were laid down at Vergennes, Vermont, in 1814, and the schooner *Ticonderoga* was purchased and armed with 12 long guns (12- and 18-pounders) and five 32-pounder carronades.

As on Lakes Erie and Ontario, the ships were built of green timber, and the rapid rate of building shows the resourcefulness and determination of the builders. The timber in the *Saratoga* was standing in the woods 40 days before she was launched.

The British were not idle. They laid down the *Confiance* (36) at Isle aux Noix near the foot of the lake. Captain George Downie was selected to command the *Confiance* and the flotilla. Allen says he hoisted his pennant on the new frigate September 3, 1814, with orders to co-operate with the army under Sir George Prevost, who intended to attack Plattsburg, New York. Again, according to Allen, General Prevost pressed Downie with letters and messages, to such an extent that the latter

agreed to sail with the *Confiance* before she was properly fitted out and her crew well organized and drilled.

Prevost's plan was for simultaneous attacks on the defenses of Plattsburg by his troops, and on our naval force off the city by Downie's flotilla. The signal for the assault on shore was to be the firing of the *Confiance's* guns, opening the naval attack.

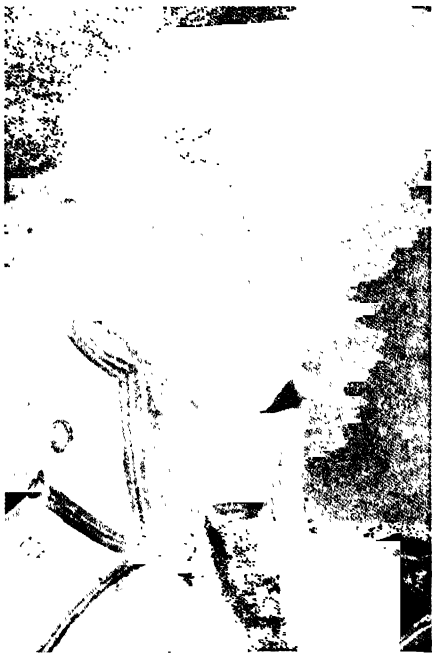


FIG. 76.—Commodore Thomas Macdonough. (From the portrait by Gilbert Stuart.) (*From Rodney Macdonough's "Life of Commodore Thomas Macdonough, U. S. Navy." Capright R. Macdonough*)

Unfortunately, Downie arrived off the port on the morning of September 11 before the troops had breakfasted. They were ordered to breakfast instead of to the assault when the *Confiance* opened fire. Whether Prevost's failure to carry out his own plan affected the naval result is uncertain. Downie, in the *Confiance,* had with him the *Linnet* (16), *Chubb* (11), *Finch* (11), and 13 galleys, 5 mounting two guns each, and 8 one gun each. The *Confiance* had 39 guns mounted, bringing the British total to 95. All galleys were armed with 32-pounder carronades, except the *Sir James Yeo,* which carried a carronade and a 24-pounder and the *Broke,* which carried a carronade and an 18-pounder.

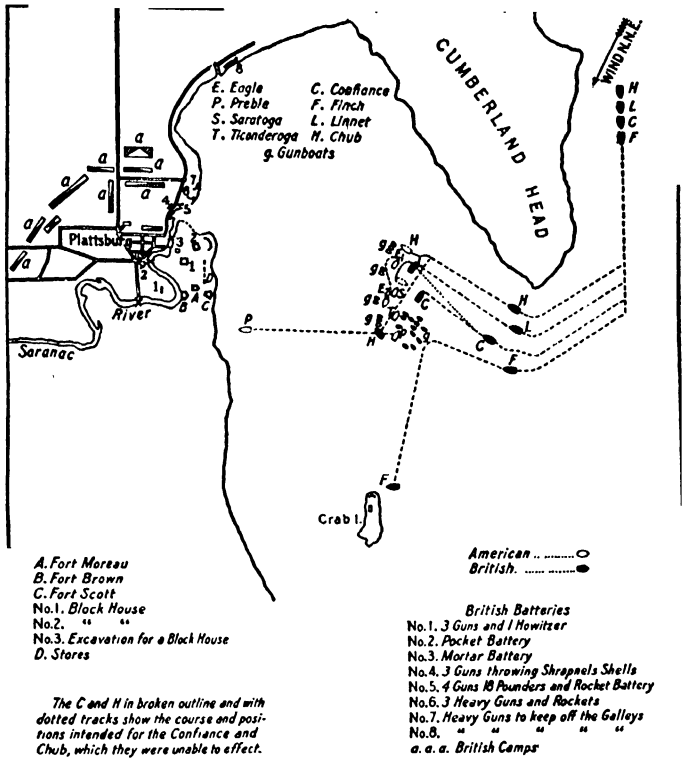
Rounding Cumberland Head from the north, Downie found Macdonough's squadron anchored in a north and south line, with the *Eagle* (20), at the northern end, too close to the Head to permit ships to pass between her and the land. South of the *Eagle,* in column, were the *Saratoga* (flag) of 26 guns, *Ticonderoga* (17), and *Preble* (7).

The wind was about northeast; fair for Downie to approach.

Macdonough had 10 galleys: 6 mounting two guns each, and four, one gun each. They were anchored a little to windward, opposite the intervals between the ships.

Unlike the British, the Americans mounted more long guns than carronades. Their flotilla, in all, mounted 86 guns. The water at the south end of their column was too shallow for Downie's larger ships to pass.

Having decided to accept battle at anchor, Macdonough had made



BATTLE OF LAKE CHAMPLAIN

FIG. 77.—(*From Mahan's "Sea Power in Its Relations to the War of 1812," Little, Brown & Company, Boston*)

the best possible disposition of his flotilla. As long as the batteries at Plattsburg were not captured, he had no fear of attack to port.

He had a better position than Brueys at Aboukir, or Arnold off Valcour Island during the Revolutionary War. Results confirmed this.

Downie attempted to send two of his ships, the *Chubb* and *Linnet*, around the head of the American column, but failed. The *Linnet* anchored on the *Eagle's* starboard bow. The *Chubb* drifted down the

line, after being injured by a broadside from the *Eagle,* and was captured by the *Saratoga.*

The *Eagle,* finding her springs shot away so that the *Linnet* was almost in a raking position, got under way and anchored astern of the *Saratoga.* The *Linnet* followed, and anchored off the *Saratoga's* starboard bow.

Downie himself hoped to bring the *Confiance* across the *Saratoga's*

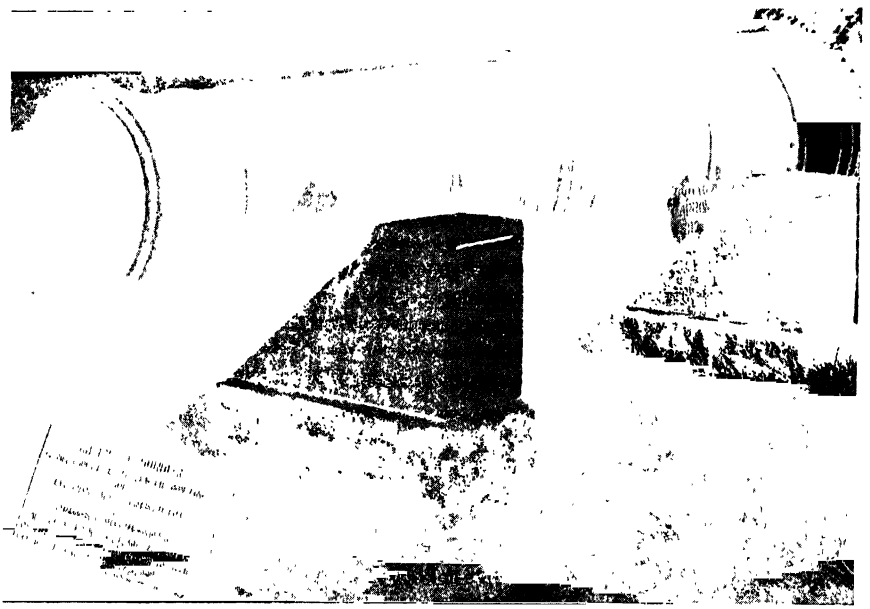


FIG. 78.—(*Courtesy U. S. Naval Academy Museum*)

bow's, but was forced to anchor at a distance of 300 yards. The fourth British ship, the *Finch,* with the British gunboats, drove the *Preble* in-shore, and the gunboats then attempted to carry the *Ticonderoga* by boarding, but failed.

The *Eagle,* while aiding the *Saratoga* against the *Confiance,* was being raked by the *Linnet,* and her starboard battery was nearly out of action. By tripping his bower, dropping a stern anchor and using his springs, Macdonough brought the *Saratoga's* port broadside to bear; first on the *Linnet* and then on the *Confiance.* He was raked by the *Confiance,* but soon disabled her port battery with his own fresh one.

Downie had been killed early in the action, being struck by a dismounted 24-pounder (possibly the gun [Fig. 78] now at the Naval Acad-

emy). The first lieutenant of the *Confiance* endeavored to bring her starboard battery to bear, but his ship was head on to the *Saratoga* which soon raked her to a surrender. Then Macdonough trained on the *Linnet* and obliged her to haul down her colors.

The *Ticonderoga* crippled the *Finch* and forced her to surrender. The victory was complete, except for the galleys. They were injured, but escaped under sail and oars. Macdonough ordered his galleys to pursue, but was forced to recall them to succor the prizes. Of these, the *Chubb* and *Finch* were the former *Eagle* and *Growler,* captured by the British in 1813.

Both the *Eagle* and *Saratoga* had all their starboard guns disabled. The *Eagle* received 39 shot in her hull; the *Saratoga,* 55; the *Confiance,* 125.

It was a hard fought and sanguinary battle. The American losses Emmons gives as 52 killed and 58 wounded; the British, 84 killed and 110 wounded. The *Confiance* lost in killed and wounded over 100 men, nearly 16 per cent of the total personnel of her flotilla. The *Saratoga* also suffered proportionately more than other ships on her side.

The galleys rowed out to the attack as the British approached. They were driven back, but they damaged the British with their long 32-pounders without much injury to themselves.

Downie's galleys, mounting carronades only, came to close action and lost 27 killed and forty wounded.

The armament of Downie's four larger vessels—70 guns in all—was divided equally between long guns and carronades. Underway the advantage would have been with Downie, had Macdonough been unable to close. With the Americans at anchor, the British could have selected their range for their larger ships if circumstances had permitted, but their galleys would have been useless.

Despite the protection of land and shallow water and the American provision of springs and stern anchors to keep their guns bearing, the action was much in doubt and at first favored the mobile ships .

Macdonough's victory completed American control of the lakes. Congress voted him a gold medal and the states of New York and Vermont each made him a grant of land.

It is well to note that the losses on both sides in the Battles of Lake Erie and Lake Champlain were relatively greater than in major fleet actions.

Ships armed exclusively with carronades were at a great tactical disadvantage against an enemy carrying long guns, unless they were

able to close quickly. At anchor, a ship with a main battery of carronades was at the mercy of a ship mounting long guns, which did not choose to close.

This was exemplified, in part, by the capture of the U.S.S. *Essex* (32) in Valparaiso, Chile, March 28, 1814, by the British *Phoebe* (36) and *Cherub* (20).

The *Essex* mounted forty 32-pounder carronades on two decks, but only 6 long 12-pounders. The long guns were on forecastle and quarter deck. Like the *Essex,* the *Cherub* was armed almost wholly with carronades. On the other hand, the *Phoebe* mounted 26 long 18-pounders, 2 smaller long guns, and 14 to 15 carronades.

The *Essex,* a staunch craft built at Salem, Massachusetts, in 1799, had been under the command of Captain David Porter since August, 1811. Porter joined his ship at Norfolk, Virginia, having previously obtained orders for his foster son, Midshipman David Glasgow Farragut, to serve with him. Midshipman Farragut was one month over ten years of age, having been born in July 1801. Porter had served as midshipman under Truxtun in the *Constellation,* under Sterrett in the *Enterprise,* and as first lieutenant in the *Philadelphia,* when she was wrecked off Tripoli in October, 1803.

On his release after 19 months in prison Porter obtained his first command, the celebrated schooner *Enterprise* (12), in which he had previously served. He cruised in the Mediterranean in the squadron of Commodore John Rodgers, and later, in 1806, returned in the *Enterprise* to the United States. He was 31 when ordered to command the *Essex,* an officer of recognized ability.

After a year of successful cruising in the Atlantic, Porter, with an experienced and well drilled crew, sailed in the *Essex* for the Pacific in October 1812 by way of Cape Horn.

Cruising off the Chilean and Peruvian coasts in 1813, he protected American whalers and captured British whalers—10 in all. The British Admiralty, in the summer of 1813, dispatched a small squadron under Captain James Hillyar to halt Porter's destruction of British commerce, destroy American whalers, and first of all, capture the *Essex.* Hillyar's command consisted of the *Phoebe* (36) and two sloops of 20 guns each, the *Cherub* and *Raccoon.*

Porter learned that Hillyar had sailed from Rio de Janeiro for the Pacific early in July. He decided to take his ship and some of his prizes to the Marquesas Islands, where he could refit and prepare to meet the enemy without danger of being molested.

After six weeks overhaul and drills, Porter sailed for the South American coast. Early in December, having in company the *Atlantic,* a captured British whaler, which he had put in commission as the *Essex Junior* and armed with ten 6-pounder and ten 18-pounder carronades taken from the other ships.

The *Essex* reached the coast several hundred miles south of Valpa-



FIG. 79.—Captain James Hillyar. (*Courtesy Lieutenant Commander Parker H. Kremble, U. S. Naval Reserve, Retired*) Commodore David Porter (*Courtesy U. S. Naval Academy Museum*)

raiso. During the passage north no ships were sighted and when he reached port, February 4, he learned that Hillyar had not arrived.

Leaving the *Essex Junior* on lookout off the port, Porter anchored.

On the night of February 7, Lieutenant John Downes, commanding the *Essex Junior,* reported two ships to the southward. Captain Porter recalled his shore party, cleared for action and anchored the *Essex Junior* close aboard the *Essex.*

In the morning, the two ships sighted, which proved to be the *Phoebe* and *Cherub,* hove to off the harbor and sent a boat to communicate with a British merchant ship in the port. They then cleared for action and entered. The *Phoebe,* with crew at quarters, steered for the *Essex* until close aboard. Porter manned his guns and called away boarders. Some



FIG. 80.—Engagement between U. S. S. *Essex* and H. M. S. *Phoebe* and *Cherub*, March 28, 1814.
(Courtesy Naval Historical Foundation)

tense moments ensued. Valparaiso was a neutral port; but it was by no means certain that its neutrality would be respected.

Captain Hillyar and Porter knew each other personally. They exchanged greetings and Porter warned Captain Hillyar that his ship was too close to the *Essex*. Hillyar backed his topsails and anchored about a half a mile from his enemy.

Later, he lay off the port with the *Cherub* close in, to prevent the *Essex* from getting to sea without a battle.

Porter several times sent messages offering to meet the *Phoebe*, ship for ship, if Captain Hillyar would keep the *Cherub* in port, but this Hillyar prudently and very properly refused to do. He had the superior force and did not propose, in effect, to decrease his advantage in any way.

A stalemate resulted; Porter fretting inside, and Hillyar on guard outside until forenoon of March 28, when a southerly gale, with squalls which parted his anchor cable, gave Porter what he thought was an opportunity to get to sea and have the weather gage. He made sail to pass the high land on the south side of the harbor, but when almost clear, lost his main topmast in a heavy squall off the promontory.

The *Essex* was a staunch ship and a good sailer, but Porter felt that he would be overtaken before he could get full sail on again, so wore to return to his anchorage, but was unable to reach it and was forced to anchor to the northward, about half a mile from the shore.

Farragut, then as already stated a midshipman with Porter, wrote afterward that it was felt the *Essex'* chances, despite the damage aloft, would have been better at sea.

Actually Porter did not expect to be attacked, but seizing his opportunity, Hillyar came in with his two ships. He hove-to with the *Phoebe* under the *Essex'* stern and the *Cherub* off her starboard bow and opened fire about 3:45 in the afternoon. Both English ships were out of carronade range and using their long guns.

Unable to use springs to bring his broadside to bear on the *Phoebe*, Porter shifted three of his 12-pounders to his stern ports. After half an hour the British ships stood off to repair their rigging and to gain an anchorage where they would be clear of the *Essex'* 12-pounders.

About this time, the gale appears to have abated, or did not blow home in the harbor, and a gentle off-shore wind sprang up, assisting the *Phoebe* to take a new position off the *Essex'* port quarter, out of carronade range.

Porter slipped his cable, hoisted his jib, and attempted to run the

Phoebe aboard, but Hillyar also slipped and kept clear, with his guns bearing. Porter anchored again, hoping the *Phoebe* would drift out of range, but Hillyar kept within range by judicious sail handling.

Porter then endeavored to beach his ship, but the off-shore wind prevented. The *Essex* was afire and unmanageable, half of his crew disabled—killed or wounded—and he felt obliged to surrender. Fearing that his magazine would explode, he gave permission to those who desired to do so, to jump overboard and try to swim ashore. Some succeeded, while others failed.

His loss was 58 killed, 66 wounded, and 31 missing (some of whom were drowned), out of a total of 255 men on board at the opening of the battle.

The British losses were very small. The *Phoebe* had seven carronade hits near her water-line. The *Essex Junior* anchored in the harbor, was forced to surrender. Captain Hillyar paroled his prisoners, and sent them in her to the United States.

Porter claimed that Hillyar violated the neutrality of the port, after having promised not to do so. This, in spite of the fact that Porter did not take advantage of the situation of February 8, when his twenty 32-pounder carronades, loaded and manned, were so close to the *Phoebe* that they could not miss had they been fired.

The only claim the British could make was that Porter was using a neutral port as a base of operations.

The capture of the *Essex* was a *fait accompli.* She was taken into the British navy and retained until 1837.

The *Essex Junior* sailed with the survivors, 30 days after the battle. She rounded the Horn and reached New York July 5, after a passage of 69 days.

The war ended with the Peace of Paris, negotiated in December, 1814, and ratified February 28, 1815. The United States Navy had proved its worth.

Before the usual peace demobilization, President Madison determined—once for all—to teach the Mediterranean corsairs and their masters a lesson that would be decisive, and wipe out, as far as could be, the memories of concessions made, humiliations suffered, and tribute paid, all to no avail.

In the spring of 1815, Commodore William Bainbridge was appointed to the command of two squadrons of ships, with our first 74, the *Independence,* as his flagship. He had orders to proceed to the Mediterranean and impose peace terms on the pirates of the Barbary Coast.

Stephen Decatur, in the *Guerrière* (36), was to have been second in command, but his squadron of ten was despatched ahead of the other.

Decatur waged such a vigorous campaign that a treaty of peace "at the mouths of our cannon" was made with Algiers before Bainbridge's arrival, and the Bey of Tunis and Bashaw of Tripoli were forced to release Christian prisoners and pay indemnities.

Decatur had sailed from New York May 20. On July 12, one of





FIG. 81.—Commodore Stephen Decatur. (*Courtesy Office of Naval Records and Library*) Commodore William Bainbridge. (*From Harris' "Life and Services of Commodore William Bainbridge," Carey, Lea & Blanchard, Philadelphia*)

his squadron, the *Épervier* (18), Lieutenant Shubrick, having on board Captain Lewis of the *Guerrière,* bearer of the treaty with Algiers, with other passengers and liberated captives, passed Gibraltar, homeward bound. She was never seen again.

Commodore Morris in his autobiography tells us that his ship, the *Congress* (36), was to have formed part of Bainbridge's squadron, but was delayed in fitting out, and was then detailed to carry to Flushing our Minister to Holland, after which he joined his commander-in-chief.

These were eventful times in Europe. Not long before the *Congress* sailed, Napoleon had returned from Elba. Before she arrived in Flushing he had lost all at Waterloo.



FIG 82—Triumphant return of the American Squadron under Commodore Bainbridge from the Mediterranean 1815 (*Courtesy Office of Naval Records and Library*)

Morris speaks of Decatur's brilliant successes and says that he returned to the United States in the *Guerrière* without joining Bainbridge. The latter showed his squadron in full force—20 ships in all—before Algiers, Tunis, and Tripoli successively, and after a short visit to Malaga, proceeded to Gibraltar, and then home.

More than a century was to elapse before our navy again appeared in such force in European waters—and then on a peaceful errand.

The *United States, Constellation, Erie, Ontario, John Adams, Alert,* and *Hornet* remained in the Mediterranean under Captain Shaw of the *Constellation.* The rest, 13 in number, sailed together for the United States.

The Signal Book of 1813 was in force.

Bainbridge prescribed a sailing order in three columns. He commanded and led the center in the *Independence* (74). Commodore Jones, in the *Macedonian* (38), commanded and led the starboard column, and, in the words of Commodore Morris, "the port column fell to my charge."

With the exception of the flags, all ships of the squadrons were small, being made up of six new 14-gun brigs, the *Firefly, Spark, Flambeau, Chippewa, Saranac,* and *Boxer,* the famous schooner *Enterprise,* built in 1799, rebuilt in 1809, and changed to a brig; the new 12-gun schooners, *Torch* and *Spitfire;* and the 6-gun schooner *Lynx.* Morris says that

> some attempts were made during the passage to maneuver as a squadron, but with very little success.
>
> Even in the simplest of orders, that of convoy in three columns, the respective vessels could rarely be brought into their proper stations, or kept there for an hour.
>
> It was very evident that none of our commanders were prepared to manage their vessels in a squadron which should be obliged to maneuver in the presence of enemy, and that such knowledge was not to be acquired except by practical exercises under an officer well acquainted with the theory of tactics, and willing to devote much time and labor to their instruction.
>
> The squadron separated before it reached our coast.

Thus ended our first recorded attempt at tactical maneuvers. Other commodores, Richard Dale, John Rodgers, and Edward Preble, had sizable squadrons under their command in the Tripolitan War, 1801-05, Preble to a total of 15 at the first bombardment of Tripoli in August, 1803; but as far as known, we had no official signal-book, and whatever codes were used must have been the product of the individual seniors in command—or it is possible that copies of British signal-books were available. Friendly as we were in the West Indies with the British

during our naval war with France, it is probable that copies of Howe's last revision were possessed by some officers. This revision remained in force in the British navy until 1816.

Collingwood issued some additional fighting instructions while in command of the British fleet in the Mediterranean, 1808-10. These related to breaking through an enemy column from leeward on opposite tacks, and what ships should do after breaking through.

In 1812, while in command on our coast, Admiral Alexander Cochrane in his additional instructions went into greater detail than Collingwood. Both admirals realized the desirability of directing their captains in what to do after breaking through.

Cochrane also planned how to prevent an enemy from breaking through his battle line from leeward.

> When an attack is likely to be made from to leeward, signal 109 will be made with a blue pennant, where best seen; upon which each ship will luff up on the weather quarter of her second ahead, so as to leave no opening for the leading ship of the enemy to pass through. This movement will subject them to the collected fire of all that part of the fleet they intended to force.

As established by Howe, a close-hauled line of battle was seven points from the wind, so that ships could luff up on each other's weather quarter without being taken aback.

The revision of the British Signal Book, which included sailing and fighting instructions, was made under the direction of Admiral Home R. Popham, who was the author of a revised signal code adopted by the Admiralty in 1803.

Corbett condemned unsparingly Popham's revision. He said it seemed to have been based on Lord Dundonald's oft quoted phrase, "never mind maneuvers; always go at them." Corbett continued, "thus had Nelson's teachings crystallized in Dundonald's mind, and in the minds of perhaps half the service."

The new book contained signals for attacking an enemy at anchor after the manner of Nelson at the Nile, and for "cutting the enemy's line in the order of sailing in two columns." Corbett said the instructions for doing this showed that Popham and others did not understand Nelson's plan and "hold up for imitation every vice of the reckless movement, in spite of which Nelson triumphed."

Corbett said further that Biddlecome's *Naval Tactics* of 1850 showed that no advances had been made in tactics either theoretically or practically in the forty-five years since Trafalgar, which is to say during the remainder of the sailing-ship era, which we leave with regret.

CHAPTER XXXI

CHANGES IN SHIPS AND WEAPONS: EARLY 19TH CENTURY

THE CLOSE blockade of our principal ports during the War of 1812 stimulated the minds of our inventors in the direction of means to break it. Our sea trade—both coastwise and foreign—was strangled. Our men-of-war were largely kept off the sea. To win the war, it seemed that some way must be found to raise the blockade.

Robert Fulton, already known to the British naval authorities, as well as to the French, for his submarine inventions, and to the world as the builder of the first successful steamboat, came forward with plans for an invulnerable steam warship which he called the *Demologos*. His drawings were exhibited to President Madison at the end of 1813, and favorably considered by the Congress.

They were also examined by a committee of naval officers: Commodores Decatur and O. H. Perry and Captains Jones, Evans, Biddle, Warrington, and Lewis. The Committee, commenting on the advantages of a steam vessel of war said:

> . . . that in a calm or light breeze, she could make choice of position or distance. If she could move at the rate of four miles per hour, she could in the harbors and rivers be rendered more formidable than any kind of engine hitherto invented. She would be equal to the destruction of one or more 74's, or of compelling them to leave our waters.

They believed that it was among the best interests of the United States to carry Mr. Fulton's plans into immediate execution.

In March, 1814, the Congress authorized President Madison to cause to be equipped "One or more floating batteries for the defense of the waters of the United States." Construction was directed by the Coast and Harbor Defense Association which had charge of the building of war vessels. The Association delegated the building of the *Demologos* to a sub-committee of five prominent New Yorkers. This committee selected Fulton as engineer of construction.

The design was for a twin-hulled vessel with a single paddle-wheel operating between the hulls. The keels were laid at the shipyard of Adam and Noah Brown, on the East River, New York, June 20, 1814. The craft was launched October 29, 1814, and towed to Fulton's works on the North River to receive the machinery.

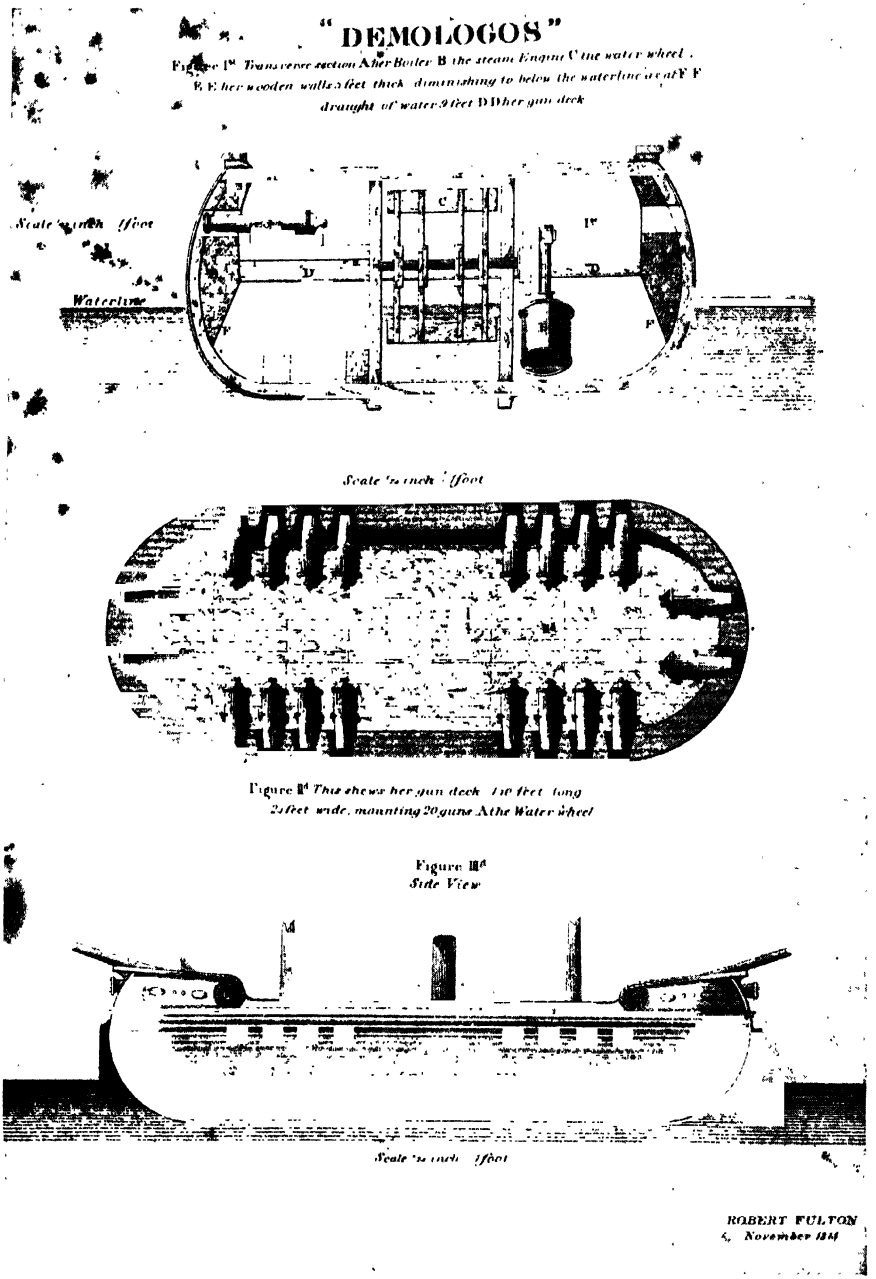


FIG. 83.—(*From Stuart's "U. S. Naval and Mail Steamers, 1853," Charles B. Norton, New York*)

The launching was the occasion of great rejoicing, ashore and afloat. It was believed the *Demologos* would raise the blockade of the coast which had been so strictly maintained by Admirals Cockburn and Cochrane for nearly two years, but her completion was delayed by the financial difficulties of the Government and by Fulton's death in February, 1815, so that she did not make her first trial trip until June 1, 1815, some months after the peace.

The *Demologos* was the first steam man-of-war, and the first armored man-of-war with protected motive power, even though the armor was but wood. She was designed to be invulnerable.

The average thickness of a 74's side was equal to 30 inches of oak; that of a frigate, 20 inches. The side of the *Demologos* was 58 inches thick, practically double that of a ship of the line. Although each hull had its own keel, the entire ship was more of the barge, or flat boat shape, than of the ship form of that day. Her length was 157 feet, beam 56, draft 11. Her tonnage (2,475) was much greater than that of any other steamship of her date. The opening between the hulls for the paddle wheel was 15 feet wide and 66 feet long. The paddles were 14 feet wide and dipped 4 feet. The engine was supported by one hull, the copper boiler by the other. She had two short masts with yards and sails, two bowsprits with jibs, four rudders, one at each end of each hull, and was intended to, and did, steam either end foremost. Her maximum speed was about six knots.

The plans of the *Demologos* show an armament of 20 guns only, on a covered gun-deck, but she was described by Fulton himself as pierced for 30 long 32-pounders. The design further provided for two 100-pounder submarine guns on each bow. Shot furnaces were installed for heating the 32-pound shot, and pumps for discharging hot water against an enemy. A portion of her battery of 32-pounders was from a British prize, *John of Lancaster,* captured by the *President* in July, 1812. They were hauled overland from Philadelphia to New York through the New Jersey mud, in order to avoid danger of re-capture if shipped by water.

As the result of the *Demologos* trials, the city of New York was considered to have the means of making itself invulnerable, and it was believed that every bay and harbor of the nation might be protected by the same tremendous power. The Philadelphia Defense Committee wrote to Fulton during the construction of the *Demologos,* with the object of getting him to build a similar vessel for that city. His death brought these negotiations to an end.

The peace with Great Britain halted further building, though the

Harbor Defense Association purchased a vessel to tow a submarine torpedo, which was called the *Torpedo* and which was carried on the Navy List for some years.

Concurrently with the construction of the *Demologos,* Fulton started to build a submersible with an iron-plated deck which he called a "mute," but nothing was done towards her completion after his death. She was designed for a crew of 100 who were to propel her with their own power.

After some short trial trips, the *Demologos,* officially called the *Fulton I,* was laid up at the New York Navy Yard, where she remained as a receiving and stationary drill ship until 1829, when she was destroyed by the explosion of her magazine.

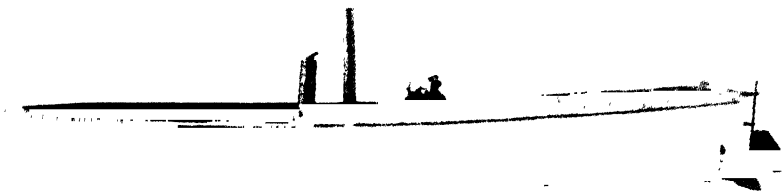


FIG. 84.—A Model of the *Little Juliana.* (*From "John Stevens; An American Record," by A. D. Turnbull, D. Appleton-Century Company, Inc., New York*)

The fact that Fulton was in the United States and that some of his inventions might be employed against the blockading fleet was brought to the attention of British commanding officers by the Admiralty, which, ever watchful of naval interests, undertook at Chatham, in 1815, the construction of a steam sloop named the *Congo,* to match the *Demologos.* Owing possibly to the laying up of the American vessel, the *Congo* was not completed. The French were likewise alive to the importance of the new type ship. Officers from a French man-of-war visited her shortly after her first trial trip.

Accounts of the *Demologos,* circulated abroad, were exaggerated, but nevertheless affected our reputation favorably. They increased the respect of the British government for the Americans as naval antagonists. The following description of the ship was given in an Edinburgh newspaper:

Her length on deck is 300 feet, thickness, 13 feet of alternate oak planks and cork wood, carries 44 guns, 4 of which are 100-pounders, and further to annoy an enemy attempting to board, can discharge 100 gallons of boiling water in a minute, and by mechanism, brandishes 300 cutlasses with the utmost regularity over the gunwales, works also an equal number of heavy iron pikes of great length, darting them from her sides with prodigious force and withdrawing them every quarter of a minute.

Colonel John Stevens, Fulton's rival in the application of steam to merchant ships and an inventor in his own right, made a design for a shot-proof floating battery which he proposed to propel by means of a screw. Stevens had made a practical test of screw propulsion in a small ferry-boat, the *Juliana,* which he operated successfully between Manhattan Island and his home on Staten Island (Fig. 84).

He also manufactured and tested some elongated hollow shot, loaded with powder and fitted with time fuses. He proposed to arm his shot-proof ship with Columbiads (Colonel Bomford's short cast-iron muzzle-loaders) to fire his explosive shot.

Like Fulton, Stevens' mind was set on breaking the blockade. In 1814 he wrote to President Madison:

If I do not grossly deceive myself, these shells are calculated to produce ultimately an entire revolution in naval and military tactics. A few heavy guns will be sufficient to effect complete protection against any naval armament whatever. Each shell will do as much execution as twenty round shot. A columbiad would discharge shells containing at least twenty pounds of powder. With such powerful means we would soon, I trust, be able to regain our lost supremacy on Lake Ontario, and prevent the enemy from ever wresting from us that or the other Lakes.

On the seaboard, by concentrating our dispersible force as much as possible and attacking the blockading squadron a great impression might be made.

Stevens went on to propose the design of steam frigates to mount his shell guns; but his plans were not accepted.

Orders were, however, given to the Commandant of the Navy Yard at New York to afford Colonel Stevens means of continuing experiments with his elongated shell. In the course of these he showed that with them he could make better practice than with round shot, that they were water proof and could not be exploded except by firing and therefore safe for use on ship board.

After protracted negotiations with the War and Navy Departments and tests in all calibers of guns from 18-pounder long guns to army 100-pounder Columbiads, Colonel Stevens obtained contracts for delivery of 1,250 shells to the Navy and 3,750 to the army.

The army authorities suggested that "it might be as well to leave their merits to be fully tested by the officers of the Navy before deciding upon their introduction into the land service." The war being over, the

Navy, as far as known, did nothing. Shell except for mortars were not generally supplied to the Navy for at least two decades, and "elongated shell" came in with rifling after at least three more decades.

Although his proposals had no immediate result, it is well to record that Colonel John Stevens of New Jersey in 1814 advocated for the Navy an armored steamship propelled by screws and armed with shell guns fitted with time fuses, intended to explode the shell after penetrating a ship's side.

Stevens fully appreciated the military advantages of a completely submerged screw (he called it a "spiral") over an exposed paddle wheel. He was instrumental in securing the passage of an act of Congress in 1816 authorizing the building of one or more steam-batteries and tried for five years to obtain a contract for building and arming such a battery. He was already a builder and operator of paddle-steamers and had tested a screw of his own design sufficiently to prove that it could be used to propel a ship.

In 1821, while Stevens was still trying to persuade the Navy Commissioners to adopt his plans, a distinguished French artillery officer, General Henri Joseph Paixhans, published an essay entitled *Nouvelle Force Maritime*, and later another, *Idées pour le Blindage de Batteries Flottantes*. In these essays he advocated four things: a navy of (1) steam-propelled, (2) iron-armored warships, mounting (3) a few shell guns (4) all of the same caliber.

Whether Paixhans only enlarged on Stevens' ideas and plans or was the originator of the proposals he made, is immaterial. Steam, armor, and shell for ships were in the minds of inventors and of some naval men. France had long sought for means of neutralizing or overcoming England's superiority at sea. Successful tests with shell fired from long guns were made at Brest in 1824 under Paixhan's directions, but without causing the French Admiralty to supply shell to ships. Naval conservatism was not yet overcome. One form of deterrent appears in an objection said to have been made by Commodore Decatur who witnessed many of Stevens' tests. Decatur said he was cognizant of the efficiency of shell fire early in the War of 1812, but considered it improper, or unsportsmanlike, to use such destructive weapons against an enemy.

The changes in ships advocated by Fulton, Stevens, Paixhans, and others were revolutionary. The change in projectiles was less so, as shell from mortars, afloat and ashore, had been common practice for cen-

turies. Fulton's successful *Clermont* had made paddle-wheels familiar except for men-of-war. But his submarine dropped from sight, and the metal armor of Stevens and Paixhans and the former's *Spiral* received little attention from those in authority in any country.

However, attempts were made in Europe and the United States to strengthen ships for both defense and offense. The ships of our navy, before and after the War of 1812, were heavier in scantling and equal, if not better, in sailing qualities, and in all other respects, to British and other men-of-war of their time; but their general lines were those that had been followed the world over for at least a century.

The British saw room for improvement in their ships of the line. The loss of life and the material injury suffered by the *Victory* during her nearly head-on approach at Trafalgar directed attention to the weakness of the bows of all ships of the line. The rounded portion of the bows, which carried the thickness of the side planking to the stem, did not extend above the second deck on three deckers nor above the first deck on two deckers.

On ships of the line, the forward forecastle bulkhead and the forward bulkhead of the highest covered deck, extended squarely athwartships, instead of following the bow lines. Moreover, these bulkheads were of lighter construction than the main hull.

This weakness did not make them less seaworthy, because sailing ships were not brought head on to seas except when tacking, and they only tacked in moderate weather. It did, however, make head-on approaches—to which the British were prone—poor tactics, because it exposed the ship's weakest part to the most dangerous raking fire.

The experience of the *Victory* at Trafalgar, and of many other ships, brought about an improved bow form, and incidentally, increased ahead fire. The topsides forward were prolonged and curved, to meet in a high stem, producing a round instead of a square bow above the first deck. The new shape tended to deflect raking shot, was stronger and harder to penetrate than the old one, and it was found possible to increase head fire.

Increasing defensive and offensive power at the bow, made head-on approach tactics less dangerous. First rates, up to that time, could fire only four guns ahead, and 74s generally but two. The new plans, with strengthened bows, provided ahead fire of 12 guns for a first-rate, 10 for a 74, and 6 for a frigate.

These changes were intended to at least neutralize, in part, broadside

fire, which the French could employ without danger to themselves until the British rounded-to, during which interval they could bear up and form again out of range, to leeward.

In 1811, the British Admiralty directed that all new ships should be built with round bows. Sir Robert Seppings, Chief Constructor, who introduced the round bow, also designed the round stern, which increased the strength aft defensively and enabled the offensive strength to be increased by mounting guns to cover the former "arc of impunity." In 1817, the Admiralty made round sterns the standard for new ships and also for those receiving extensive repairs.

Our first 74s were round-bowed ships, with considerable sheer which would protect them from raking fire ahead. But they all had square sterns.

Under date of February 24, 1821, the Board of Navy Commissioners wrote to the Chief Constructor Samuel Humphreys about the design of our first and only three-decker, the *Pennsylvania* (120):

> The ship of the line hereafter to be built at Philidelphia is to have a round stern, a beakhead, but no poop, two galleries, and a stern gallery, the cable to work on the second gun-deck, 10 shrouds to foremast, 11 to mainmast, 8 to mizzenmast. The Commissioners are of the opinion that you will have no difficulty in constructing the round stern, so as to make it as safe, or safer than the square stern. All that is necessary to effect this, is to give a fullness above the low water line equal to what is allowed in the construction of the common square stern. . . . [signed] John Rodgers.

On round stern ships of the line, the British planned to carry 14 stern chasers, some of which would bear in the former points of impunity.

There were no great naval battles under sail after the end of the Napoleonic wars. Therefore, we have nothing to show what changes—if any—in British and French fighting tactics would have resulted from the increased bow and stern fire and the increased value of the weather gage. While fire was increased during the approach, it was also increased in a retreat.

A French naval officer was quoted as expressing his astonishment that the British, who had hitherto "beat them and drove them over the sea in every direction," should be the first to teach them, by the new circular sterns, the best means of arming their ships for defense in the future.

Not long after circular sterns were adopted, both in England and the United States, there were advocates of elliptical sterns, as affording greater offensive and defensive possibilities than the circular stern. As a matter of history, the fast frigate *Brandywine* (44), when launched at the Washington navy yard, in 1825, had an elliptical stern. This was

claimed to be the invention of Colonel Doughty, naval constructor at that yard. The elliptical stern outlived sailing ships and became the standard for all types of ships, merchant vessels as well as men-of-war.

Ships were changed, but not guns. Stevens' elongated shells were not adopted. Smooth-bore solid shot guns without sights, mounted on wooden carriages, composed all ships' batteries. The relative numbers of long guns and carronades varied greatly. There were no set rules in this respect. Flint locks were in common use to fire the powder in the pan of the lock which ignited the powder in the primer, inserted in the vent. No satisfactory percussion locks were invented until 1842, though many attempts were made. The match was kept lighted for use in case the flint-lock failed.

General Sir Howard Douglas, son of Sir Charles Douglas, and the great English gunnery authority, said that no established form of gun drill existed in the British naval service until 1817, when a committee of officers was appointed to digest and arrange a new system of gun exercise. Sir Howard said that "the mere arrangement of a manual for the drill is making but very trifling progress in the improvement of the practice of naval gunnery."

The French gunnery drill manual of 1815 was an elaborate one, but there is every probability that British drill, though not standardized in print, was standardized in practice and that their gunners were at least as expert as those of the French.

Several articles from the French manual will bear quoting. One of these shows a vital difference between French and English practice when passing each other in action. For the latter we have Collingwood's maxim, "three broadsides, well aimed, at a passing ship." We also have the record of the changing of his gun mounts by Sir Charles Douglas, to increase train, which enabled him to fire both earlier and later than from the ordinary mount.

The French manual directed:

> When a vessel is to pass rapidly by the object that is to be fired at, or when another vessel is to move rapidly past her, the guns should not be traversed fore and aft, to anticipate the object, but should be pointed square in the ports, and the captains instructed to wait until the mark comes in the direction of their guns, and then to fire with the greatest precision, by paying attention to the rolling motion, as well as to the arrival of the object on the proper line. A very oblique fire is very uncertain; it strains the ship's side, the shot hits with less force and meets with more resistance.

Another rule in the French manual gives light on why France's enemies were generally more injured in sails and rigging than in their hulls:

The guns ought never to be fired when the ship rolls to the side which is in action, but always when that side rises; because in the rising motion, the shots which miss the hull may take effect in the masts or rigging.

Gun captains were enjoined before firing to lay their guns horizontally, as nearly as possible, so that during the rise the "line of sight over the gun will pass and re-pass the object intended to be hit." Obeying both orders required that guns be fired when the ship was on an even keel, on the roll away from the enemy.

Sir Howard Douglas said that the usual British method was "to fire when the vessel is nearest on an even keel." He personally advised that ". . . in fighting the weather side, we should prefer to fire at the pause, immediately before the commencement of the declining motion . . ." (roll towards the enemy, i.e., at the bottom of the roll away). This would require guns to be depressed.

When fighting to leeward (having the weather gage) he thought the best time to fire was at the end of the roll toward the enemy. This would require guns to be elevated.

In both cases, strength of breechings and amount of roll were to be considered. Firing the weather broadside, at the end of the roll away, if of more than a few degrees, would cause a violent recoil.

It is to be remembered that firing at any greater range than point-blank was considered a *"coup perdu."*

Point blank, for the French, meant without elevation other than that of the "line of metal," which depended on the difference in diameter between the breech and the muzzle and the length of the gun. British point blank range was considered to be that due solely to the height of the gun above the water, the axis of the bore being horizontal on firing.

The French Manual estimated point blank range for 12-, 18-, and 24-pounders as 600 meters; for 4-, 6-, and 8-pounder and 24-pounder carronades, 500 meters; for 36-pounder carronades, 650 meters. These and shorter distances were battle ranges.

Douglas, in 1817, published *An Essay on the Theory and Practice of Naval Gunnery*. A second edition was published in 1829. He devoted thirty pages of his work to the discussion of windage, which at that time, in England, was excessive for all classes of guns except carronades.

He explained why the results of firing were so irregular, even at short ranges. It arose

from the reflections of the ball in passing along the bore. If the last bound be upon the lower part of the bore, the angle of the shot's departure will be increased; if above, diminished. If the last reflection be on either side of the bore, the line will be

altered, and in every case the friction arising from these rubs will give the ball an irregular, whirling motion.

He estimated the loss of pressure from windage (two- to three-tenths of an inch) as from one-third to one-fourth of what could be developed by the charge. His remedy was to ream up carronades to the same diameter as long guns firing the same shot, and then increase the size (and weight) of all shot, to reduce windage to one-fortieth or one-thirty-fifth of the caliber.

Here his reasoning was faulty. A fixed clearance, regardless of caliber, and only large enough to permit free loading, was the solution, and the French custom.

Windage, and later position of center of gravity of shot, were subjects of investigation as long as smooth-bores predominated in ships' batteries, but the possibility of decreasing the shock of discharge by casting guns so that the axis of the trunnions would be in the same plane as the axis of the bore, was not recognized (except by one British captain, see p. 373).

The axis of carronade trunnions was below the bottom of the bore, and of other guns, tangent to the bottom of the bore. The moment of revolution around the trunnions produced a violent jump of the carriage at every discharge.

Douglas was familiar with the principles of rifling, but did not recommend its adoption to improve accuracy of fire. He spoke of rifling as

a contrivance to reduce errors arising from the unequal action of resistance, or any superficial inequalities in the ball, by giving it a rapid rotation, perpendicular to the axis of projection; but it is found that a ball of uniform consistency or solidity, smooth and perfectly spherical in its shape, may be projected from a plain barrel with as much accuracy as from a rifle.

In 1830, as the result, at least in part, of Douglas' recommendations, the British Admiralty established a gunnery school on the *Excellent*, formerly commanded by that practical exponent of good gunnery, Lord Collingwood.

The first Superintendent of the Gunnery School was Captain Smith, who had formerly been executive of the *Victory*. Like Captain Broke of the *Shannon*, he was a predecessor of Sir Percy Scott in the invention of aids to good gunnery.

Douglas says that Smith was well known in his time as the inventor of the movable lever target.

This contrivance was intended for the instruction of seamen gunners in the practice of naval gunnery at sea without the consumption of ammunition . . . by giving the

target an artificial motion whilst the gunner is taking his sight. This motion is stopped by a line leading to the target connected with the trigger line (lock-string) and thus is exhibited relatively with the line of sight through the center of the wooden gun any error which the gunner may have made in pulling the trigger line at the proper instant to hit the center of the target.

Captain Smith wrote to Douglas immediately after the establishment of the school, as follows:

I take the earliest opportunity after having heard of your return to England to inform you that the Establishment which you have so long desired to see in our Navy has commenced on the limited plan I have the honor to submit to you. . . . I trust you will have eventually the gratification of seeing the system extended as much as you desire.

The displacement of shot by shell, for ships' guns, lagged except in a minor but most instructive test made of their value in action by a former British naval officer, Captain F. R. Hastings, who fitted out and commanded the steamer *Perseverance,* better known as the *Karteria,* in the war for Greek independence.

Hastings had plans for a steamship for use in the narrow Greek waters, with which he would be able to neutralize, or counterbalance, the overwhelming Turkish naval force.

After four years, during the most of which he was fighting for the Greeks, ashore or afloat, his plans were realized by the aid of Lord Cochrane (formerly Lord Dundonald of the British navy), then Commander-in-Chief of the Greek navy.

Hastings' ship, the *Karteria,* measured about 400 tons. She mounted eight 68-pounders. Four of these were carronades of the ordinary pattern. The four others were of Hastings' own design, intended to fire hot shot, cold shot, or shell. In his own words:

Having obtained the command of a steam-vessel destined for Greece, I prepared for her armament eight sixty-eight pounders; four of these carronades, Government pattern, thirty-six hundred weight, five feet, two inches, and four long shorts, after drawings I gave. These were seven feet, four inches long, and fifty-eight hundred weight, with the form of a carronade in all, but having *trumicons* to mount them, the same as long guns; but these *trumicons* are not placed, as is usual in long guns, below the line for the quarter sight (to admit of which sight is the only reason I could ever imagine of placing them thus low), but so as to *intersect the guns horizontally.*

Aside from the interest inseparable from all of Captain Hastings' observations, it is specially to be noted that his guns were made after his own design. Whether the unusual spelling of "trunnions" is his, or a misprint, is unimportant, the important fact being that he recognized the value of having the center line of the trunnions intersect the center

line of the bore. He was probably familiar with the writings of Muller and others, as he unquestionably was with those of Paixhans. Of further interest, is his intimation that possibly the necessity for some elevation had its influence in keeping the trunnions in their low position, clear of interference with the quarter-sight lines.

If we except the performance of Captain Hastings' shell guns on the *Karteria,* during the Greek Revolution, no sea engagements of any gunnery significance took place after the close of the War of 1812, until the destruction of the Turkish fleet by Russian shell fire at Sinope in 1853.

Hastings sailed from England, in May, 1826, and arrived in Greek waters late in August, after many vicissitudes. He began active operations in the spring of 1827. During 1827-28, he fired about 16,000 shells, without an accident from explosion.

He fought his ship against shore fortifications and troops, as well as against Turkish men-of-war. On two occasions he captured ships of greater tonnage and batteries than his own. His ship was hit many times in hull and rigging, but was never disabled.

His engine-room was enclosed by solid water-tight bulkheads and the other compartments were of such size that any one of them might be filled without causing the ship to sink.

He burned coal instead of wood and used coal between the boilers and the ship's side as a protection against shot. Finding this inconvenient, he replaced it with packed wool.

Hastings was greatly in advance of his time. He should have gone far, but met his death in June, 1828, at the age of 34 from a neglected gunshot wound received in action.

Hastings, when serving in the *Themistocles,* fitted all of his guns with sights and locks. There is little doubt that all the *Karteria's* guns were similarly fitted.

Lord Cochrane, when accepting service in Chile, in 1818, had a steamer, *The Rising Star,* built for his own use. *The Rising Star* reached Valparaiso after many delays, and too late to share in Cochrane's triumphs, but Cochrane continued to be an enthusiastic advocate of steam propulsion.

The ideas embodied in the *Fulton I, The Rising Star, Karteria,* and the proposals of General Paixhans, had as their *raison d'être,* not tactics, per se, but the utilization of new means to enable small navies to cope successfully with larger ones; to make their superior force and their tactics of no avail.

The earliest effort to evaluate steam and the tactics of steamships as a factor in the British navy, is found in a treatise by Captain John Ross, R.N., published in 1828.

Ross dedicated his work to the Duke of Clarence, Lord High Admiral, and a son of George III. It was, largely, "An Essay towards a system of Naval Tactics peculiar to Steam Navigation . . . its advantages . . . speed, safety, and economy . . . for the National Defence."

Ross foresaw that steam would bring about a great increase in the number of officers in navies relative to the number of men, and that an entirely new system of tactics must result from the addition of steam to ship motive power. But he had no clear idea of what these changes would be. He thought that the cost of a first-rate would build and equip forty steamers, each of which could overcome two first-rates in action. His steam vessels could be made, at least partially, shot proof and the machinery installed below the water-line. One, alone, could maintain itself within 600 yards of a ship of the line, and with one gun only, could eventually disable and destroy her. Further:

> A steam vessel may be rendered a single offensive weapon in herself, on a system similar to that of the ancient warfare of galleys in the time of Rome, and to use familiar language, may be employed in running down the antagonist.
>
> The history of the Burmese war [*Narcissus*] indeed and the more recent Greek warfare [*Karteria*] are examples . . . of the value of steam ships in battle.

In his tactics, which are fanciful and of little interest, Ross visualized the use of steamers as auxiliaries and also their employment as a separate force. He felt that steam made boarding a thing of the past and that it doomed threedeckers, at the same time deploring that "the insignificance of an Admiral's flag, flying at the miserable mast of a steamboat, cannot be denied."

He was familiar with the works of Paixhans and thought that by means of steam and armor, the French might easily, quickly, and cheaply become the equals of the British at sea. He said, "An experimental squadron of steam vessels ought to be formed with as little loss of time as possible."

For coast defense Ross recommended, in effect, an armored ship that could be used as a ram and should carry only bow and stern guns.

Naval officers and others continued to speculate on changes in ships and guns and projectiles.

Writing in 1834, Lieutenant Alexander Slidell Mackenzie of our navy said:

We are threatened with a total change. This is by the introduction of bombs [shells] discharged horizontally, instead of shot from common cannon. So certain are those who have turned their attention to this subject that the change must take place, that, in France, they are already speculating on the means of excluding these destructive missiles from a ship's sides, by casing them in a cuirass of iron. Nor are these ideas the mere offspring of idle speculation. Experiments have been tried on hulks, by bombs projected horizontally, with terrible effect. If the projectile lodged in a mast, in exploding, it overturned it, with all its yards and rigging; if in the side, the ports were opened into each other; or, when near the water, an immense chasm was opened, causing the vessel to sink immediately. If it should not explode until it fell spent upon the deck, besides doing the injury of an ordinary ball, it would then burst, scattering smoke, fire and death, on every side. When this comes to pass, it would seem that the naval profession would cease to be very desirable. Nevertheless, experience has, in all ages, shown that, the more destructive are the engines used in war, and the more it is improved and systematized, the less is the loss of life. Salamis and Lepanto can either of them alone count many times the added victims of the Nile, Trafalgar, and Navarino.

One effect of the predicted change in naval war, it is said, will be the substitution of small vessels for the larger ones, now in use. The three-decker presents many times the surface of the schooner, while her superior number of cannon does not confer a commensurate advantage; for ten bombs projected into the side of a ship would be almost as efficaceous to her destruction as a hundred. As forming a part of a system of defense for our coast, the bomb cannon, mounted on steamers, which can take position at will, would be terribly formidable, with them, to say nothing of torpedoes and sub-marine navigation. We need never more be blockaded and annoyed as formerly. Hence, peaceful nations will be most gainers by this change of system; but it is not enough that we should be capable of raising a blockade; we are a commercial people, our merchant ships visit every sea, and our men of war must follow and protect them there. . . .

What Mackenzie wrote more than a century ago is in large part as applicable now as then.

Captain Simmons of the British Royal Artillery, writing in 1837, and again in 1839, offered an explanation of British conservatism in adopting shell, guns, and other improvements. He said,

So long as the maritime powers, with which we were at war, did not innovate by improving their guns, by extending shells horizontally from shipping; so long was it the interest of Great Britain, not to set the example of any improvement in naval ordinance, since such improvements must eventually be adopted by other nations, and not only would the value of our immense material be depreciated, if not forced out of use, but a probability would arise that these innovations might tend to render less decisive our great advantages in nautical skill and experience. Many of the defects which were known to exist so long as they were common to all the navies, operated to the advantage of Great Britain.

The system of our navy was at once to bear down on the enemy, and that manœuver seems best which in the least time brought the closest action.

The science of artillery, with very few exceptions, was altogether neglected, if not despised, in our navy; nor was it of importance, so long as our superior nautical skill and seamanship insured, as it did, in almost every case, an action at point blank range.

Captain Simmons' reasons for ignoring possible improvements in naval warfare may or may not have been the true ones; but they do bring to mind Sir Charles Douglas' recommendations that his methods for increasing train and rapidity of fire be allowed to lapse, and the Admiralty's dread that submarine torpedoes might make their surface ships useless.

All naval officers were familiar with mortar shell. Their resistance to carrying shell for other guns was probably based on the danger of explosion in magazines and in handling.

Ships' guns supplied with shell were long known as "Paixhans," and at first, these were as a rule 68-pounders. (8″). It was not until 1837 that the French Admiralty authorized "Paixhans" as part of ships' batteries. Two years later, the British followed their example. In our Navy, a few 8″ shell guns were introduced in 1841.

The tendency in the principal navies, including our own, was to reduce the number of calibers; 12-, 18-, 24-, 36-, and 42-pounders were gradually replaced, as broadside guns, by 32-pounders of different weights and different weights of charge.

There was a standard full charge for each weight of gun, and first and second reduces. The British had as many as six weights of 32-pounders, but not more than three weights were mounted on the same ship, and generally only two. One caliber and one weight of shot for all guns made for simplicity; not so, the filling and serving out of three weights of charge for each weight of gun. At dates not fixed, both shell and shot were supplied for 32-pounders in all navies. Our navy made the 32-pounders of 7 weights the standard broadside gun in 1845. In all navies the change to single caliber proceeded slowly and was never entirely completed, because batteries for steamers became more important than batteries for sailing ships.

England is said to have continued to ream up 18- and 24-pounders to 32s and to cast new 32s until 1850. She had also mounted at that time 1,600 shell guns—8″ (Paixhans). The allowance for these was 10 for first and second rates, 12 for third rates, and a lesser number for frigates. Carronades were gradually withdrawn from their ships by both English and French.

Very soon, after we followed France and England in establishing smooth-bore standards, tests were being made on the Continent with a weapon—the rifled cannon—which was to displace all others, and whose value had been predicted by the English scientist, Benjamin Robins, just a century before.

William Harwar Parker, in his *Recollections of a Naval Officer,* gives an account of the shell guns on board the *Columbus* (74), when he joined her as a midshipman in 1843. His point of view, as a midshipman, may not have been entirely sound, but is nevertheless interesting, as indicating the precautions taken with shell as compared with shot, a fair proportion of which were kept stowed in open shot racks around the hatches in the vicinity of the guns.

On the passage from Madeira to Rio de Janeiro we had target practice for the first time. I well remember the preparations for it; it took so long to get ready for the great event that we seemed to require a resting spell of six months before we tried it again. Then shells were a great bother to us; as they were kept in the shell-room and no one was allowed to even look at them; it seemed to be a question with the division officers whether the fuse went in first or the sabot; or whether the fuse should be ignited before putting the shell in the gun or not! However, we used to fire them off, though I cannot say I ever saw them hit anything.

We were great in running the guns in and out rapidly, but some parts of the "manual" would strike an officer of these days as very ridiculous; for instance, after the guns were pointed, the orders were very slowly and deliberately, "handle your match and lockstring," "cock your lock," "blow your match," "stand by," —"fire"; and if the ship did not remain stationary all this time it was not our fault.

CHAPTER XXXII

STEAM VS. SAIL

NAVIES were as conservative in their building programs as in the introduction of shell guns.

After the successful voyage of Fulton's *Clermont* on the Hudson in 1807, steam won its way rapidly in the merchant service. In 1818, the *Savannah,* a ship of 350 tons, crossed the Atlantic under steam and sail. By 1820 more than a hundred steamers were plying the inland waters of the United States.

In the next decade, England and France procured a few small steamers for naval use. In 1822, the United States purchased a schooner-rigged steam galliot, the *Sea Gull,* for service in the suppression of piracy in the West Indies. But practically no steam men-of-war were laid down, except those for the Greeks, of which the *Karteria* was the only successful example. The *Congo* was not finished. The *Fulton I,* unused, was destroyed at her anchorage in 1829. Despite Colonel Stevens' urgent demand, the Navy Commissioners built none of the three steam batteries authorized in 1816.

The building of even larger naval sailing ships continued, though not in great numbers. Our own *Pennsylvania* laid down in 1820 and the great Turkish *Mahmoudieh* surpassed the famous *Santissima Trinidad* in tonnage and guns.

It was not until 1835 that the Navy Commissioners proceeded with one of the "steam batteries." In the following year, they recommended that Congress authorize a naval building program which would provide a fleet of 15 of the line, 25 frigates, 25 sloops, 25 steamers, and 25 smaller vessels. The personnel to man such a fleet they estimated at 30,000.

The ship laid down in 1835 was named *Fulton II.* She was modeled after a successful steamer built by Henry Eckford in 1819 for the run from New York to Charleston, Havana, and New Orleans. She was not a Goliath intended to carry all before her, nor was she a "David," but simply a side-wheel steam-frigate of medium tonnage, smaller than the *Fulton I,* yet larger than any steam warship of her date abroad.

The five foot live oak sides of the *Fulton I* were not repeated, although accounts speak of the sides and bulwarks of the *Fulton II* as heavily built and beveled to ward off shot. She had two paddle-wheels,

hung outboard in the usual manner, with an engine for each. The design provided four copper boilers and a smoke stack for each boiler, but boilers and stacks were reduced to two. Her dimensions were: length 180 feet, beam 35 feet, draft 11 feet, displacement 1,200 tons. Her battery consisted of eight long 42-pounders and one 24-pounder, all solid shot guns. She was laid down in 1836, and launched May 18, 1837.

In September, 1837, one of the ablest officers of the navy, Captain Matthew C. Perry, was appointed to her command. Mr. Charles C. Haswell, who designed her engines, became her first engineer. When Haswell and the other engineer officers of the *Fulton II* received their appointments in 1837, which were issued by her captain, under the authority of the Secretary of the Navy, our naval engineer corps was founded, in effect, and a few years later, August 31, 1842, it was established by law.

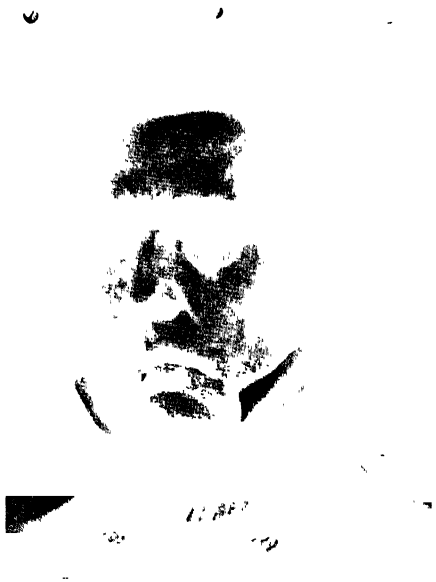


FIG. 85.—Commodore Matthew Calbraith Perry. (*Courtesy U. S. Naval Academy Museum*)

Perry was a post-captain when ordered to the command, and eligible for a much larger vessel, but being especially interested in gunnery and steam for men-of-war, he gladly accepted the appointment. He was a younger brother of Oliver Hazard Perry, who won undying fame at Lake Erie, and is himself best known to history as the maker of the treaty with Japan, in 1853, which opened that country to commerce with the rest of the world.

Perry had entered the navy as a midshipman in 1809, and at this time, 1837, was 43 years of age. His high professional qualifications were well known. The Czar of Russia had endeavored to secure his services for the Russian navy.

At the New York Navy Yard, he had been studying steam-engines, with the idea of determining the best way to install them in men-of-war.

A mixture of coal and wood was used in the trials of the new *Fulton*.

Perry had seen the *Fulton I,* under steam, making not more than five or six knots. He remembered the British blockade of our coast in 1812-14. In his report on the trials, he said:

> In less than an hour after orders had been received, the *Fulton* could be moved in any direction, at the rate of ten miles an hour, with power of enforcing the instructions of the government.

Another officer said,

> She would in a fight, be equal to any 74, and in fact to any number of vessels, not propelled by steam. Her strength and power were unrivaled in the world.

The *Fulton*'s speed on her trials averaged a little over 13 miles per hour, in a run of nine hours; faster than any sailing ship. The next year, 1838, in a test against the *Great Western,* the first trans-Atlantic passenger steamer, the *Fulton* won easily, at a maximum speed (estimated) of 15 miles per hour. In 1851, with new machinery—boilers, engines, and paddle-wheels—she ran at 20 miles per hour for seven hours.

After her first trials, Perry took her to Washington for President Andrew Jackson and his Cabinet to enjoy the spectacle of a warship, independent of wind and tide. In the varied comments made on her qualities at this time, consideration seems to have been given almost entirely to engagements with sailing ships and not with vessels of her own type.

Perry started a naval gunnery school and a school for training naval engineers on the *Fulton.* When detached, he was sent abroad for six months to acquaint himself with foreign progress on these subjects and on his return he inaugurated the proving ground at Sandy Hook which he operated in connection with the *Fulton.*

Up to this time—1838—neither France, England, nor any other country had built a steamship of tonnage, armament, or speed equal to the *Fulton II.* The French, however, were beginning to appreciate the value of steamers, if only as auxiliaries. Admiral Baudin's squadron which bombarded the Castle of San Juan de Ulloa at Vera Cruz, in 1838, included two steamers, the *Météor* and *Phaeton.* Their principal use was in towing the sailing ships to their bombarding stations. Admiral Jurien de la Gravière, the distinguished French strategist, tactician, and author, described them as "inestimable re-enforcements."

In 1839, and subsequent years, Commodore E. W. Moore, commanding the Texas Navy, employed the armed steamer *Zavala* against Mexican ships, to prevent the enforcement of a blockade against Texan ports

which had been proclaimed by Mexico, but which, owing to the fact that she had no steam driven men-of-war, she was unable to make effective.

The Texas Secretary of State, writing to the Texan (then spelled *Texian*) Minister to France and England, said, referring to the *Zavala,* which mounted eight guns, "With this acquisition, we can command the coast, the Gulf, annihilate the commerce of Mexico, prevent an invasion and force the enemy to a reasonable peace." These were great expectations.

In 1840, Admiral Sir Robert Stopford, in operations on the Syrian coast with the Turks, against Mehemet Ali, Viceroy of Egypt, employed a flotilla of seven paddle-wheel steamers, of which the largest, the *Gorgon,* measured about 1,000 tons. The names of the British steamers used in these operations were more warlike than those employed by the French, *Météor* and *Phaeton.* They were *Gorgon, Cyclops, Hecate, Hydra, Phoenix, Stromboli,* and *Vesuvius.*

The steamers assisted at bombardments, transported fleet marines and troops to landing points, towed first and second rates to bombardment stations, and carried despatches and supplies. Their services contributed greatly to the success of the operations.

A brief account of these historic events is in order. Tyre and Sidon were bombarded and carried by storm. Beirut was bombarded and occupied after its evacuation by the troops of Ibrahim Pasha, Mehemet Ali's son. The campaign ended with the bombardment and capture of the strong fortress of St. Jean d'Acre, on November 3.

The bombarding ships were anchored in two squadrons. One of 11 ships, southward of the forts, included a Turkish 74, one Arabian frigate, two Austrian frigates, two British frigates, two British brigs, two British 74s, and the *Vesuvius.*

The other squadron, west of the forts, comprised five British ships of the line; *Princess Charlotte* (104), *Powerful* (84), *Thunderer* (84), *Bellerophon* (80), *Revenge* (76), and the *Gorgon.*

The *Princess Charlotte* was Admiral Stopford's flagship, but on this occasion he commanded under way from the *Phoenix,* stationed where he could supervise the work of both squadrons.

During Stopford's operations, Mehemet Ali, the Sultan's rebellious subject, was immobilized in Alexandria, with his own fleet and the main portion of the Sultan's fleet, including the *Great Mahmoudieh* which had surrendered to the Egyptians without firing a shot.

After the fall of Acre, a convention, signed at Alexandria later in

the month, provided for the evacuation of Syria by Mehemet Ali and the restoration of the Turkish fleet to the Sultan.

Mehemet Ali had disturbed the Sultan's peace for many years and also that of Christendom. While nominally supporting his sovereign against the revolting Greeks, his fleet, under his son, Ibrahim Pasha, was destroyed in the harbor of Navarino, October 20, 1827, by the combined fleets of England, France, and Russia.

Ibrahim Pasha's fleet, at that time, comprised 9 of the line, 15 48-gun frigates, 26 corvettes, 11 brigs, and 5 fire-ships.

The allied fleet was composed of 11 of the line, one 50, two 48s, five 46s, and a number of smaller ships.

In 1840, France was supporting Mehemet Ali with supplies and munitions. He had rebuilt his navy during the thirteen years after Navarino.

We have a word picture of its appearance, as it lay at anchor with its prizes (the main Turkish fleet) in Alexandria. The author, A. A. Paton, says:

> The first scene had an effect never to be forgotten. We entered in a French steam packet, the old port, which then contained the combined fleets of the Sultan and Mehemet Ali, amounting to fifty vessels of war and including nineteen sail of the line. The pace of the steamer slackened, and we slowly moved up a majestic avenue of line of battle ships, with here and there, an immense three-decker, in all the pride, pomp and circumstance of naval architecture. There stood the motionless sentry, high perched on the poop, the setting sun glistening on his bayonet, and warming the congenial tints of his red fez and dusky visage into the semblance of a statue of rose-colored granite. Just as we dropped anchor, the sun went down, the drums rolled from ship to ship; the evening guns were fired and up rose a thin vapor that drew a grey veil over the embers of the glowing horizon, while we heard for the first time, the solemn and impressive tones of the call to prayer from the minarets on shore.

This assemblage did not include all of either fleet. Its strength was probably not again equaled, except at a Spithead review. It so impressed the Powers, that in addition to the return of the Turkish fleet to the new sultan, Abdul Mejid (son of Mahomet II), Mehemet Ali was forced to reduce his army to 18,000 men and forbidden to maintain a navy. His ships were doomed to rot at their anchors.

Here we see a partial precedent for some terms of the Treaty of Versailles in 1918.

The famous and notorious Mehemet Ali was neither an Egyptian nor a Turk, but an Albanian or a Greek. He was born in Kavala, Macedonia, in 1769. He continued as Viceroy of Egypt until a year before his death, at the age of 80, outliving by one year his son, the Admiral-General Ibrahim Pasha.

Beirut, a city on the Syrian coast, is about 300 miles by sea northeast of Alexandria. Acre, also on the Syrian coast, is about 60 miles south of Beirut.

While conducting on this coast his operations, Admiral Stopford kept close watch on Alexandria. Clowes says that his brief campaign was a remarkable illustration of the military importance of command of the sea:

> At Alexandria was a large, but by no means efficient Egyptian fleet which, had the sea been open to it, could have accompanied the left wing of the advancing army, protected it, and supplied it; but the sea was not open to it. The less numerous, yet much more efficient fleet under Stopford, not only terrorized the Egyptians into remaining under the forts of Alexandria or captured such vessels as ventured out, but also struck blow after blow on the flank of Mehemet Ali's communications, landed and supported troops, and in less than two months so imperiled the conquering army of Egypt that the rebellious viceroy was glad to make terms.

It is not too much to say that the seven steamers of Stopford's fleet were an important factor in his success.

Now a century later history is repeating itself.

As the result of his experience with the *Fulton II* and the information he obtained abroad, Matthew Perry, with the support of some other naval officers and some civilians who united in advocating the use of steam on warships, succeeded in obtaining an Act of Congress authorizing three additional steamers for the navy.

Two of these, the *Missouri* and *Mississippi,* were laid down in 1839, launched in 1841, and commissioned in 1842. They were sister ships. Perry is credited with the main features of their design and was called "The Father of the Steam Navy."

1839 was the last year in which sailing men-of-war of any size were laid down for our navy. The *Congress* (44) was laid down at Portsmouth, N.H., and launched in 1841.

One 74 and several 44s, already on the ways, were launched after 1839, but the only sailing ships laid down after that date were seven 20-gun sloops, measuring about 1,000 tons each. We were committed to steam.

These sloops, however, the best known of which were the *Saratoga, Portsmouth,* and *St. Mary's,* did good service in all parts of the world for many years and were long employed in training seaman apprentices in home waters. They were entirely seaworthy, fast sailers (logging 13 to 14 knots, running free) and handled well in all weathers. Their dimensions were approximately: keel 150 ft.; beam 38 ft.; draft 17 ft. They outlived all 74s and 44s, except the *Constitution.* They carried

the light-weight 32s as batteries. Of the *Portsmouth* her captain, J. B. Montgomery, remarked after a cruise of four years, during which he sailed 63,000 miles: "Carries her guns 6 feet above water. Excellent, whether sailing, steering, working, scudding, lying-to, or riding at anchor in a seaway."

It can be easily understood why the "Sailor of the Sail" was loath to see such ships disappear before the advance of naval science.

Perry's ships, the *Missouri* and *Mississippi,* displaced 3,200 tons. Their length over-all was 229 ft., beam 40 ft., draft 19 ft. Hulls were wood, and they were bark-rigged. They were poor sailers. Under steam, their maximum speed was about 10 knots.

Until side-wheels were succeeded by screw propellers, all steamers carried much weaker batteries than sailing ships of the same tonnage. Space for gun-mounts was limited. To compensate for lack of numbers, the tendency was to increase the caliber of guns carried. After Perry's experiments at Sandy Hook, and, to some extent, following the French example, 8″ shell guns formed a proportion—and as time went on, a steadily increasing proportion—of the batteries of our ships. Some 10″ guns were cast, to make up in caliber for the reduction in numbers. But steamers, generally, were under-gunned in all navies and weak batteries persisted even after screw propellers left decks free for gun-mounts.

The *Mississippi* mounted ten guns in all—two 10-inch and eight 8-inch. The *Susquehanna,* a later and larger ship, mounted only three 8-inch and six medium 32-pounders.

There is no doubt that the very evident vulnerability of paddle-wheels, combined with the reduced space for mounting guns, had a delaying effect on the introduction of steam in navies. Few agreed with Captain Ross that the days of the three-deckers were numbered. Especially was the thought disliked by the vast majority of Englishmen, for two reasons. One was their inbred conservatism; the other, the fear that steam could—or would—affect their position as Mistress of the Seas, with the most powerful navy extant.

Nevertheless, advances in ships, and in guns and gunnery continued. No tactician could forecast the results.

Up to 1840, no British steam men-of-war equal in tonnage to the *Mississippi* and *Missouri* had been laid down. While building, and when commissioned, they were objects of great interest, both at home and abroad.

The *Mississippi* had a long and varied career. It came to an end on

the night of March 14, 1863, while she was endeavoring to follow Admiral Farragut, in the *Hartford,* past the batteries at Port Hudson. She was partially abandoned after being set on fire to prevent her from falling into Confederate hands. After burning some hours, she drifted clear of the bank and went down, going "to her long rest, a coffin for many of her crew in the bosom of her false god-mother."

Her sister ship the *Missouri* had an earlier end. After being exhibited in the Potomac to President Tyler and his Cabinet, she made a short cruise in the West Indies and then sailed for the Mediterranean. On the day after her arrival at Gibraltar, August 25, 1843, she took fire and was completely destroyed. Her hull was subsequently raised and served as a coal hulk in Gibraltar harbor.

Colonel John Stevens had kept before our Navy Commissioners the subject of armored ships and the importance of submerged propellers. Paixhans' articles and experiments had re-enforced Stevens' arguments.

In some quarters, iron was brought forward as a better material than wood for the hulls of steamers.

To protect propelling power and to obtain more deck space for mounting guns, Lieutenant W. W. Hunter, U.S.N., designed a paddle-wheel to operate completely submerged, in a horizontal plane; one on each beam of a ship; the inboard part of each wheel being recessed in the ship's side. This invention was tested, first in the *Union* (4), laid down at Norfolk in 1841; then in the *Water Witch* (3), laid down at Washington in 1843; and in the *Alleghany* (10) at Pittsburgh, in 1844.

In all cases the Hunter wheels were failures. The most complete trial was in the *Alleghany*. She served with her Hunter wheels for three years (1847-50) in the West Indies and on the Brazilian and European stations. Her maximum speed under steam was 6.5 knots. Hunter wheels were not exposed to gun fire; they left decks clear for mounting guns; but their engineering defects were inherent and could not be overcome.

The *Alleghany* was an object of interest for another reason. She was built of iron. She was not the first iron-hulled man-of-war built, however. That record belongs to the *Michigan,* laid down at Erie in 1842 and launched in 1844. The *Michigan's* single gun—an 8″ shell-gun—was in accordance with the treaty of 1817 between the United States and Great Britain, that armed vessels on the Great Lakes should carry but one gun.

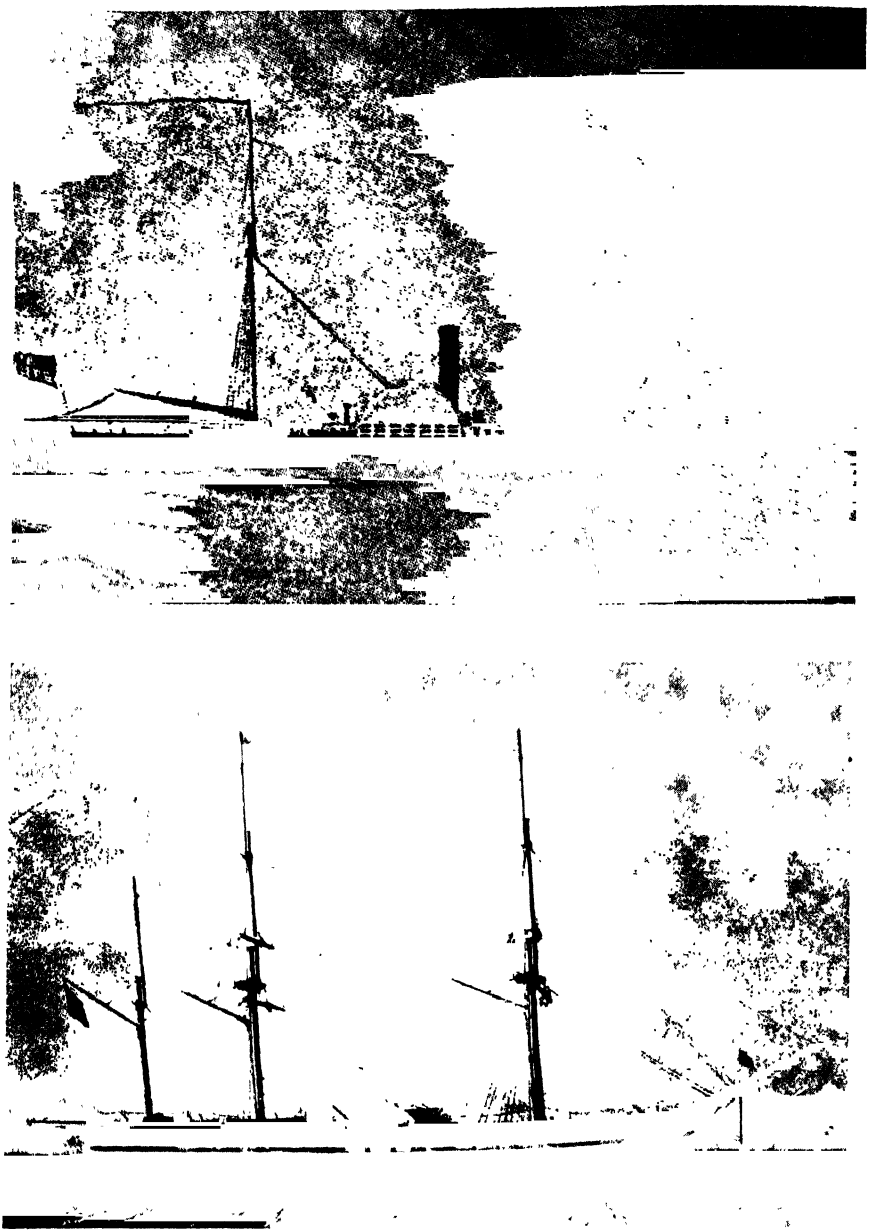


FIG. 86.—The *Fulton II.* (*From "Memoir and Correspondence of Charles Steedman, Rear Admiral, United States Navy." Privately printed, Riverside Press, Cambridge*) U. S. Naval Steamer *Mississippi.* (*From Stuart's "U. S. Naval and Mail Steamers, 1853," Charles B. Norton, New York*)

The *Michigan's* wrought-iron hull floated in the fresh lake waters for more than 80 years.

On August 31, 1842, the much maligned Board of Naval Commissioners was abolished and five Bureaus established in the Navy Department, to conduct, under the Secretary of the Navy, the business theretofore conducted by the Commissioners. This organization, in essentials, is still in effect.

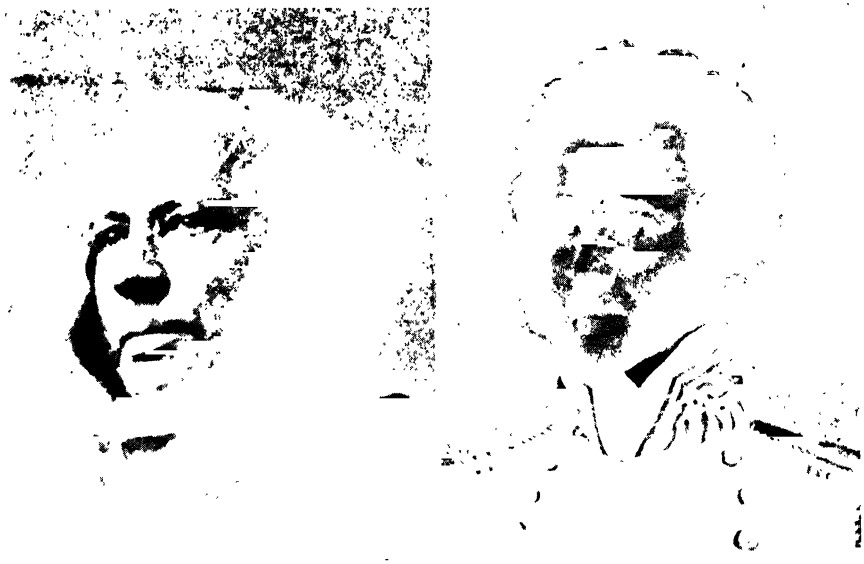


FIG. 87.—Captain John Ericsson, builder of U.S.S. *Monitor. (Courtesy Office of Naval Records and Library)* Commodore Stockton. *(From "Life of Commodore Stockton," Derby & Jackson, New York)*

The Board, before it was abolished, had decided to test a third method of propulsion in the third ship authorized by the Act of 1839. The new ship, somewhat smaller than the *Fulton II,* measuring slightly less than 1,000 tons, was rated as a second-class sloop-of-war, and was named *Princeton,* in honor of the home city of her first captain, R. F. Stockton, like Perry, a strong advocate of steam for men-of-war.

Stockton's influence and persistence convinced the Board that the new ship should have her machinery below the water-line and be propelled by an Ericsson screw.

Also like Perry, Stockton is more widely known for other services than his record with the *Princeton,* his name being inseparably con-

nected with the conquest of California during the Mexican War. Again, like Perry, he was recognized as one of the leading officers of the navy and eligible to command a 74, but preferred to accept a small ship in the interest of promoting steam propulsion.

While abroad in 1838 as executive officer of the *Ohio,* Stockton obtained leave to study improvements in naval architecture and ordnance in England. There he became acquainted with the later famous Swedish engineer, John Ericsson, whose propeller was then being tested. Stockton was so much impressed with some of the tests which he witnessed, as foreshadowing the possibilities of screw propulsion, that he ordered two small iron steamers to be built at his own expense on Ericsson's plans and equipped with Ericsson's engines and screws.

One of these, the *Robert F. Stockton,* was a twin-screw craft, 70 feet long, with 10 feet of beam, drawing 6 feet. Under the command of Captain Crane, with a crew of four men and a boy, the *Robert F. Stockton* crossed the Atlantic to New York in the spring of 1839, making the passage under sail in 40 days. Under steam, she could make 10 knots.

Captain Crane was given the freedom of the city in honor of the successful conclusion of his hazardous voyage. His little craft was used as a tow-boat on the Raritan River for many years.

Stockton persuaded Ericsson to come to the United States, assuring him that the Government would build a steamer on his plan. On his own return and after repeated solicitations, Stockton (who had been offered the Cabinet post of Secretary of the Navy) secured an order from the Naval Commissioners for a ship to be laid down in Philadelphia and built on Ericsson's designs for both hull and machinery. Ericsson was to superintend her construction, under his sponsor Stockton's supervision.

This ship, embodying so many new ideas, was the *Princeton,* named, as already stated, after Stockton's home city. Her boilers were of iron instead of the usual copper. They were built to burn anthracite (smokeless) coal, instead of soft coal and wood. Centrifugal blowers were installed for ventilating the machinery compartment and to assist fuel combustion. Her smoke-stack was telescopic, and when it was lowered she could not be distinguished from a sailing ship.

Ericsson's plans were completed and the ship laid down in 1842. She was commissioned January 1, 1844. Stockton, her first captain,

described her and what he believed she could do, in his first report to the Navy Department. It read, in part:

The United States Ship *Princeton* having received her armament on board, and being nearly ready for sea, I have the honor to transmit to you the following account of her equipment, etc.:

The *Princeton* is a full rigged ship of great speed and power, able to perform any service that can be expected from a ship of war. Constructed upon the most approved principles of naval architecture, she is believed to be at least equal to any ship of her class with her sail, and she has an auxiliary power of steam and can make greater speed than any sea going steamer or other vessel heretofore built. Her engines lie snug in the bottom of the vessel, out of reach of an enemy's shot, and do not at all interfere with the use of the sails, but can at any time be made auxiliary thereto. She shows no chimney, and makes no smoke and there is nothing in her external appearance to indicate that she is propelled by steam.

The advantages of the *Princeton* over both sailing ships and steamers propelled in the usual way are great and obvious. She can go in and out of port at pleasure, without regard to the force or direction of the wind or tide, or the thickness of the ice. She can ride safely with her anchors in the most open roadstead, and may lie-to in the severest gale of wind with safety. She can not only save herself, but will be able to tow a squadron from the dangers of a lee shore. Using ordinarily the power of the wind and reserving her fuel for emergencies, she can remain at sea the same length of time as other sailing ships. Making no noise, smoke, or agitation of the water (and if she chooses, showing no sail), she can surprise an enemy. She can take her own position and her own distance from an enemy. Her engines and water wheel being below the surface of the water, safe from an enemy's shot, she is in no danger of being disabled, even if her masts should be destroyed. She will not be at daily expense for fuel as other steamships are. The engines being seldom used, will probably outlast two such ships. These advantages make the *Princeton,* in my opinion, the cheapest, fastest, and most certain ship of war in the world. . . .

To economize room, and that the ship may be better ventilated, curtains of American manufactured linen are substituted for the usual and more customary and expensive wooden bulkheads, by which arrangement the apartments of the men and officers may in an instant be thrown into one, and a degree of spaciousness and comfort is attained unusual in a vessel of her class.

The *Princeton* is armed with two long 225-pounder wrought iron guns, and twelve 42-pounder carronades, all of which may be used at once on either side of the ship. She can consequently throw a greater weight of metal at one broadside than most frigates. The big guns of the *Princeton* can be fired with an effect terrific and almost incredible, and with a certainty heretofore unknown. The extraordinary effects of the shot were proved by firing at a target, which was made to represent a section of the two sides and deck of a 74-gun ship, timbered, kneed, planked and bolted in the same manner. This target was 560 yards from the gun. With the smaller charges of powder, the shot past through these immense masses of timber (being fifty-seven inches thick), tearing it away and splintering it for several feet on each side, and covering the whole surface of the ground for a hundred yards square with fragments of wood and iron. The accuracy with which these guns throw their immense shot (which are *three feet* in circumference), may be judged by this: the six shots fired in succession at the same elevation struck the same horizontal plank more than half a mile distant. By the application of the various arts to the purposes of war on board the *Princeton,* it is believed that the art of gunnery for sea service has for

the first time been reduced to something like mathematical certainty. The distances to which these guns can throw their shot at every necessary angle of elevation has been ascertained by a series of careful experiments. The distance from the ship to any object is readily ascertained with an instrument on board, contrived for that purpose by an observation which it requires but an instant to make, and by inspection without calculation. By self-acting locks, the guns can be fired accurately at the necessary elevation, no matter what the motion of the ship may be. It is confidently believed that this small ship will be able to battle with any vessel, however large, if she is not invincible against any foe. The improvements in the art of war adopted on board the *Princeton* may be productive of more important results than anything that has occurred since the invention of gunpowder. The numerical force of other navies, so long boasted, may be set at naught. The ocean may again become neutral ground, and the rights of the smallest as well as the greatest nations may become once more respected. All of which for the honor and defense of every inch of our territory, is most respectfully submitted to the honorable Secretary of the Navy, for the information of the President and Congress of the United States.

By your obedient and faithful servant,

R. F. Stockton,
Captain, U.S. Navy.

After commissioning, the *Princeton* was sent to Washington for exhibition to President Tyler and his Cabinet. On February 28, 1844, the President, with a distinguished party of civil and military officials proceeded on a pleasure and trial trip on the Potomac River to witness the performance of her engines and battery.

Stockton, as well as Perry, was interested in improving gunnery, and while in England, due to his association with Ericsson, whose engineering activities covered a wide range, he became an advocate of wrought iron guns. A 225-pounder, which had been built in England on Ericsson's design, was brought to the United States and after a successful test, was made part of the *Princeton's* battery. This gun was named "Oregon" because one of the compelling causes for the construction of the *Princeton,* and other building activities of the Navy Department at that time, was our dispute with England over our northwest territorial boundaries, the whole area of what is now Washington, Oregon, and part of Idaho being then known as "Oregon Territory."

Captain Stockton had ordered built in the United States another wrought iron gun of the same caliber as the "Oregon," but of greater weight. This gun was also installed on the *Princeton* and named "Peacemaker." The Peacemaker weighed about ten tons, was claimed to be the largest forging then in the world and considered a great manufacturing triumph. In addition to the two 12-inch guns, the *Princeton* carried 12 42-pounder carronades.

The Peacemaker was fired a number of times during the trial trip for the edification of President Tyler and his party.

While returning to the Washington Navy Yard one of the guests asked that the Peacemaker be fired once more. The captain at first refused, but finally yielded to the expressed wish of the Secretary of the Navy. On this firing, the gun burst, injuring Captain Stockton, killing the Honorable Abel P. Upshur, Secretary of State; the Honorable Thomas W. Gilmer, Secretary of the Navy; Captain Beverly Kennon, U.S.N., Chief of the Bureau of Construction, Equipment, and Repair; The Honorable Virgil Maxey of Maryland, Mr. David Gardiner, and a colored servant.

This horrible calamity caused the removal of the "Oregon" from the *Princeton.* One 8-inch shell gun replaced the two 12-inch and four of the twelve carronades were taken off. When rebuilt in 1851, she mounted four 8-inch guns and six medium 32-pounders.

About a year after commissioning, the *Princeton's* original screw was replaced by one of six blades, without any supporting drum, of slightly greater diameter, and somewhat less pitch than her original screw. It proved to be 11 per cent more efficient than the old one. In 1847, she was supplied with new boilers and sent on a cruise to the Mediterranean, where she attracted much attention. She was considered, in connection with the amount of fuel consumed, to be the most efficient steamer in existence.

With machinery below the water-line; no vulnerable side-wheels, but a submerged propeller, safe from shot and shell; clear sides for mounting and firing her guns; no interference with mast and sails except the smoke-stack, which was made telescopic, to be housed when under sail; and nearly smokeless while steaming; the *Princeton* was instrumental in overcoming all objections to the introduction of steam for naval vessels.

In addition to the above epoch-making improvements in design, the *Princeton's* guns were mounted so that they could all be fired on either beam, thus enabling her to use every gun of her battery against a single foe instead of but half, as in broadside ships. She thus anticipated the center line batteries of the present day, and in fact, was the parent, in all essentials except armor, of the most modern men-of-war. The armor, in all probability, would not have been lacking, had Stockton's plans and repeated requests to build a ship of at least twice the *Princeton's* tonnage been approved, since he was a personal friend, relative

and supporter of Colonel John Stevens and his brilliant sons, whose armored steam battery will presently be described.

In his letter to the Secretary, describing the *Princeton,* Stockton used almost exactly the same words as those of Decatur's committee concerning the *Fulton I* and of Sailing Master Pickering about the *Fulton II;* namely, "She can take her own position and her own distance from an enemy." This shows that all these officers were considering, primarily, engaging sailing ships rather than steam ships.

Lieutenant J. W. Miller, in an article in the Naval Institute *Proceedings,* wrote:

> When the U.S.S. *Princeton,* propelled by Ericsson's screw and armed by Ericsson's wrought iron gun, was launched, the war between armor and projectiles began.

The ever watchful British Admiralty determined to match the *Princeton,* as it had determined to match the *Fulton I* if she had been kept in active service. The Admiralty had been fearful of Fulton's submarine and wished to suppress it. The *Constitution* and her sister ships had forced heavier batteries on the British. Our 74s, they felt, were equal to their three-deckers.

The ship designed to match—or more than match—the *Princeton* was the *Rattler,* laid down as a side-wheeler, but converted during construction. Her length and beam were 195 and 33, compared with 164 and 30.6 of the *Princeton.*

Ericsson had trials of his screw on the Thames before coming to America, but Preble says that the *Rattler* seems to have been built to determine if a screw would *really* propel a vessel. So doubtful were the Lords of the Admiralty of her success that the spaces on her broadside where paddle-wheels were usually placed, were kept clear of gun-ports as late as 1854, so that paddle-wheels could be installed in case of the non-success of her screw. She was considered a fine model and was, on the whole, a successful vessel. Her maximum speed was not given, nor do we find any record of the *Princeton's* maximum speed, although it was stated that like the *Fulton I* she showed her heels to the *Great Western,* the fastest ocean side-wheeler of her day.

The *Rattler* had a test, not only for speed, but for towing power, against the *Alecto,* a paddle-wheel steamer of about the same nominal horse power. Admiral John Moresby, R.N., in his interesting biography, *Two Admirals,* thus describes the *Rattler* and her trials:

> No one considered gunnery beyond the points of rapid loading and firing, for it was believed that every action would be at close quarters. Nor was any account taken

of the paddle-wheel steamers attached to the fleet. They were "dirty smoke-jacks," and might possibly be of some use in towing; that was all, and there was a certain amount of reason here, for it was evident that the cumbrous paddle-wheel and the revolving cranks several feet above the upper deck, must be rendered useless by one well-placed shot or shell. There was obviously no future for this type in the service, and sails would continue to waft us as they had done from the beginning. So we thought. A little later, however, a long, low craft, barque-rigged, and possessing no outward sign of a steamship but the funnel, joined the fleet, and attracted universal attention. She was the *Rattler,* the first man-of-war screwship, of 880 tons, and 200 horse-power, carrying 11 guns.

Pitted against her in every trial was the *Alecto,* a paddle sloop of equal tonnage and horse-power, the *Rattler* easily beating *Alecto* in all circumstances. Finally, a definite trial was ordered, and they were lashed stern to stern in a "pull-devil-pull-baker' grip, and ordered to put forth all their strength to see which would succeed in towing the other. Well do I remember the scene. It was a calm day, with a long heaving swell. *Alecto's* paddles were revolving and churning the foam like a whale in a flurry; a slight ripple under the *Rattler's* stern alone showed there was power at work; but it was power to some purpose, though so little demonstrative. *Alecto* was dragged steadily astern at the rate of two and a half knots an hour, and the doom of paddle-wheels was sealed. Not many days later another convincing proof was given. The *Rattler* was ordered to take station on the weather quarter of the old *Canopus,* and both ships ran before a fresh gale for the fleet rendezvous. In these circumstances, according to the experience of all old seamen, *Canopus* should have run a small sloop out of sight; but it did not come off. The *Rattler,* under a rag of a topsail, kept her station easily. At the close of the day, the Captain of *Canopus* signalled his surprise thus: "Never saw a ship of your tonnage equal to you."

The long, lean, flat floor of the new-comer had done the trick. Yet the preformance passed out of our minds. We had not realized that she had doomed our white wings as well as the clumsy paddles of the "smoke-stacks."

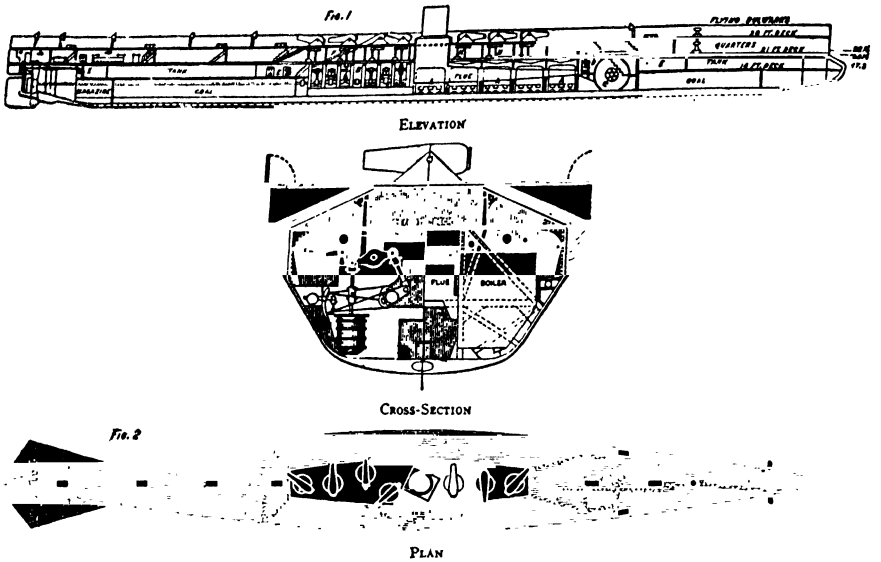


FIG. 88.—The *Stevens Battery*. (*From "John Stevens; An American Record," by A. D. Turnbull, D. Appleton-Century Company, Inc., New York*)

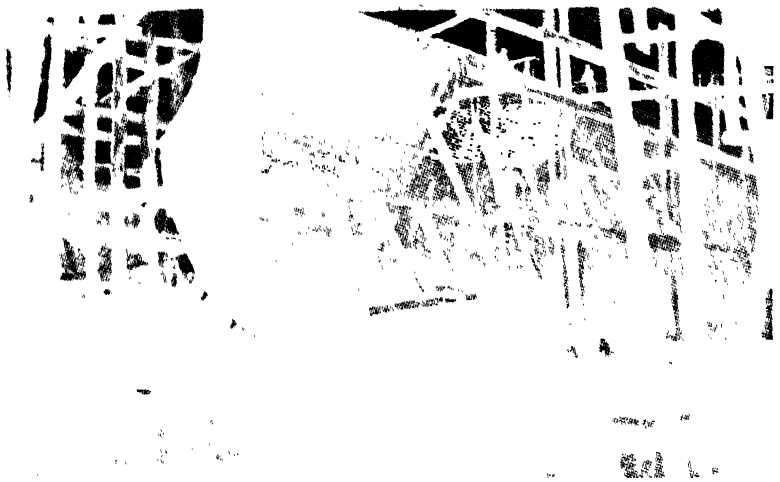


FIG. 88a.—The *Stevens Battery* on the Ways. (*From "John Stevens; An American Record," by A. D. Turnbull, D. Appleton-Century Company, Inc., New York*)

CHAPTER XXXIII

THE STEVENS RAM

AFTER THE successful test of his elongated shells, in 1814-15, Colonel John Stevens wrote to Decatur about his design for a shot-proof vessel to be propelled by his engine and screw and to be the carrier of a Columbiad for firing shells into the sides of ships of war. He considered his plans better than those of Fulton for the *Fulton I,* which was then building.

From time to time, until his death, in 1838, at the age of 89, Colonel Stevens and his sons brought these plans to the attention of the Navy Department and the Congress, but without result until 1841. In that year, Edwin Stevens conducted armor tests at Bordentown, New Jersey, and confirmed them before a combined board of army and naval officers at Sandy Hook, Captain Matthew Perry being one of the naval officers who observed the tests. These being successful, the Congress on April 14, 1842, passed an Act that read as follows:

> That the Secretary of the Navy be and he is hereby authorized, to enter into contract with Robert L. Stevens for the construction of a war steamer shot and shell proof to be built principally of iron upon the plan of said Stevens provided the whole cost including the hull, armor, engines, boilers and equipment, in all respects complete for service, shall not exceed the average cost of the *Missouri* and *Mississippi.*

This Act was almost coincident with the Navy Board's decision to build a ship on Ericsson's design, so that the Board just prior to its dissolution had the *Fulton II* and *Mississippi,* side-wheelers, in service; had ships building to test Hunter's method of propulsion; had contracted for the *Princeton* to test Ericsson's principles; and had arranged for building a single screw armor-clad of Stevens' design.

After the arrival of the "Oregon," Ericcson's gun, from England, it was tested, presumably at Sandy Hook. Stevens' tests at Bordentown and Sandy Hook indicated that 4.5 inches of iron could not be penetrated by shot or shell from any gun then existing. Stevens' battery was accordingly designed to have 4.5 inch armor. It was found, however, that a shot from the "Oregon" would pierce more than 4.5 inches of iron, and since the contract was that the Stevens battery should be "shot and shell proof" a redesign of the ship to meet the more powerful guns was required. The result of the "Oregon" test does

not seem to have been noised abroad, or it may be that the bursting of the "Peacemaker" gave rise to the belief that guns of such size and power were impracticable. In any case the *Warrior* and the *Gloire*, the first armored ships built in England and France about 18 years after the Sandy Hook test, had 4.5 inches of armor which was decided upon, after tests made in those countries, as sufficient to exclude projectiles from any gun then in existence.

Colonel Stevens had formulated as early as the time of the *Little Juliana* his principles for the construction of marine engines. These are cited by Turnbull as follows:

> Multitubular boilers which would stay tight and produce high pressure steam; a quick moving engine directly connected to the propeller shaft; a short four-blade propeller; and twin screws.

In like manner when advocating his elongated shells he set forth the objects which he believed he had attained:

> First, that the ball may be directed with at least as much accuracy as a round ball, I believe more; second, that by lengthening the fuze the time of explosion may be extended to any length; third, that the fuze may always be ignited with certainty; fourth, and what crowns all, that the effect of the explosion on the ship's side must necessarily be tremendous. The thicker and stronger the sides the more tremendous will it prove.

In their turn, his sons John and Edwin, when laying down the principles on which they proposed to construct their battery, stated

> It appears to us that steam vessels of war should possess the following qualifications: motive power . . . out of reach of an enemy's shot, the vessel herself proof against either shot or shell, the capability when required of great speed combined with the power of choosing under all circumstances her position with facility and certainty . . . . We would arm her with a few guns of the largest caliber that present forges are able to execute as having greater strength in proportion to their weight and throwing shot to a greater distance than any now in use. We would load them in the breech which would enable us to rifle the guns. The remainder of the armament should be shotguns of large caliber to throw a great weight of metal at short distances.

They went on to say that such a vessel, safe from shock herself, would cause instant and immediate destruction of any vessel that she might come in contact with, and that even one would protect a harbor and be more than a match for a fleet of the usual construction. This summary was presented by them in 1841. As regards hull and engines, they proposed to build the hull of iron, and to work the engines expansively, with boilers capable of resisting high pressure, and generating, by the use of more concentrated and inflammable fuel, a large quantity of steam.

In January, 1842, their brother Robert, who had been in Europe studying foreign steamship construction, gave still further details of the vessel they proposed to construct, the design of which, he said, had been matured for many years. His principal additional information was, that he meant to attain 4.5 inch armor by riveting together a series of wrought iron plates. He proposed to have the port-holes of the vessel very little larger than the guns, and to protect them from canister, grape, or other shot, by movable screens; to provide artificial ventilation, to be "constantly and thoroughly applied," and stated that "with anthracite as fuel and without rigging she would not be rendered visible either by smoke or sparks and would therefore attract the attention of the enemy less either by night or by day."

The actual details of design, as provided under the original contract for the Stevens Battery, were:

Length	*Beam*	*Armor*	*Boilers*	*Engines, condensing*
250 ft.	40 ft.	4½ in.	4	4 or more

Horse-power	*Propellers*	*Auxiliary Engines*
900	1	2

The redesign required by the discovery that the "Oregon" could pierce more than 4.5 inches of iron; correspondence with the Government relative to the new design; disputes about payments, etc., covered a period of twelve years, and actual work on the ship was not begun until 1854. The new design was

Length	*Beam*	*Armor*	*Boilers*	*Engines*	*Horse-power*
415 ft.	48 ft.	6¾ in.	10	8	8,624

Propellers	*Auxiliary engines*
2 •	9

The new design also included an under-water ram. Construction was begun in 1854, in a dry-dock at Hoboken especially dug for the purpose. Work continued until 1856, when it was halted by the death of Robert Stevens, who had been most actively employed in her design and construction. His brother Edwin took over the task, but it was not until 1861, and after many vicissitudes in and out of Congress, that the work was finally brought near completion.

A board appointed by Congress in 1861 to report on the expediency of continuing work on the battery brought out that her broadside weighed 2,200 lbs. as compared with 1,564 of the *Warrior* and 1,130 of the *Gloire;* that her speed could be estimated as between 17 and

20 miles per hour, and that her guns were elevated and depressed by hydraulic machinery. However, she was still so far in advance, even at that date, of anything that had been conceived in the way of men-of-war that the board could not be convinced, despite various tests made, that she would be seaworthy and support the concussion of her own guns. Their report was to the effect that she be not completed. However, Mr. Edwin Stevens continued work on her at his own expense, with some idea of selling her to either Russia or France.

In the meantime he built a small, fast steamer, with an iron-clad bow, called the *Naugatuck,* carrying a 100-pounder Parrott gun. The *Naugatuck* could be partially submerged while in action in order to afford a small surface as a target. This vessel was twin-screwed, with a speed of 11 miles an hour. She saw considerable service in and about Hampton Roads and in the James River in 1862-1863. Mr. Edwin Stevens presented her to the Government and on the occasion of the battle between the *Monitor* and *Merrimac,* the *Naugatuck* exchanged shots with the *Merrimac* before the latter withdrew from the action.

Stevens' Battery, being much faster than either the *Merrimac* or the *Monitor,* would unquestionably have been a much more powerful antagonist than either of them, but she was destined never to be launched. She was finally broken up and sold. She comprised all the features of the most modern men-of-war except a center line battery. She was armored, twin-screwed, ram-bowed, artificially ventilated, smokeless, and operated her main battery by power. The Stevens were also ahead of their time in advocating breech loading rifled guns. The *Princeton* may be said to have anticipated the modern cruiser, and the *Stevens Battery* the modern ironclad, although the *Princeton* had the center line battery of the present ironclad.

It is again noteworthy that the Stevens brothers advanced, as one of the qualities of their ironclad, "the power of choosing her position with both facility and certainty." They seem to have had in mind engagements not only with sailing ships but also with steam ships, and relied on her great speed to bring about a favorable position in action.

No more definite opinion about the tactics that steamers might employ in action can be found, prior to 1850, except the suggestion of Captain Ross in 1828, that steamers would engage bows on and should mount bow and stern guns only.

CHAPTER XXXIV

DEVELOPMENTS IN ORDNANCE, TO 1861

A CENTURY before the sons of Colonel Stevens proposed to build breech-loading rifled guns, Benjamin Robins, an English engineer, son of a Quaker family, made an extensive experimental study of the flight of projectiles. He invented the ballistic pendulum for measuring velocities. His studies included internal as well as external ballistics.

He embodied the results of his studies in *New Principles of Gunnery,* published in 1742. His conclusion was that for dependable accuracy of fire, all guns should be rifled.

Earlier, in 1829, Sir Howard Douglas, as already quoted, had said that

> A ball of uniform consistency or solidity, smooth and perfectly spherical in shape, may be projected from a plain barrel with as much accuracy as from a rifle.

However, Sir Howard's specifications for shot were hard to meet, and in fact, were not met.

Shot floated in mercury all showed centers of gravity different from centers of form. It was shown that both range and direction were affected by the relative position of the two centers, as the shot lay in the barrel before firing. There was a tolerance for shot necessary, which affected the area of the demi-lune of clearance; increasing, or decreasing, the actual windage.

It had been shown in 1840—and earlier—that if the center of gravity of a shot, when loaded, was above the center of form, the range was greater than when it was below. When it was to the right or left, the direction of the shot was likewise to the right or left. These factors might increase, or decrease, the effects on range and deflection, resulting from ballotting in the bore.

Belgium, France, and England conducted experiments on shore, with varying amounts of eccentricity, and ranges up to 3,500 yards. The final conclusion was that no useful application of eccentricity could be made. However, the fact that such tests *were* made, showed a general desire to increase fighting ranges beyond point-blank.

Douglas submitted the third edition of his *Gunnery* in 1851. He gives his conclusions of the effect upon battle tactics of steam propulsion and shell fire from guns, in these words:

Steam gives the means of avoiding, as well as closing to action, and when that *giant power shall have been applied to line-of-battle ships, as well as other vessels* of war . . . naval evolutions will be capable of being executed with the utmost precision, and hence, the principles of naval warfare with steam as well as wind, will require to be well studied and practiced by naval officers . . . . The destructive effects of shell firing at short distance . . . will, it may rather be presumed, cause action at sea, in general, to be commenced at great distances, and be continued with the utmost circumspection, tactical skill and practical sense . . . . No longer will a ship be permitted with impunity to run down end on against her opponent, nor, without serious damage, will divisions of fleets in line ahead—as at Trafalgar—be permitted to advance, almost unscathed. . . . We cannot fail to be convinced that distant firing will be the ruling practice on which success will depend in future war.

Here, Sir Howard enunciated a tactical maxim, advanced for his time. Not long before the establishment of the U. S. Naval Academy at Annapolis in 1845, Lieutenant James H. Ward, U.S.N., prepared and published "An Elementary Course of Instruction in Ordnance and Guns for the Midshipmen at the Naval School in Philadelphia." Ward was ordered to duty at the Naval Academy as the first Commandant of Midshipmen, and also served as head of the Departments of Seamanship, Ordnance and Gunnery. His treatise on Ordnance and Guns was the Academy textbook for some years.

Ward gave small consideration to the use of shell. He advocated heavy, solid shot guns with the smallest possible windage for ships' batteries. At that time, we had some 10-inch guns in service on our steamers.

Gun trunnions with their axes tangent to the bottom of the bore were specified for the first guns cast for our navy. Just when the Navy Department changed its specifications to provide that the trunnion axis and the axis of the bore should be in the same plane, is uncertain. The change appears to have been made in the first quarter of the 19th century. Ward said:

Usually, trunnions are cast in diameter and length, equal to a caliber and they must be placed with their axis precisely at right angles with that of the bore. Formerly their axis was set below the center of the gun, and when so placed, the guns were said to be *quarter* hung. The object was to give a clear, unobstructed side sight. The disadvantage proved to be that guns so hung, wrecked their carriages. The practice, therefore, is generally discontinued and guns are now cast *center* hung, that is, have the axis of the trunnions passing through the axis of the bore.

Hastings hazarded a guess that "the trunnions were placed low in order not to obstruct the side sight." Ward states this to be a fact, but it may be doubted.

There are guns, now at the Naval Academy, that were cast in the

17th, 18th and 19th centuries, all with the axis of the trunnions well below the axis of the bore. None of these guns had quarter sights. The latest, and newest in point of age, is an 8-inch rifle, muzzle-loader, presented by the Italian government, in which the top of the trunnions appears to be tangent to the bottom of the bore. The date, 1862, is stamped on one trunnion.

We have been unable to learn just when our Navy Department discarded the quarter-hung for the center-hung gun, but it appears to have been in the first quarter of the 19th century.

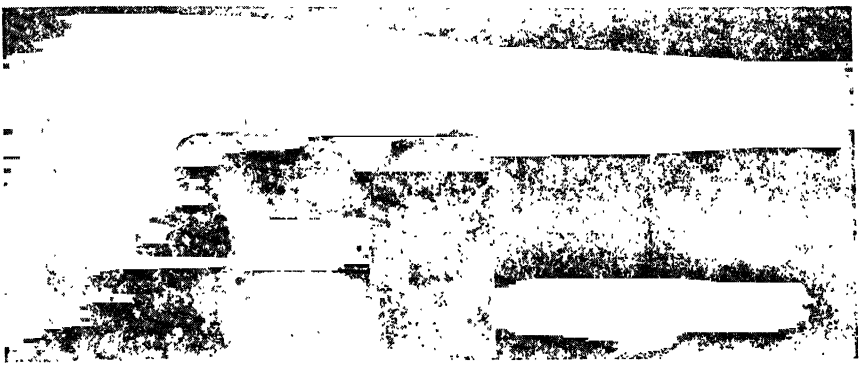


FIG. 89.—Italian M.L.R., 1862. (*Courtesy U. S. Naval Academy Museum*)

Ward describes the tangent sight, then supplied to all ships, and also the four-wheeled carriage, with bed and quoin for elevating. Apparently no other elevating gear had yet been supplied, except for carronades.

Sights were graduated in yards, corresponding to degrees in elevation, and apparently there were gradations for each of the different weights of charge. He says, evidently in answer to criticism of sights:

> It is no valid argument against tangent sights to say they are no use when the enemy is obscured by smoke for this is as true of a dispart as of a tangent sight. A prominent advantage of a tangent sight is that it puts the battery measurably under the control of one direct intelligence, the commander on the quarter-deck. . . . . If the commander from his superior position judge the enemy at a particular distance, say 800 yards, and order the tangent sights set for that distance and signals fire when they barely discern that the enemy and the sights are in a line, they will be ordinarily sure of striking him, and if the commander observe his shot to overreach or fall short, he can by means of the tangent sights order the battery set at a less or greater elevation to suit the case.

Ward had invented what he considered an improved gun carriage. He goes on to say,

If heavy broadside guns were mounted on chassis or slide carriages working around fixed pivot bolts or circles graduated for concentration of fire at an average distance of broadside fighting, say from 300 to 600 yards, the commander by observing the degree of training necessary with the gun under his own immediate eye on the quarter-deck and knowing also that when one gun set at a given graduation bears every other gun set at a corresponding graduation must also bear, he might be able to control the whole battery in aim as well as in elevation.

It will be remembered that Broke, in the *Shannon,* had sights on all guns and deck circles marked for concentration at different ranges, but the latter was not a requirement of the Admiralty nor of our Navy Department.

Ward had cruised in the Mediterranean in the *Constitution* about the time of the Greek revolution, and was entirely familiar with the results of the battle of Navarino. He invites attention to the excessive expenditure of ammunition at that battle, compared to the results. He also comments upon the expenditure of shot in the engagement between the *United States* and the *Macedonian.* He says:

Hitherto in marine engagements for want of some arrangement by which to place the fire of the battery under control of a skillful head not one shot in thirty has taken effect on an enemy's hull, even in some actions noted for their close and destructive character.

For example, in the action between the *United States* and the *Macedonian* but ninety-five of the *States* shot struck the *Macedonian's* hull and but five of her shot struck the *States'* hull, and no damage was done to her aloft. Yet it is fair to suppose that those ships fired each fifty broadsides.

He then gives the expenditure of the *Albion* and *Genoa* at Navarino and adds:

Such results, though common hitherto in naval combats, cannot but strike the mind as remarkable. Yet they are the natural consequences of the imperfect or total want of control on the part of a commander, over his battery whilst in action; and of the crowded, obscured and confused state of things which, in battle, exists on the gun decks of a vessel. On those decks, let any one figure to himself the rapidly successive discharges of 15 broadside guns; the thick smoke thus produced; the crowded action of 200 or 300 men who compose the crews of those guns; the deafening noise, rushing to and fro of powder boys, boarders and others; the penetration of enemy's shot, scattering of splinters, an explosion of shells; and he will not wonder, that, uncontrolled as these guns have hitherto been by any mind free from such confusing influences upon the senses, by far the greatest part of the shot have been fired at random, and utterly thrown away.

If it were possible always to close with an enemy, and decide actions by yard arm contests, tangent sights, and other appliances conducive to accuracy of fire, would be of less consequence. But such possibility, especially in fleet fighting, does not always exist. The weathermost vessel or fleet may keep its wind, and approaching warily, reaping all the advantages of superior equipment or gunnery, in the end close, only to complete an enemy's destruction.

And if the weather line be determined to close at the commencement of an

engagement, it is the lee line which fights at a disadvantage, unless its batteries and their equipments be adapted to damage the enemy at a distance during his approach. For, if the weather line coming down fresh, and but little injured, doubles upon the lee line, thus bringing the whole weather against half of the lee fleet, its fate is very much influenced by that manoeuvre.

But with well adapted batteries, equipped so that commanders in the lee fleet can concentrate their broadsides upon the van ships of approaching columns, and fire at elevations governed by their own estimates of the distances, the scale of advantage would probably be reversed and preponderate in favour of the leeward line; unless indeed the attacking columns can come down rapidly before a fresh wind.

With the light wind and consequent delay which Lord Nelson experienced at Trafalgar in closing with the combined fleet to leeward, had that fleet been better prepared in battery, equipment, and practice, and been managed by seamen skilled in perceiving and improving the advantages of their position, the results of the day might at least have been less decisive.

. . . it is manifestly unwise in any nation to treat with contempt the modern refinements in equipment conducive to accuracy in distant firing, while other nations are perfecting their gunnery by all the aids which science affords.

Ward was thoroughly impressed with the importance of training gun captains.

To form expert gunners, it is necessary to train the nerves, the eye and all faculties concerned, to catch a quick sight under a motion such as a ship has at sea, and to fire at the instant when by this motion the gun is pointed so as to strike the object. For this purpose, practice schools are, in Europe, established afloat.

He did not mention Broke's training devices, but described one used on the British gunnery training ship *Excellent* which consisted of a gun mounted on a movable platform. The platform was rolled, to imitate the motion of a ship. At the instant of firing, determined by the explosion of the primer, the platform was locked, "so as to perceive and continue the precise direction of aim as it existed at the moment of explosion for the deliberate inspection of the instructing officer."

A note in long-hand in the volume of Ward's Treatise from which these extracts have been made reads: "At Woolwich it is the target that is set in motion and which is fixed by the pull of the lock-string."

The general use of such training devices and the improved forms of them waited for half a century.

Ward did not mention any prescribed gun drill. It appears that no standard gun drill existed up to 1850, although Parker mentions a manual in his recollections of the *Columbus*.

The match-tub, match and staff were still provided as an alternative method of firing, if lock or primer failed, and with them, went a powder-horn for priming.

Ward went a little beyond point-blank, in his judgment on what were maximum battle ranges. Midshipmen were instructed that

. . . beyond 600 or 800 yards, it is regarded as a folly to fire broadsides and throw away shot. If vessels continue beyond that distance and do not close, it is presumed that they are either maneuvering with some object in view, or that one chases the other. For these chasing or maneuvering ranges, it is supposed, better marksmanship, nicer adjustment of sights and cooler and more deliberate aim are introduced, requiring the heavier long gun.

In loading, rope grommets were rammed home on top of the shot, to reduce, or prevent, balloting in the bore, and to keep the shot in place on a windward roll. Minimum windage was one-tenth of an inch to permit hot shot to be loaded. Shot tolerance was one-tenth of an inch, which brought maximum windage to two-tenths of an inch.

Any range beyond point-blank was still called "random range." At this time, it was estimated (or measured) that the maximum muzzle velocity of a 32-pounder shot, fired with a full charge, was about 1,600 feet per second, and that to penetrate a 74 (30 inches of oak) required a remaining velocity of 1,545 feet per second for a 32-pounder, and 1,354 for a 64-pounder.

In other words, against ships of the line, ranges beyond point-blank were ineffective.

To what extent the bed and quoin had been replaced by elevating gear, is not clear. Nor is there any definite information about the rate of fire from the 32-pounders or the larger guns.

Both Ward and Passed Midshipman W. M. Jeffers (the latter in his treatise on *Naval Gunnery,* 1849) stress the importance of rapid fire.

Some of the data given above is from Jeffers.

Neither Ward nor Jeffers mentioned rifling. It was evidently not a live subject at that time. Nor did they voice any opinions on the merits of iron as compared with wood for the hulls of ships, which question was agitating both France and England. Sir Howard Douglas was a consistent advocate of wood, to the end of his life, in 1861. He was then 85. About two years before his death, Douglas published his views "On the Tactics of Naval Warfare with Steam," which so impressed Ward, who was then preparing his *Manual of Naval Tactics,* that he published a large portion of it, verbatim, with notes of his own, as an appendix to his *Manual* (see page 583).

Although the conservatism of age explains Douglas' preference for smooth-bore guns over rifling, and for solid shot over shell, it is probable that his knowledge of ranges already obtained with rifled guns influenced his prediction that "distant firing will be the ruling practice . . . in future wars."

Douglas described experiments with a breech-loading rifle in Sardinia in 1846 and with a rifled muzzle-loader at Shoeburyness—a Swedish invention. The shot was "cylindro-conoidal" in shape. With relatively small charges of powder, ranges of 3,500 yards were reached with 15 degrees elevation. With equal charge, a 64-pounder *rifle* projectile outranged a 32-pounder *smooth-bore*. It was predicted that the rifle projectile would not ricochet. This was incorrect, but it was noted that the rifle deviated more from the line of fire at every graze.

The British also tested a conoidal shell, invented by Captain Thistle, U.S.A. In the report of this test, the statement was made that on the third round, Captain Thistle's shell "turned over several times in its flight."

Here we have the first, or at least, one of the earliest records of "tumbling," a defect to which spherical projectiles were not subject.

Taking note of equal ranges with less elevation, Sir Howard was one of the first to point out that flat trajectories increased the "danger space." He said

> . . . the chances of hitting a small object near the extremity of the range of shot is manifestly greater in proportion as the trajectory approaches in that part nearer to a horizontal direction; that is, the angle of descent is less.

It may fairly be said that when the steam era was well established, movable sights graduated in degrees had superseded the line of metal as a means of aim; that ranges greater than point blank were being considered as the caliber of guns increased; that shell, as well as shot, were supplied to broadside and larger guns; that rifle vs. smooth bores were being considered; that iron for hulls had its advocates.

CHAPTER XXXV

IRON VS. WOOD FOR MEN-OF-WAR; SCREWS VS. PADDLES

As NOTED in the preceding chapter, the United States laid down the *Michigan,* and *Alleghany,* and contracted for the *Stevens Battery* all three to have iron hulls.

The East India Company in 1839 built an iron side-wheeler called the *Nemesis.* She made a passage to the East Indies and was in action several times against the forts defending Canton.

At about the same time, an iron frigate was built at Birkenhead and offered to the British Admiralty, which refused to buy. The frigate was sold to the Mexican Government and christened the *Guadeloupe.* Mexico was then at war with Texas and endeavoring to suppress a rebellion in Yucatan and Campeche.

The *Guadeloupe* was in action twice with the Texas squadron under Commodore Moore. With the possible exception of the *Michigan,* she was the first iron warship. She was somewhat larger than the *Michigan* and also larger than the *Gorgon,* England's largest steam warship.

In 1843, the British laid down the *Trident,* an iron steam frigate, with side-wheels. The *Trident* was 200 feet long by 31 feet beam, but mounted only 6 guns, two 10″ pivots and four 32-pounders. The British experimented with some other iron ships as tenders.

The French had not acted on General Paixhans' recommendations that ships be built entirely of iron and armored, but there is no doubt that both France and England were fully acquainted with the general plans for the *Stevens Battery.*

Following the *Princeton* and *Rattler,* the British in 1846 began the construction of five iron frigates with screw propellers known as the *Simoom* class. While on the ways, the Admiralty proposed to the builders that these five frigates be built with side-wheels instead of screws, but the work was too far advanced to make the change.

At the same time, so much discussion arose as to the merits of iron for the hulls of men-of-war, that the Admiralty directed the gunnery ship *Excellent* to conduct some experimental firings against a small iron steamer, the *Ruby,* and later against a target representing the side of the iron frigates, made of five-eighth inch plates.

The war service of the *Nemesis* in China and the *Guadeloupe* in

Mexico had been communicated to the Admiralty in all its details. Both captains testified to their preference for iron over wood. Captain Charlewood gave particulars of five holes in the *Guadeloupe* made by 24-pounders of the *Austin,* Moore's flagship. He said the ship's force had no difficulty in plugging them. The captain of the *Nemesis* testified to having been struck fourteen times in one action, without serious injury.

The gist of the *Ruby* experiments was, according to Douglas, that iron fragments were more deadly than wood splinters and that he considered Paixhans' proposal to make ships impenetrable as preposterous.

The five frigates of the *Simoom* class were converted into troop ships and although experiments against heavier plates were made in 1849-51 the results were to condemn iron altogether, as unsuitable for ships of war.

France had followed the British in making trial of iron ships, but had built more and larger ones, until about the time of the *Ruby* experiments, which seem to have halted iron ship building by both nations. Wood carried the day against iron, even in the United States. No more iron men-of-war were built in the United States until 1861, and the first of these was the *Monitor.*

When war began between the United States and Mexico (without formal declaration) in 1846, Mexico had two steam frigates, the iron *Guadeloupe* (already described) and the wooden *Montezuma.* Both were purchased in England and both somewhat larger than the *Princeton.*

At that time, the only active steam warships in the U. S. Navy were the *Princeton* and *Mississippi.* The *Mississippi* was considerably larger than either of the Mexican frigates, but properly manned and officered, the latter would have been dangerous antagonists.

But far from attempting to contest control of the sea with the two United States men-of-war, the *Montezuma* and *Guadeloupe* escaped from Vera Cruz during a calm and put in to Havana, where they were transferred to British registry. This ended any possibility of sea action during the war, which ended early in 1848.

The problem before the Navy Department continued to be: what manner of ships shall we build, instead of the tactical question, how shall we employ them? On this, the Mexican War threw no light.

The navy of the United States, though small compared to those of England and France, also had its investment in "wooden walls" and

smoothbores. But the bar against change was less, and tradition, possibly, less binding. The choice was between wood and iron for hulls; sails, paddles, or screws for motive power; shot or shell, for guns. Rifling was still experimental.

After 1850, although some side-wheelers continued to be built, it was true in the main that, both at home and abroad, the screw superseded side-wheels for men-of-war. It was impracticable to install paddle-wheel machinery in broadside ships, but this was not the case with screw machinery. Installation of screws, in ships already built, offered an alternative to scrapping many ships of the line, still in good condition, in England and France.

Even less opposition from the sailing school was met, when it was found possible to so install the screw that it could be lifted when desired, thus obviating the loss of speed due to blade resistance when under sail alone. The *Princeton*'s first screw was six-bladed. Prior to the lifting-screw invention, screws generally had four or more blades. Experiment, however, showed that a two-bladed screw would propel a ship without any marked decrease in efficiency. Although vibration was considerably increased, it was not deemed dangerous, especially as screws were looked upon as auxiliaries only, sails being still the main reliance.

When it was not desired to lift the two-bladed screw, it could be housed with the blades vertical, in which position they were partially shrouded by the stern-post. In order to make the shrouding, when vertical, almost complete, propellers were designed with twin blades on each side of the hub, one immediately abaft the other, the combined area of the two being little greater than the area of a single blade to transmit the same power. However, this caused a definite loss of propulsive efficiency which hindered the adoption of the twin, or parallel, blades; so lifting the screw became the accepted practice for large ships in all navies.

A decrease in the number of guns carried by paddle-wheel steamers as compared with sailing ships of the same tonnage has previously been referred to. This helped to bring about an increase in the caliber of guns. It also brought about the introduction of pivot guns, bow and stern, on paddle-wheel steamers. Another drawback inherent in paddle steamers was the difficulty of giving full sail power. With the introduction of the screw, both these drawbacks disappeared.

However, considerable complaint was made in England that the Admiralty, having established standards of steamer armament as the result of their experience with paddle-wheels and a corresponding stand-

ard of sail area, insisted on applying the same standards to screw ships, failing to recognize that the reasons for these standards no longer existed.

The secondary result of the decreased armament standard was that ships with bluff bow and sterns, built to carry pivot guns without undue pitching, continued to be built after the introduction of the screw, which required for its best effect a fine run aft, and for speed a comparatively fine entrance.

By 1858, the British and French navies had become of equal force in screw ships of the line, while France was superior in screw frigates, besides possessing the armored floating batteries, to be later described. Of this period in Great Britain, Admiral—then Commander—Colomb, wrote:

> Thirty-three years had steam itself been toiling upward in our fleet, in times of peace, almost belying the few who steadily predicted its triumph, until the outbreak of the Russian War, with a suddenness never equalled, swept away forever the notion of a sailing fleet and set the workshops of England going, to turn out with speed, those hundreds of marine engines which the years of 1854-55-56 saw created.

The United States did not undertake to convert any sailing ships to steamers, except the old *Franklin* (74). This change was part of a complete re-building.

In new ships, the five screw-steam frigates of the *Merrimac* class and the *Niagara* were in advance of any ships abroad and the envy of foreign naval architects. In these ships, batteries were mounted which amazed England and France, still clinging to the weak batteries of paddle steamers. They were called double-banked frigates; that is, mounting guns on two decks, one covered and the other the open or spar deck. On the latter they carried two 10″ pivot guns and fourteen 8″ guns in broadside; on the covered (gun) deck, twenty-four 9″ in broadside. Shell and shot for all guns were in the ammunition allowance.

The *Niagara* was in a class alone: length 328 feet, beam 55 feet, displacement 5,500 tons; ship-rigged; two telescopic funnels instead of one. She had a lifting screw, like other frigates, but steam for 11 knots instead of 9.5, like the *Merrimac* class. Her battery was unique and occasioned much discussion, at home and abroad. It consisted of twelve 11″ smooth-bore, shifting-pivot, Dahlgren guns, all of which could be fired either to starboard or port, and all mounted on the upper—or spar—deck.

The *Niagara,* in 1857-58, shared with the British *Agamemnon* the honor of laying the first Atlantic cable, and in 1860 she returned to

Japan, via the Cape of Good Hope, the members of the first Japanese Embassy to the United States.

The *Agamemnon* was Great Britain's first screw ship of the line. She was a two-decker, mounting thirty-six 8″ guns on her lower deck, thirty-four 32-pounders on her main deck, and eight 10″ and two 68-pounders on her upper deck and forecastle. Her tonnage was considerably less than the *Niagara's;* her beam the same; her length, 100 feet less.

The weight of the *Niagara's* broadside was nearly equal to that of the *Agamemnon.* The relative rate of fire is not known, but on the whole it appears that for all purposes of those days, the British ship was superior, since any of her guns—except the 32-pounders at long range—were capable of piercing the side of any ship she might encounter, including the *Niagara.*

The *Niagara* had superior speed and could choose the range, but with her relatively poor sights, great windage, and what would now be considered clumsy training and elevating gear, few, if any, hits could be expected, except at the most moderate ranges, where every shot from either ship could pierce the other.

The destruction of a Turkish squadron in Sinope, in November, 1853, by a Russian squadron, had given the naval world a startling lesson in the effectiveness of shell fire. The *Niagara's* center-line battery of guns, larger than any abroad, and firing both shot and shell, created great interest and some consternation in France and England.

Navies were in a state of flux. Under the classification rules of her time, the *Niagara* would have been called a "sloop," because she carried all guns on the upper deck.

In the days of sailing ships, or when sailing ships ruled the seas, a ship of the line of any rate could without disgrace refuse to fight one of a higher rate. A frigate could refuse an engagement with a ship of the line, and a sloop with a frigate, without loss of prestige. This was because the caliber and number of guns carried by the same class of ships did not differ greatly in different navies.

But with steamers, mounting generally fewer and larger guns, varying widely in number on the same tonnage, the custom of rating men-of-war as ships of the line, frigates, corvettes, sloops, and brigs, fell into disuse and was finally abandoned for other designations that will appear.

The thought of an impenetrable floating battery persisted. When the Crimean War began, March 27, 1854, the French feared that, in the event of an attack on Sebastopol, the effect of Russian shell fire from

the forts on the French and English attacking ships would be as disastrous as it was to the Turks at Sinope.

Experiments by Stevens in the United States, as well as in England and France, on the penetration of shot in iron, agreed that four inches of iron with proper wood backing would be impervious to both shot and shell from the larger smooth-bores.

With this result in mind, Napoleon III directed the building of five steam floating batteries for service in the Crimea, to have 4-inch side armor and a thin iron deck covering.

Napoleon gave his floating batteries the rig of a three-masted schooner. Their hulls were wood and propelled by screws; maximum speed under steam, about six knots. On a draft of 8 feet, beam 42 feet, length 164 feet, they mounted sixteen 56-pounder shell guns on a covered deck.

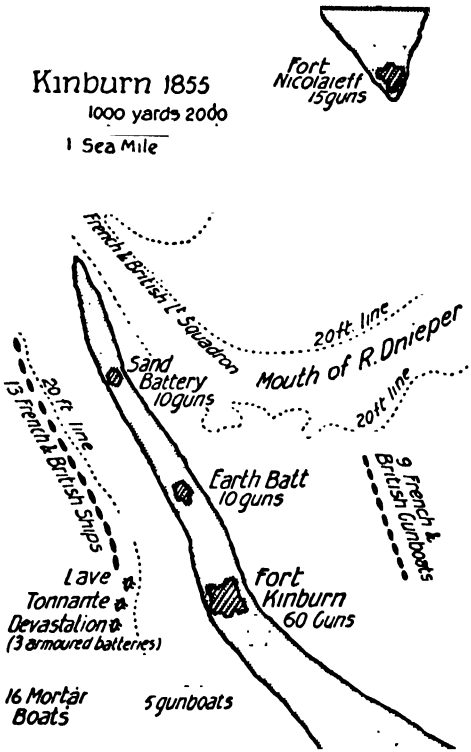


FIG. 90.—(*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Three of them, the *Devastation, Tonnante,* and *Lave,* joined the allied fleet in October, 1855, and on the 17th of that month took a principal part in the bombardment of the fortress of Kinburn, at the mouth of the Dnieper. They were henceforth known, and referred to in naval histories as the "Kinburn batteries."

They fought at anchor about 800 yards from the fort. All were struck many times by Russian shot and shell, without any damage other than slight indentations of their plates. Their fire dismounted many guns and brought about the surrender of the fortress.

Thus the first ironclads came into action.

When he learned that the French Emperor was considering the building of ironclads, Ericsson, the designer of the *Princeton* and later the *Monitor,* was early in the field with designs which he furnished to the French, but the batteries had been started on the Emperor's own plans before Ericsson's were received. The fact that these floating batteries, although hit many times, were completely impervious to any guns the Russians could bring to bear was so well demonstrated that Great Britain undertook to build four similar ones but with armor about 4½ inches in thickness, and the following year, 1856, built four more with iron hulls instead of wood. These were somewhat larger than the Kinburn batteries, of greater length and beam and carried heavier guns, but were also of light draft and very low speed (between four and six knots).

Neither France nor England took immediate steps after the war to apply the lessons learned at Kinburn, although the French were apparently more impressed than the British with the success of armor in keeping out shells. Halsted says,

> There was always sufficient sign to show that the official faith of England and that of France in the competency of the floating batteries of 1855 were of very different degrees of strength. There was always (in England) a tone of depreciation as to the efficiency of the proof sustained by the French vessels before Kinburn.

Both countries agreed, it is true, that the days of wooden sailing ships of the line were over. They entered the war, nevertheless, believing that these wooden ships could be utilized against the Russians, but there was no enemy afloat against which they could be employed and they were too vulnerable for close action against forts.

Thus while the use of steam was accepted, armor was not considered a necessity.

Like the Mexican conflict, the Crimean War furnished no lessons in the tactics of sea engagements.

Except in the early stages of the attack on Sebastopol, naval engagements were almost entirely against fortifications in both Black and Baltic seas. In the Baltic, especially, shallow water prevented the near approach of large ships to the fortifications and the Russians consistently refused to risk their own ships against the vastly superior forces of the combined navies except under the shelter of their forts.

The necessity for some form of naval attack on Russia, as well as the fear of shells from her forts, stimulated invention. In addition to the eight iron-clad batteries the British built for this war 200 single screw, shallow draft wooden gun-boats, each carrying one heavy gun.

France and England each followed the other's naval development closely, but the ever watchful British Admiralty was somewhat surprised and alarmed at the number of well-manned and well equipped screw ships of the line and frigates that Napoleon III mobilized in 1854. Although England still held the lead, France continued to build, rapidly and efficiently.

The sea going fleets of these two powers were more nearly equal at the end of the war (April, 1856) than at its beginning.

Robertson says that the leading cause of the French success with steam men-of-war was their being astute enough to benefit by the results of English experiments with paddles and screws. He writes:

> After waiting for some time and watching our long series of experiments, they (the French) convened in 1849 a grand Enquête Parliamentaire, a commission which primed with the latest information as to British naval material, was to decide on what basis of size, number, armament and means of propulsion future French war ships should be built. For two years the commission sat sifting evidence and then it recommended screw propulsion of the highest power for all new ships as well as the conversion of some existing classes to auxiliary screw power. England had fitted her ships with screws capable of giving them small speed. France must fit hers with screws of greater power. *"Speed,"* said the Commission, *is an element of power.* Superior speed is the only means with which the English can be fought with a good chance of success. Sails must be secondary, therefore, and full reliance must be placed on the screw.

The recommendations of the Commission were duly realized and the following years a powerful force of fast screw battleships, frigates, transports, and despatch boats was constructed which by 1858 had brought the aggregate of the horse-power of the French almost to a level with that of England.

Returning now to the consideration of our own frigates, a British writer says of the *Merrimac* in 1857,

> We believe that no ship of war created a greater sensation amongst nautical men in England than the arrival of this stupendous ship. This excitement was in some degree owing to the importance we feel in England at the progress our Atlantic rivals are making in the art of ship-building, and also in the fact that she is a sample ship of a batch of six other frigates now in a state of forwardness in the Naval Yards of the United States and further our curiosity at the weight of metal she can throw as well as by the novel construction of her guns. . . .
>
> We have shown how steam has increased the size and added irresistible force to the terrific armament of our own ships of war. We imagined that we had arrived at a period when a limit was put to any further expansion either in size of ships or weight of metal, but we are now invited to an inspection of a single decked ship of a tonnage nearly double that of the *Victory,* three-decker, in the days of Nelson, and equal to the *Marlborough,* first rate line of battle ship of 131 guns and the largest ship of war in our Navy. We allude to the recent visitor to our ports, the *Merrimac,* United States frigate of 60 guns. . . .
>
> We however recognize in naming the *Merrimac* a frigate something of that smart

practice which characterized our American "brethren" in the last war. However, if by "frigate" is meant a ship with a single battery deck from stem to stern, then the *Merrimac,* notwithstanding her vast size, is a frigate, but equal to a line of battle ship in everything but name.

Thus, in British eyes, at least, the *Merrimac* class carried on the tradition created by Joshua Humphreys with the *Constitution* and her sister ships.

When the *Niagara* steamed up the Thames to London, in 1857, to take on board her half of the Atlantic cable (1250 miles) she was an object of even greater interest to the Admiralty than the *Merrimac.*

As an answer, England built the *Orlando* and *Mersey,* wooden screw frigates, credited with 13 knots speed under steam, and mounting batteries which included some 10″ guns. They were somewhat smaller than the *Merrimac* class, but had greater speed and some heavier guns. Captain Eardly Wilmot, R.N., says they were structurally weak and did not last long.

Although these ships were designed for speed under steam, steam (for sea going ships) was still considered as an auxiliary, for war alone, and for entering and leaving port at will, independently of winds and tide. The expense of steam for sea voyages and for cruising was considered prohibitive.

The conditions under which steam could be employed were laid down in British Admiralty instructions and differed little from orders on the same subject issued by our Navy Department.

Speed having become a factor, the ratio of beam to length was studied for its effect on the engine capacity for a given speed. The ratio of length to beam in the *Agamemnon* and Kinburn batteries was about 4 to 1; of the *Merrimac* class about 5 to 1. The *Orlando* and *Mersey* had about the same ratio as the *Niagara;* 6 to 1. The Stevens Battery, then building, and the *Great Eastern* had 8 to 1.

The effect on speed of the shape of the under-water body was not clearly realized.

About the time the *Great Eastern* was launched, 1858, a leading British engine builder announced that, on account of difficulties experienced in attaining desired speeds, his firm would not take machinery contracts for ships in which the ratio of length to beam was less than 6 to 1.

The *Great Eastern* was built of iron. Her over-all length was 692 feet; beam, 83 feet; displacement, 27,000 tons. Broken up in 1886, no other ship of equal tonnage was launched until 1899. Her designer, John Scott Russell, advocated a ratio of 10 to 1 for fast passenger ships and men-of-war.

CHAPTER XXXVI

EARLY TACTICS FOR STEAMERS

IN 1846, a British naval officer, Captain Moorsom, published a brief work on tactics in which he endeavored to visualize an action between steamers. "It will be admitted," he said,

> that steamers may encounter steamers on equal terms, and that they are now numerous enough to compose fleets in the event of war.
>
> It seems, therefore, desirable to determine beforehand, the system of tactics under which a fleet of steamers would be rendered more efficient.
>
> The distance of the vessels from each other, the number of columns or divisions in which the fleet may be most conveniently arranged, the relative position and distance of these columns, the several formations that are expedient and the rules for effecting them, and a corresponding code of signals, are among the points to be determined.

Captain Moorsom stated his problems but did not go far towards their solution. A decade later, when the transition from sail to steam for action was completed, Moorsom published an *Organization and* Maneuvers of Steam Fleets which went into greater detail than his earlier effort.

In his organization and proposed evolutions, we see for the first time the movements of fleet units approximated to those of an army on a level plain. It arose from the belief that steamers were—or would be—independent of wind and sea; that they could steer astern as well as ahead and that their speed, at any instant, was completely under control. The supposed analogy between cavalry on shore and steamers at sea, attracted and confused some of Moorsom's successors who aspired to be tacticians. His rules for fleet formations were never adopted nor employed, as far as is known, in practice, although in modified form they appeared in our General Signal Book.

At the time Moorsom wrote, the Admiralty had a set of alphabetical signal flags. Nine of these had numerical designations. These, with a special flag for zero, made up the ten numerals.

Moorsom's signal code employed only the numerals, negative, affirmative, and interrogative flags and ships pennants.

A paraphrase of his plan of fleet organization follows:

> The *Fleet*; all vessels under a commander-in-chief.
> A Division; any part of the fleet from 10 to 50 ships.

Squadron; any number of ships from 3 to 12.
Sub-division; any *two* contiguous ships.

He recognized *Wings* of a Fleet, Division, or Squadron, and starboard, center and port sub-divisions of a division or squadron.

He provided for three orders of steaming:

Line (previously called by the British, "line abreast").

Line of Squadrons.

Two columns.

He visualized five types of ships and recommended that squadrons be composed of vessels of the same type.

Stations of flag officers were as in sailing ships.

In a division of five squadrons, the arrangement of types in line would be:

5th Squadron; right, starboard, van, (natural order) heavily armed and very fast ships.
3rd Squadron right center, medium armed and fast.
1st Squadron; center medium armed and slow.
2nd, Squadron; left center, medium armed and fast.
4th Squadron; left, port, rear (natural order), lightly armed and very fast.

The admiral commanded the center ship of the center squadron. The second in command, the center ship of the right squadron. The third in command, the center ship of the left squadron. All ships on the admiral's right, beginning with his own, as No. 1, were odd numbered. Those on his left were even numbered.

In the second order of steaming, "Line of Squadrons," squadron leaders were in line. Ships of a squadron on the right of the leader formed column with the head of column three points on the starboard quarter of the leader. Ships on the left of the leader took a similar formation, three points on the leader's port quarter.

This resembled Ramatuelle's "pélétons"; the difference being that each ship had a fixed position instead of being irregularly formed astern of the leader of the péléton or group.

There were signals for changing front by groups. Some of these might require a reversal of course by certain groups, because the *pivot* on which the change of front (wheel) was based might be a flank, center, or intermediate ship.

The possibilities of the new method of propulsion were much overestimated. In fact, Moorsom is perhaps better known as the first officer to enter the Admiralty offices wearing a beard, than as the author of a work on tactics.

Moorsom introduced the military term "échelon" for a four point line of bearing. This term—with the adjectives, single and double—was later used in our signal books.

Moorsom's rules of the road include:

> Ships meeting, are to port their helms in order to clear each other [present practice] and a ship passing another ahead, is to do so, that is, pass on the starboard side of her [contrary to present practice].

There seem to have been no Admiralty fighting instructions at this time, governing steamers in action. In 1850, Master Biddlecombe, R.N., published a short treatise on sailing ship tactics, and in 1857 another on the *Tactics of Steam Fleets,* but neither had Admiralty sanction.

In 1857, the French Ministry of Marine published a book on tactics, both sail and steam. This was an official publication and junior naval officers were informed that familiarity with its contents would be considered in their examinations for promotion. The Ministry stated that their object was "to collect a summary of the Standing Orders for the Navy of France" and also to "reproduce those traditions which have been consecrated in their Navy."

Its contents were not fighting instructions. It was pointed out that no attempt was made

> to fetter their Admirals by any directions as to the manner of engaging hostile fleets but . . . a number of different formations and orders of sailing, suited for the purpose, are put before them from which to make their choice.

Steam tactics, as being the most important, were given the first and major place in the book. Sailing tactics were limited to a description of the orders of sailing, changing from one order to another, and re-establishing formations after a shift of wind.

Two years after its publication, Captain Augustus Phillimore, R.N., translated it for the benefit of British naval officers.

Like Moorsom, the French overestimated the possibilities of maneuvering under steam, but stated that their tactics for "screw line of battle ships" were provisional only.

Ramatuelle's groups are elaborated to a greater extent than those by Moorsom, but apparently with no thought of their employment for offense or defense. They appeared to be attractive as formations that could be taken up by steamers.

The persistence of the group idea is notable. Admiral Missiessy had revived it in 1828, not as a route march, but as a regular formation in squares. Each ship had her station at the corner of a square, and squares

bore from each other on a continuation of one of their diagonals.

There seems to be no good reason for such a formation under either sail or steam.

The French established "distance" as two cables, from main-mast to main-mast. One of their maxims was,

the closer a battle line is, the stronger it becomes.

Distance . . . ought to be reduced as much as prudence and the necessity of free movement will permit, if the enemy approaches very close or seems to wish to cut through the line.

Concentration of fire, when possible, was made obligatory. "When several vessels of the Fleet can unite their fire upon one only, they are ordered to do so." To prevent concentration on a single French ship, they were to keep closed up.

When once the battle has begun, or the mêlée is established, each captain who thinks he can board the enemy, with advantage, ought not to hesitate to execute this maneuver.

In two articles, captains of ships were cautioned not to disturb the formation by "brusque" movements or maneuvers, whether under steam or sail. This is still a wise rule when not evading torpedoes.

Reserve divisions were contemplated. One ship, separate from the reserve, was to be a tender—"Relieving Ship" to the flag, at the admiral's discretion "to take the admiral's place in the line when he quits, and to assist him in the fight." Reserves were to watch, particularly, the rear of a battle column, as being the weakest part.

It was contemplated that an Admiral might wish to lead, and a signal was provided for that purpose.

The Admiral was cautioned before battle, to prepare, and make known, as much as possible, his plans of attack and how he intended to execute them.

The influence of Villeneuve's accidental formation at Trafalgar may be traced in signals for "the order abreast, indented" and the "order ahead, indented."

In addition to the usual signals for counter-marching and reversing course in succession from van or rear, was a new and important one, still valuable; viz., squadron leaders to go about simultaneously, followed in succession by the ships of their squadrons. (Squadrons were then smaller than divisions.)

One of the "Principles" assumed was that no signals are necessary after an action has begun. No mention is made of a parallel attack, ship to ship, relying on gunnery.

What were considered the principal methods of attacking at an advantage, five in all, were described:

1. To defile on one portion of the enemy's fleet, so as to disable it with superior force.

2. To double on one of the extremities of the enemy's fleet, so as to put one portion of this fleet between two fires.

3. To cut off from the main body of the enemy's fleet any portion of his forces, so as to surround them.

4. To break through the enemy's fleet at several points, so as to bring on a general engagement. (Howe)

5. To board the enemy when once the mêlée takes place in the engagement. (Villehuet)

One paragraph of the French tactics contemplated "sinking an enemy" with a violent shock, but does not specifically indicate ramming as the method.

Captain Phillimore made no comment on this, but remarked that neither groups nor a "relieving ship" were considered necessary by the British.

In 1858, our Navy Department issued a revision of the signal book of 1813. It included signals for movements under steam and prescribed three orders of steaming. The first was column. The second was groups (similar to the French). An illustration showed groups of five; leader and four mates, two on each quarter—the headmost five points abaft the leader's beam; the other in the wake of the headmost. The third order of steaming was double column.

In 1859, Commander James Ward, whose gunnery manual for midshipmen has been described, published a *Manual of Naval Tactics* which he dedicated to Isaac Toucey, then Secretary of the Navy. Ward called it an "Endeavor to awaken attention to a most important, yet neglected branch of the Naval profession." He said:

> It is of little avail that Admirals are accomplished tacticians, unless subordinates, especially captains, understand the system familiarly, so as to, at once, comprehend a manoeuvre directed by signal . . . . This readiness cannot be suddenly acquired. It comes only from study, best begun in youth, unremittingly pursued, and perfected by practice first in sketching diagrams, next with the use of *blocks*, and finally with fleets.

He describes his book as a digest of the works of Paul Hoste, Admiral Ekins, and of various histories, made while in command of a corvette . . . "on the coast of Africa, where it served to beguile leisure, and relieve the tedium of service in that torrid region."

Much of his text and many of his diagrams were prepared for the press before the signal book of 1858 appeared. Ward spoke highly of the new book and said its diagrams made the publication of his own, unnecessary. He felt—and recommended to the Navy Department—that the diagrams might be given to the service at large "without violating that reserve in which the signal book ought most carefully to be guarded." But as signal books then were evidently for captains alone, his recommendation was disapproved.

Looking ahead, he wrote,

> . . . yet it is not at all unlikely that the ultimate policy in composing fleets will assign to them, as component parts, a basis of heavily armed "screws," with steam power sufficient to control position, but with no reference beyond that to speed, and a flying division with great speed and a peculiar battery . . . .
>
> France gives higher speed to her screws of the line than either the Americans or English. In this, she is true to her traditional policy of maintaining a dispute of power on the ocean by cherishing the ability to avoid a decisive engagement.

Ward devoted most of his own work to sailing tactics and an appraisal of the conduct of battles:

(a) Where a direct attack was made from to windward: as by Howe on the First of June, Duncan at Camperdown, Nelson at Trafalgar, and Perry at Lake Erie.

(b) An oblique attack from to windward: as by Byng at Minorca, and Graves at the Chesapeake.

(c) Engagements when neither fleet had the wind, as Jervis at St. Vincent, and Rodney at the Saints.

(d) Engagements of fleets at anchor, as by Hood at St. Kitts, Nelson at the Nile, and McDonough on Lake Champlain.

He concluded that

> probably neither the attack nor the defense preponderates in advantage so greatly as to warrant much effort or sacrifice to gain, or avoid, the weather gage.

He recognized, however, the moral influence in favor of the attack; boldness, and all speed in closing.

While Ward was preparing his book for the press, Sir Howard Douglas published his *Naval Warfare with Steam,* which so impressed Ward that he included it entire—with notes of his own—as an appendix to his manual.

In discussing Sir Howard's work and the three orders of steaming prescribed in the signal book of 1858, Ward made a most important generalization, soon lost or disregarded, but re-discovered in later

years. The words in which he enunciated this great tactical maxim, were:

> Whatever the course steered may be, the line of bearing is meant to be perpendicular to the direction of an enemy, when one is near . . . from which direction an attack may be apprehended, or in which to make one, may be contemplated.

He refers to this maxim in discussing groups in the second order of steaming, by providing that, whatever the course, the line of bearing of group leaders was meant "to be perpendicular to the direction of the enemy, if sufficiently close."

Sir Howard strongly favored line of bearing (échelon) as a fighting formation.

The difficulty of keeping position, under sail, on any line of bearing but the close-hauled line was recognized by all tacticians, but it was thought that the advent of steam removed this difficulty. Some tacticians still think so, but ample experience shows that it is not simple or easy to keep position on any line of bearing, other than column.

Line of bearing is, therefore, a poor battle formation, except in a modified form.

Ward remarks that ships in line, with the line of bearing set at right angles to the bearing of the enemy, are in "an attitude of offense, head to the enemy, but he appears to have entertained no thought of ramming. His head-on position was apparently for the approach only.

The signal book (signal 652) shows three groups of seven ships each, leaders of groups in line, but does not indicate this as an attack formation.

Ward's *Manual* became a text book for the instruction of midshipmen. He was the first Federal naval officer killed in action during the Civil War (1861-1865).

Although neither Ward nor Douglas takes into account the ram, or ramming tactics, it was generally known that construction work was going ahead on the Stevens ram.

Two of Wards' contemporaries, Admirals Gregory Boutakov in Russia and Admiral Bouet-Willaumez in France, were studying steam tactics—theoretically and practically. The results of their labors were published in the decade 1860-70. They are summarized in Chapter XLII.

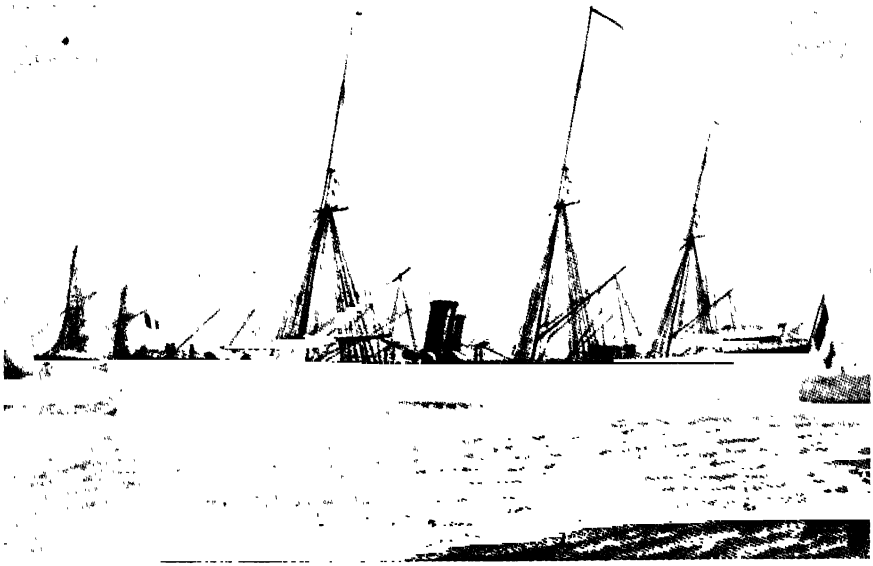


FIG. 91.—*La Gloire. (From Moore's "Sailing Ships of War," reproduced by permission of the publishers, Halton and Company, London, England)*

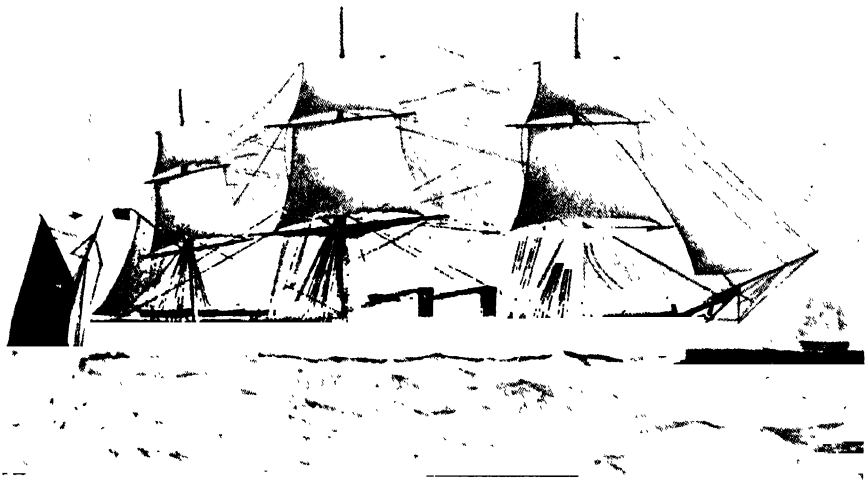


FIG. 91a.—H. M. Steam Frigate *Warrior*, 40. *(From Moore's "Sailing Ships of War," reproduced by permission of the publishers, Halton and Company, London, England)*

CHAPTER XXXVII

ARMOR AND THE RAM

FRANCE was the first to take advantage of the experiences at Kinburn and later in the Baltic during the Crimean War. In 1857 she resolved to apply armor to four wooden ships of the line. They were first razeed by taking off the upper deck and then armor was applied to their sides above the water line. The French called them "Frégates blindées." The British called them iron-plated, or iron-cased ships. The general term ironclad for armored ships came into use later.

Hans Busk, writing in 1859, said, "Such is the opinion of French naval officers respecting the tremendous power of these ships that they fully anticipate the complete abolition within ten or a dozen years of all line of battle ships."

The effect in England of this action in France, coupled with French diligence in turning out screw frigates and converting sailing ships to screws, was the appointment of a Royal Commission in 1858 to consider the relative strength of the British and French navies. The report showed that although the British had five steam line of battle ships for every four possessed by France, the French had 46 steam frigates to 34 possessed by Great Britain. The report further stated that four iron-plated ships were being built by France and these "appearing so ominously had completely changed the situation."

The "ominous appearance" of these four ships, as Captain Eardley Wilmot said, created such excitement that the British Admiralty was stirred to action.

Sir Howard Douglas (England's distinguished naval artillerist, who had been most influential in preventing the use of iron for men-of-war), and his followers, were overcome by advocates of iron, led by Scott Russell, the designer and builder of the *Great Eastern*. Russell, in conjunction with Isaac Watts, Chief Constructor of the British Navy, was engaged to design a ship to cope with the *Gloire,* the first of the four French ironclads.

The *Gloire* was the re-named *Napoleon* (90) ship of the line, launched at Toulon in 1850. M. Dupuy de Lome, Chief Naval Constructor, was responsible, according to Wilmot, for boldly transforming "a wooden

line of battle ship into an armor-clad which should be a seaworthy, as well as a formidable fighting structure."

Commencing in 1857, *Napoleon* was "razeed," cut in two, lengthened, and given an armor belt about 4.5 inches in thickness, backed by 26 inches of wood. French underwater bodies, at this time, were superior to those of the American and British navies. On a ratio of length to beam of about four to one (235-55), practically the dimensions of the British *Agamemnon,* the *Gloire* made twelve knots. Her completion, in 1859, created, according to Wilmot, "even more excitement than the appearance of the *Niagara,* two years previously."

The *Gloire's* sister ironclads, *L'Invincible, La Normandie,* and *La Ville de Lyon (Couronne),* were slightly smaller.

According to Robertson, the *Couronne* was built of iron to obtain a direct comparison between timber-built and iron ships, and her armor was applied in two layers, with six inches of wood between them. The inner layer, 1½ inches thick, was next to the iron hull plating. The outer layer was 3 inches thick; the whole bolted to the hull.

These ships mounted thirty-six 16-centimeter, 50-pounder, smooth-bore, shell guns in broadside.

The British *Warrior,* England's first ironclad, was designed to out-class the *Gloire* in every respect. She was to be larger and faster and to carry more and heavier guns. She had armor of smaller total area than the French ships, but of equal thickness.

A sister ship, the *Black Prince,* and two smaller ironclads, *Defense* and *Resistance,* were laid down at the same time, but were not pushed to completion as fast as the *Warrior,* which was begun in 1859 and completed in 1861. According to Fletcher, in her external appearance there was nothing to distinguish her from the average wooden steam frigate of the time, except her extraordinary length. She was three-masted, square-rigged, with a graceful overhanging cut-water. Her length was 380 feet, draft 25½ feet, speed 14½ knots, two telescopic funnels. Built of iron, she had over 80 water-tight compartments. Above her armor belt, 218 feet in length, she mounted 48 guns, the heaviest being 68-pounders.

Wilson says that the *Gloire* had no ram, but her end to end armor belt made her bows strong.

The *Warrior,* on the other hand, according to Robertson, had "hidden behind, and altogether disguised by the shapely bow, with its sur-mounting figure-head, a stout iron ram stem, worked to the knee and

side plates of the bow," an inconspicuous, but significant feature.

The inclusion of a ram in the *Warrior's* plans evidently did not escape the attention of the French Admiralty, nor did the Emperor call a halt in the building competition. The same year the *Warrior* was laid down, he began the construction of two wooden two-decker ironclads mounting 54 guns each, the *Magenta* and *Solferino*. Both were fitted with rams.

The French, however, did not follow the *Couronne* with other iron-hulled, armored ships. Until 1872, though using iron freely above the waterline, their under-water hulls continued to be built of wood.

The opinion of Sir Howard Douglas, condemning iron for hulls, was echoed on this side of the Atlantic—or the same view reached independently—by one of our young ordnance officers, Lieutenant Edward Simpson, whose treatise on *Ordnance and Gunnery* was approved for use at the Naval Academy as a text-book and printed as a public document, in July, 1859.

Simpson quoted experiments made at Metz in 1834, at Woolwich in 1840, those against a section of the *Simoom* class in 1850, and the injuries sustained in action by the iron steamer *Lizard* in 1846. All were unfavorable to iron. He summed up by saying:

> From what has been stated, it is evident that iron vessels, however convenient and advantageous in other respects, are utterly unfit for the purposes of war.

Simpson's views, to be imparted to midshipmen on material for men-of-war hulls, were extremely conservative, when we consider that the *Alleghany* and *Michigan* were in service and the Stevens battery had been under contract for more than a decade. More than this, there were numerous small iron paddle-wheel and screw men-of-war in other navies, and the *Warrior* and *Black Prince* building in England. England continued to build her ironclads of iron, and to increase their speed, their thickness of armor, and the caliber of their guns—all of which required increase of dimensions.

Except for the retention of wooden hulls, French developments paralleled England's.

It is not too much to say that the Stevens battery was the prime stimulus for the building of iron-clad rams by the navies, especially by France and England. Smaller navies in Europe—Russia, Italy, Austria, Sweden, Denmark, Prussia—followed their example. How best to coordinate guns and rams in action was a problem not readily solved.

Our country's plunge into civil war brought forth ships designed

solely for waging that war, without regard to developments in other navies. In fact Ericsson considered his *Monitor* a warning to other navies (hence her name), and her battle record with that of her successors had a marked influence on foreign designs. However, before undertaking to give an account of the naval building and battles of our Civil War, it seems desirable to give some account of the guns with which it was fought.

This will be found in the next chapter.

CHAPTER XXXVIII

U. S. GUNS AND GUN DRILLS

A CONTRIBUTOR to the U. S. *Nautical Magazine and Naval Journal,* 1856, wrote,

> It does not follow that because England has built her fleet to fight on the broadside the United States are required to be so very obliging to John Bull as to follow him in this particular. A few large guns in addition to the ram principle would revolutionize fleets and place the English Navy at best as far astern as they now claim to be ahead. Her fleet would be useless . . . . There is no power in shot or shell to damage a vessel when coming head on *if built right,* and who can contemplate the consequence of a blow from a war steamer built expressly for destroying her foe by this mode of warfare?

The writer went on to criticize the Stevens war steamer for having a greater number of gun emplacements than he considered necessary for an armored ram. He appeared to agree with Captain Ducie Chad, R.N., who, as previously quoted, said in 1850 before a Parliamentary Committee that "steam vessels would most probably engage directly end on."

From 1850 our naval ordnance heavier than 32-pdrs. was being cast from the designs of Lieutenant—later, Admiral—John A. Dahlgren. Under his superintendence, 8-, 9-, 10-, and 11-inch guns were cast, and at the time Simpson wrote, Dahlgren had designed and produced some experimental cast-iron muzzle-loading rifles. From his station at the Washington Navy Yard, he journeyed twice weekly to the Naval Academy, in the capacity of Professor of Gunnery. Through his lectures, midshipmen learned of new ordnance progress. Simpson's *Manual* made no mention of rifling, although both muzzle and breech loading rifles had been tested abroad and were being mounted on some British ships.

Dahlgren was a staunch advocate of mounting on ships the heaviest manageable guns, and he helped to design mounts to make possible the control of heavy guns on small ships. In order to convince the critics of his policy, he obtained the designation of the *Plymouth* (20) as a "gunnery practice ship" with himself in command. A special appropriation for this purpose was made by Congress.

The *Plymouth,* sloop-of-war, built in Boston in 1843, measured 147 feet in length by 38 feet beam. Her regular battery was four 8″ shell guns and 18 light 32-pounders. Dahlgren replaced these for his experi-

mental firings with four 9″ shell guns, one 11″ pivot gun, two 24-pounder howitzers and one 12-pounder howitzer, all of his own design.

While on his experimental cruise, he was ordered to voyage as far east as Lisbon and to visit the important arsenals in France, Holland, and England from convenient ports in those countries. He sailed at the end of June, 1857.

His gun captains were furnished with "A few hints to Captains of the new IX shell gun," which he had written and had printed in 1856. These are believed to be the first printed instructions of this character and are quoted in full.

Paragraph 12 gives some information (infrequently found) on maximum rates of fire.

Dahlgren's record of an interval of 40 seconds between shots from a 9-inch gun compares well with the *Excellent's* record of an average interval of 43 seconds for eleven rounds from a heavy 32-pounder and 46 seconds for eleven rounds from a 68-pounder, 8-inch.

1. The Sliding Sight-Bar is graduated to distances in yards, and to the full range beyond which accurate practice cannot be expected. When entirely down, so that the head rests on the box, the line of sight is parallel to the axis of the bore.

2. Estimate the distance of the object, adjust the sight-bar to it and take aim, keeping the eye well down along the bottom of the notch in the head of the bar, over the point of middle sight, and upon the *water-line* of the vessel fired at.

3. If the Gun is discharged with the direction thus given to it, the shell will be thrown to the distance assigned by the graduation of the bar used, within fifty yards, more or less.

4. Wherefore, should the shell exceed or fall short of the object by a greater distance than fifty yards, the bar must be readjusted for the next fire, to the corrected estimate thus obtained.*

5. You have thus, in the sight-bar itself, the best instrument for approximating unknown distances.

6. The very common practice which captains of guns are taught to follow, of endeavoring to spring aside from the recoil of the gun, is most hurtful to accurate firing. It requires, as you well know, the attentive use of every faculty, in the best trained seamen, to seize the favorable instant for firing when the movement of the vessel brings the sights exactly on the object. If, therefore, his thoughts be occupied with any other consideration at so critical a moment, he cannot fire well. The captain of the gun should stand directly behind the gun, lock-string in hand, just taut, and eye on the sight, beyond the reach of its recoil, and fire the piece deliberately without any attempt to move from his position until required to do so by the manoeuvre that may follow.

7. The sight-bars of the IX inch, X inch, and XI inch Shell Guns will be graduated for full charges, as it is only designed to use smaller charges in these guns

* Note by Commodore Morris.—When the distance is varied by the manoeuvres of contending vessels, these corrections of the sight-bars must be frequently attended to, and great care taken to guard against firing too high.

at ranges so short as not to exceed the scope of horizontal firing, at which time the head of the bar will be down on the box.

8. The cartridge-bags of reduced charges are to be diminished at the larger end, so as not to lessen their length, which is to be that of the chamber of the gun in all cases.

9. Ricochet Fire is more effective than direct practice, when the water is perfectly smooth and the gun levelled. Under such circumstances, the shell will bound nearly in the direct line for a mile or more, losing very little force; but in going farther it is liable to begin to turn aside, and this once occurring, increases very rapidly as the shell proceeds.

The Ricochet loses in extent, in direction, in force and in nearness to the surface of the water, proportionally to the elevation of the bore and the roughness of the water.

10. Be careful when the fuze is uncapped, not to touch it with the hand, which may be moist, nor with the rammer, which should be so made as not to come in contact with it and brush off or derange the priming.

The rammer-handle should be marked so as to show when the shell is home, which may be done by blacking the part left outside of the muzzle-face.

11. There are three classes of fuzes distributed to our ships, viz: five seconds, ten seconds and fifteen seconds. Use the five-second fuze for distances not greater than three-fourths of a mile: the ten-second fuze for distance not greater than one mile or one mile and one-eighth. Always employ the shortest timed fuze that will reach the object, because its combustion is more powerful and therefore less liable to extinction than the fuze of greater duration—an accident more apt to occur by the collision with the water in regular Ricochet fire with a levelled bore, than in direct fire, when it is very unfrequent.

12. The IX Inch Gun Carriage has many advantages over the common truck-carriage; but you must not expect to find these out immediately; therefore, don't be in a hurry to condemn it. Upon just such a carriage five shells have been fired from that gun in 2 minutes 39 seconds, the average interval being 39¼ seconds, the number of men 12, and the gun handled in all respects as customary on ship board.

The thread of the elevating screw is so adjusted that *one* complete turn is equal to a degree of the quadrant. Its length is sufficient to elevate the gun 19° and to depress it 8°, but as the ports only permit 10° of elevation and 7° of depression, the transom of the carriage is scored so as to keep the gun within limits and prevent the muzzle from wooding.

13. Sights may look very handsomely when polished bright, but such work wears away the figures and lines in time, and makes the bar work loosely in its box. It is much better only to wipe them clean, leaving them to take the dark color that the sea air will give to all bronze in a reasonable time.

14. If you do not see the object when you pull the lock-string, whether by reason of smoke, or hurry, how can you expect to hit it, even if you knew the distance exactly?

Some account of drill methods on our first gunnery practice ship is still of value.

When well out to sea, the drill of the crew commenced and practice with 9-inch and 11-inch was had, day after day. Every means to excite emulation was used. Premiums were given to the three most skillful in general management and to the

three of the best shots. The use of the guns was also offered to volunteer crews and one was at once made up of petty officers and seamen for the pivot 11-inch.

At the Azores, howitzer practice from boats was undertaken. After leaving the Azores, target practice against floats with muslin screens took place, each gun captain being allowed five shots with the ship under sail, instead of being nearly hove-to, as was often the case in ship duels.



FIG. 92.—Jack-Tars of the Old Navy. The Pivot-Gun of the *Wissahickon* and its crew. (*Copyright, "Photographic History of Civil War"*)

While abroad, Dahlgren carried out his orders relative to visiting shore arsenals. With regard to Great Britain, he wrote in his journal, after visiting Woolwich,

The union of land and naval ordnance is fatal to the Navy. How can landsmen know the troubles of ships, or knowing them, know their remedy? Good-by Woolwich, I am easy.

The *Plymouth* encountered long continued boisterous weather on her return homeward, with some heavy gales, during which the heaviest of the cannon were secured perfectly with ordinary lashings, and were as well under control in a rough sea when cast loose for practice as could be desired. During the cruise, 121 shells were fired at sea from the 11-inch pivot gun, without experiencing any of the difficulties usually supposed to render such heavy ordnance nearly unavailable on shipboard. The results of the operations of the *Plymouth* . . . seem . . . not only to justify the previous adoption of such ordnance in the steam frigates recently built, but also to render it expedient to extend this plan of armament. I earnestly recommend the renewal of the appropriation and the permanent employment of a ship on this duty.

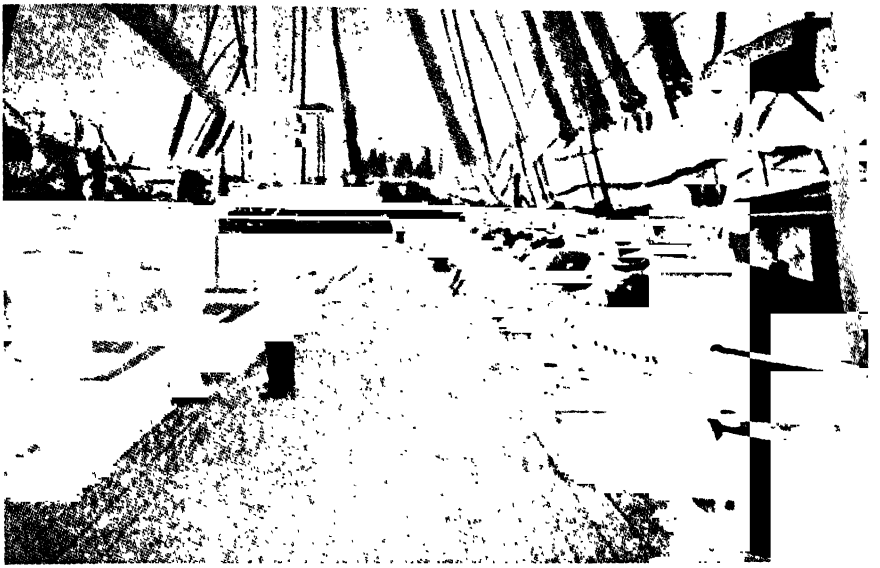


FIG. 92a.—Spar-Deck of the *Hartford.* (*Copyright, "Photographic History of Civil War"*)

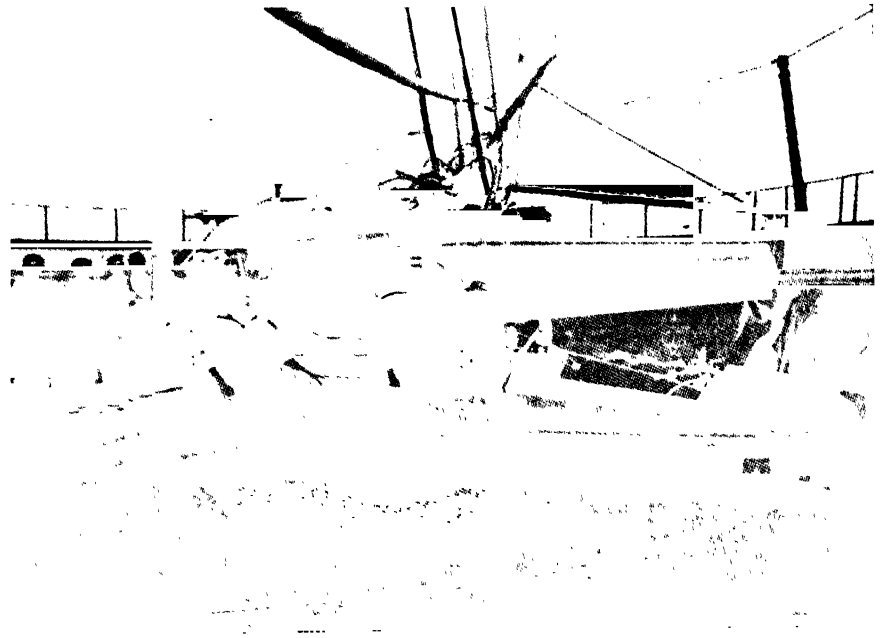


FIG. 92b.—Parrott Pivot Gun. (*Copyright, "Photographic History of Civil War"*)

Drill on the *Plymouth* continued after her return, during the winter of 1857-58. Dahlgren was so enthusiastic that he wrote, "How long may it be, before a caliber of 20 inches can be brought into a practical use at sea?"

He followed the experiments with rifled guns abroad with interest, and, as already stated, made some of his own in 1859. This interest in rifling was not shared by his superiors until they heard of the success of the Armstrong breech-loader in England, in 1860. (The progenitor of our present guns.)



FIG. 92c.—A "Powder-Monkey" on a deep-sea craft. (*Copyright, "Photographic History of Civil War"*)

Dahlgren retained command of the *Plymouth* until the end of 1858, when she was sent to Annapolis as a school-ship.

In 1859, a board of army officers, convened at Fort Monroe, expressed the opinion that "The era of smooth-bore artillery had passed away, and that rifled cannon, from its superior accuracy and greater range would supply the place."

Later, Dahlgren wrote, "It may be that the time for Dahlgrens has gone by, and also smooth-bores; but it is not determined what shall replace them."

In 1860, he recommended that ships mounting 9-inch guns, also mount six 6-inch, 80-pounder rifles, and that the furnaces at the Washington Navy Yard be increased to allow the heaviest rifled cannon to be cast. The following year, he reports that

> . . . the heavy rifled cannon I have designed, prove to be capable of placing their shell within an area of a square of seventeen feet, at 2,000 yards and four-fifths of the number within a square of 12½ feet, and so far as concerns practice at a ship in motion, I am sure that the most exact accuracy in flight would not produce military effect beyond 2,000 yards, and even for this distance, the most favorable circumstances would be needed.

Dahlgren does not give the caliber of the rifle which could keep all discharges within a 17 foot square at 2,000 yards, and although he began the manufacture of rifles immediately upon the outbreak of the Civil War, our first ironclad, the *Monitor,* mounted two 11-inch Dahlgren smoothbore guns in her single turret.

A 15-inch smooth-bore had been cast and proved, but the rate of production in this type of guns was not equal to that of the monitors for which they were intended.

Congress was informed that designs for a 20-inch smooth-bore had been prepared. Before the end of the war, a few 20-inch Dahlgrens were cast in Pittsburgh and at least two were completed. One was called "Puritan" for the unfinished monitor of that name, and the other, "Beelzebub."

Smooth-bores, 11 and 15-inch, continued as the favorite turret guns throughout the war. For ships other than monitors 8-inch muzzle loading rifles were developed. These were pivot guns; 9-inch smooth-bore was the largest broadside gun. The 11-inch, when not mounted in turrets, was a pivot gun. Parrott guns, of calibers up to 200-pdrs., were obtained from the War Department for naval use. On the Confederate side, the 6-inch and 7-inch Brooke rifle, made in the South, was a favorite weapon. Larger guns, smooth-bores, were principally those captured at Norfolk or taken from forts in Confederate territory at the outbreak of the war.

Both combatants utilized all available guns regardless of caliber.

CHAPTER XXXIX

U. S. CIVIL WAR

Ships vs. Forts; "Monitor" vs. "Merrimac"; Confederate Rams on the Mississippi

IN 1861, events in the United States moved rapidly. On Feb. 4 the seceding states formed a government, and on Feb. 18 they inaugurated a President—Jefferson Davis. Fort Sumter in Charleston harbor fell on April 12. Civil war began.

On April 19, just one week after the fall of Sumter, President Abraham Lincoln proclaimed a naval blockade of the coasts of South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. Some time soon after, the blockade was extended to North Carolina and Virginia—more than 3,000 miles of coast line from the Capes of the Chesapeake to the Rio Grande.

This was a strategical rather than a tactical operation. It deserves attention because determination to maintain the blockade on one side and to break it on the other, led to the building of ironclads and rams whose unique features affected naval construction in other countries. The extensive use of rams and the results, had a determining effect on the battle tactics of the world's major navies.

Ships of the Federal Navy were few in number and widely dispersed. At first, it was only feasible to station one steam frigate or sloop-of-war off each of the principal Confederate ports.

This nucleus was rapidly augmented by recalling ships from foreign stations; commissioning others laid up; purchasing and arming merchant steamers of all types, including ferry boats; and laying down many types that could be quickly built. Before many months, more than 100 ships were on blockade duty. This number was eventually increased four-fold. Ships were maintained on station in all weathers—winter and summer—for more than three years. It was evident that a continuance of the blockade of this kind would strangle, as it eventually did, the Confederacy.

Having no navy, the Confederates saw the necessity for building ships in their own waters or obtaining them abroad in numbers and strength sufficient to break or raise the blockade.

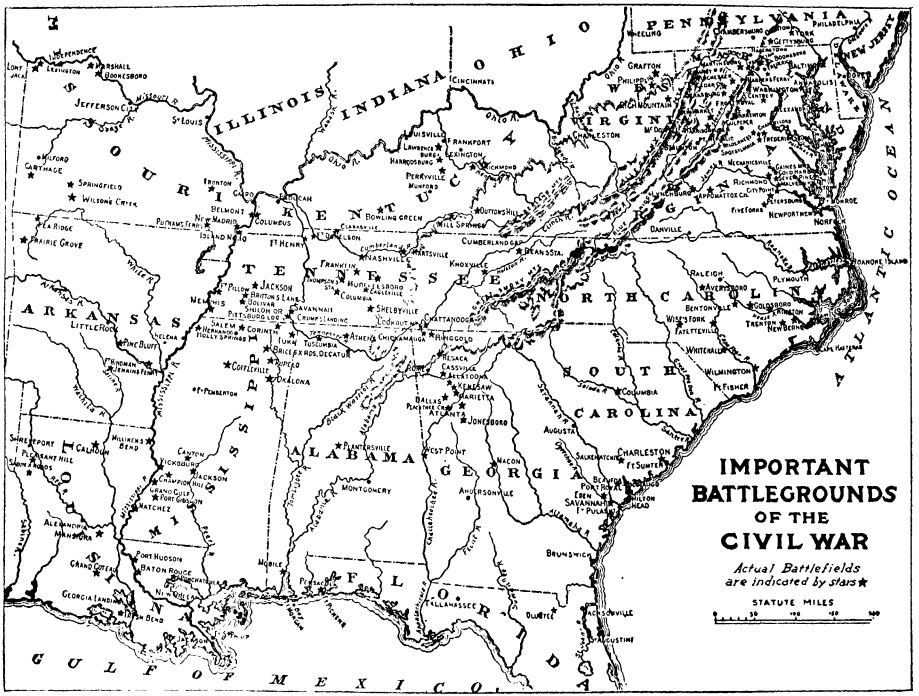


CHART V.—(*Copyright "Photographic History of Civil War"*)

The Federals realized the necessity of bases on the blockaded coasts for anchorage, supplies, and repairs. Hampton Roads was already in their possession.

In August 1861, a combined naval and military expedition under Flag Officer Silas Stringham and Major General Benjamin F. Butler bombarded and captured Forts Hatteras and Clark at Hatteras Inlet, North Carolina, and thus secured a base for light draft ships in the North Carolina Sounds.

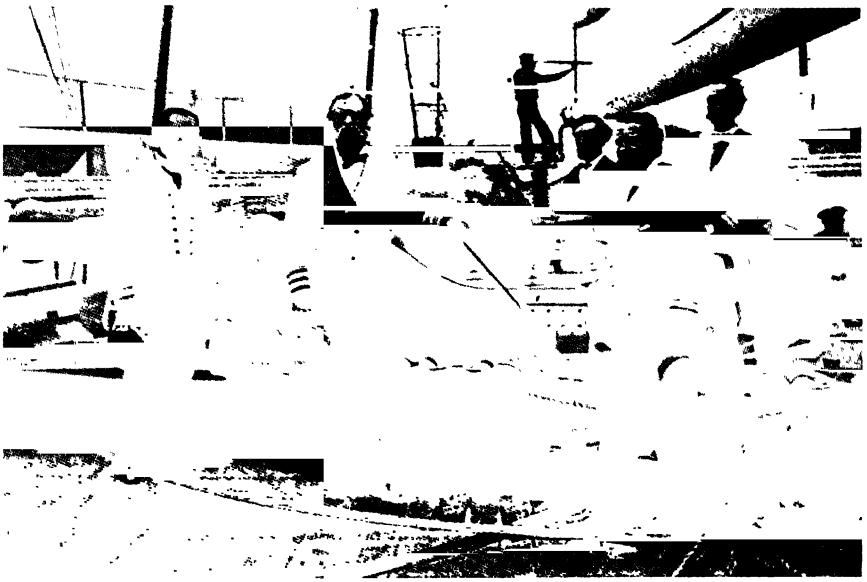


FIG. 93.—Rear Admiral Samuel Francis du Pont on his flagship *Wabash*. (*Copyright, "Photographic History of Civil War"*)

In September, Ship Island in Mississippi Sound, some 50 miles west of the entrance to Mobile Bay and 80 miles north of the mouth of the Mississippi, was seized as a base.

On October 29, a combined naval and military expedition under the leadership of Flag-Officer Samuel F. du Pont, comprising 77 ships of all classes, men of war, transports, and supply ships, sailed from Hampton Roads for the capture of a base in Port Royal Sound, South Carolina, about 60 miles south of the port of Charleston, and having inland water connections with the important seaports of Charleston to the north and Savannah to the south.

The transports carried 13,000 troops commanded by Brigadier Gen-

eral Thomas W. Sherman. A violent storm off the coast of North Carolina dispersed du Pont's fleet. Three ships were disabled and returned, two more were driven ashore, and two foundered but only seven lives were lost. The *Sabine* (44) rescued 600 marines from the transport *Governor* which foundered. The armed steamer *Isaac Smith* rescued the troops from the transport *Peerless* which also went down.

Seventy ships reached the rendezvous outside Port Royal Bar. Four of the men-of-war were what were known as ninety-day-gunboats, built and armed after the outbreak of the war.

The Confederates had a fort on each side of the entrance, Beauregard to the north, Walker, the stronger, on Hilton Head to the south.

A Confederate flotilla of four lightly armed steamers commanded by Flag-Officer Josiah Tattnall lay inside the entrance. Tattnall attacked without success three gunboats under Lieutenant Daniel Ammen, of the *Seneca,* sent in to guard the replacement of the channel buoys.

Leaving the transports outside, du Pont, about 9:00 on the morning of Nov. 7, led into the attack with his flagship, the heavy frigate *Wabash.* His fleet was in two columns, *Wabash* leading the first column, followed in the order named by the side-wheel frigate *Susquehanna,* screw sloops of war *Mohican, Seminole, Pawnee;* ninety-day gunboats *Unadilla, Ottawa, Pembina;* and bringing up the rear the small steamer *Isaac Smith,* towing the sailing sloop of war *Vandalia.*

The second column was led by the large armed side-wheeler *Bienville* followed by the ninety-day gunboat *Seneca,* small screw steamers *Curlew* and *Penguin,* and large screw steamer *Augusta.*

Except the ninety-day gunboats, there was no uniformity in ships or batteries. The largest guns were on the gunboats, each mounting one 11-inch Dahlgren, one 20-pounder rifle, and two 24-pounder howitzers. On the armed steamer and sloops 32's predominated. The *Wabash* was heavily armed, mounting two 10-inch pivot guns and a broadside of seven 8-inch and fourteen 9-inch Dahlgrens; the *Susquehanna* carried fewer and smaller guns, the largest 8-inch.

On the Confederate side Fort Wagner mounted 23 guns and Fort Beauregard 18, about equally divided between 32's and larger calibers.

Both forts were considered to be well built earthworks. They were about 5,000 yards apart. Du Pont could have used both batteries with effect when abeam; but he with the first column passed closer to Fort Wagner, leaving the principal attack on Fort Beauregard to the second column, which also had the duty to prevent Tattnall from getting out to attack the transports.

Experience at Hatteras Inlet had shown that such forts could be successfully attacked at short ranges by moving ships. Du Pont steamed in at about six knots with the flood tide. Coming out, he steered his column to within 600 yards of Fort Wagner. He turned again when out of range and renewed the attack continuing to steam in an ellipse, all ships firing when their guns would bear.

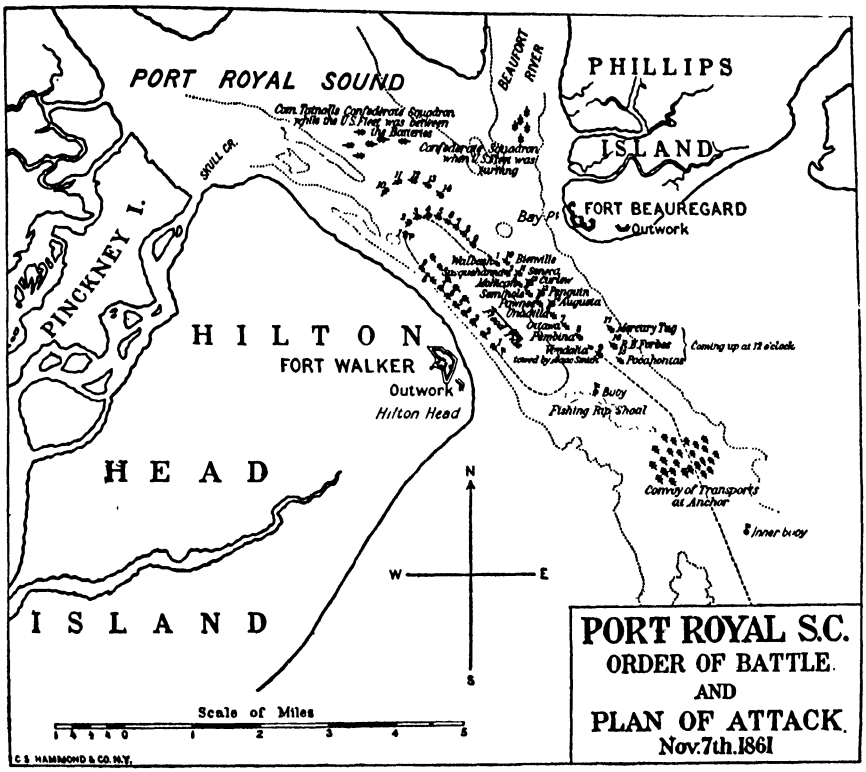


FIG. 94.—(*From "Rear Admiral Samuel Francis du Pont, United States Navy," by H. A. du Pont*)

On the second turn he was joined by the screw-sloop *Pocahontas,* Captain Percival Drayton, whose brother commanded at Fort Wagner. The *Pocahontas* stopped close under Wagner's guns and fired her broadsides rapidly. The second column took station inside the sound and attacked Fort Wagner from the westward.

About 2:00 o'clock, no flag was seen on either fort. A boat sent in to investigate found Wagner evacuated and later the same situation was

found at Beauregard. The Stars and Stripes were hoisted over both ports, the transports brought in, and troops landed to take possession. Complete disembarkation of the army and its supplies took two days.

Losses on both sides were small; no ships were lost and none disabled. Ships' shot and shell dismounted guns, destroyed earthworks, and made the forts untenable.

Gun mounts afloat and gun crews afloat were more adapted to keeping on targets changing in bearing and range than mounts and crews ashore.

Operating from his base in Port Royal Sound, du Pont in a few months had control of the coast and inland waterways of Florida, Georgia, and South Carolina. This condition obtained throughout the war. The three ports not then captured, Wilmington, Charleston, and Savannah, were closely blockaded from the sea.

Discussion of the causes of this long and bitterly contested war is outside of the purview of this work. Its purpose is limited to brief descriptions of major naval operations. These, in the first and second years of the war, clinched the grip of the Federal navy on the entire Atlantic and Gulf Coast and further constricted the Confederacy by gaining partial, if not complete, control of the Mississippi.

A major disaster had befallen the Federal Government immediately after the fall of Fort Sumter. Foreseeing that Virginia would secede, the Commandant of the Navy yard at Norfolk had been directed to send all serviceable ships away from the yard. These included the steam frigate *Merrimac,* undergoing repairs, a sister-ship of the *Wabash.* The Commandant was directed to send the *Merrimac* to New York. Chief Engineer Isherwood was sent to the Navy yard from Washington to direct the connecting up of her engines. In this he was successful and had steam up when the Commandant delayed her sailing over night.

He apparently decided to make an attempt to defend the yard in the face of the defection of the majority of his officers and workmen, but failing or unable to take any effective steps to that end, he set fire to or scuttled all ships, except the sailing frigate *Cumberland,* which was towed out by the *Pawnee.*

It is only fair to add that the Commandant also had orders not to do anything which might appear hostile or provoking to the Virginians, it being vainly hoped that Virginia would not secede. The *Merrimac* had steam up, had tested her machinery, and was in condition to sail, but the Commandant refused to give the necessary orders.

The result of his vacillation was the loss by burning or sinking of the *Merrimac,* and of the *Pennsylvania, Columbus, Delaware, New York,* ships of the line; *Columbia* and *Raritan,* frigates; *Plymouth* and *Germantown,* sloops; and *Dolphin,* brig—all sailing ships. The *United States,* frigate, also at the Navy yard, was not destroyed. She, together with the yard, fell into the hands of the Confederates. The most important of the stores obtained by the Confederates were 1,200 naval guns which became the main source of supply for arming Confederate ships, shore fortifications, and batteries. This catastrophe occurred on April 20, 1861.

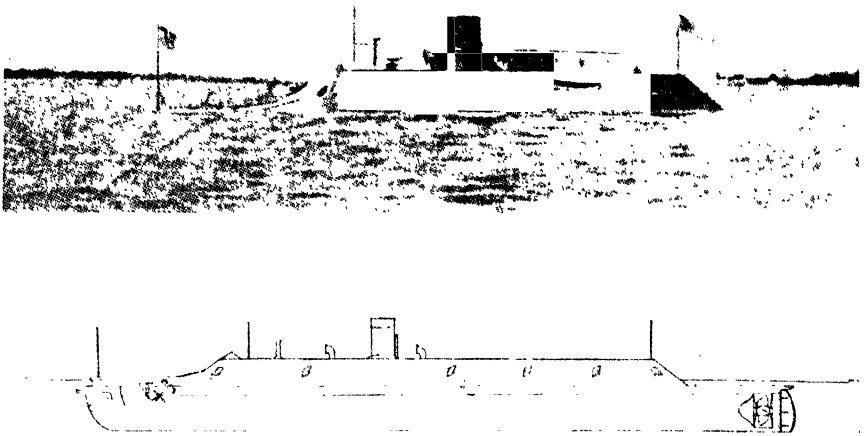


FIG. 95—C. S. Steam Frigate *Virginia.* (*Courtesy Virginia Historical Society*)

The *Merrimac* sank, after burning to the water's edge. Immediate steps were taken by the Confederate Navy Department to convert her to an ironclad. She was raised on May 30, and from then until March 8, 1862, when she steamed for Hampton Roads as the *Virginia,* the utmost energies of the Confederacy were extended towards her completion. She was cut down to the berth deck, and upon this was erected an ironclad superstructure 170 feet long, with its center amidships, leaving a length of about 50 feet between the ends of the superstructure and the stem and stern, respectively. The superstructure was built to a height of about 7 feet above the deck on which it was erected. Its sides were inclined like the roof of a house, at an angle of about 35 degrees with the vertical. The ends had approximately the

same slope, and were rounded. On top of the forward end, a conical pilot-house was built, with walls of cast-iron, 12 inches thick, with four holes for observation purposes.

The space between the top of the sides and ends of the superstructure was covered with an iron grating, two inches thick, pierced by three hatch-ways, closed by pivoted shutters. This space formed the spar deck.

The material of the sides and ends was 24 inches of pitch pine and oak, covered with two layers of wrought iron plating, each layer two inches thick; the one next the wood, laid horizontally, and the outside layer, vertically.

The stem was fitted with a cast-iron ram, weighing about 1,500 pounds, shaped like a wedge, and projecting about four feet. The superstructure did not project beyond the hull at its lower edge. At that point, when the ship was prepared for action, it was submerged about two feet.

The outside of the hull, to a distance of three feet six inches below its junction with the superstructure, was covered with iron, two inches thick.

The deck, forward and aft of the superstructure, was intended to be submerged two feet when the ship was ready for action. This, one of her peculiar and distinct features, was to render the casemate and the ship's side immediately below it, invulnerable with armor, while the unprotected ends, which contributed to her buoyancy, were also invulnerable, through submergence below the reach of shot or shell.

The superstructure, or casemate, was pierced for 14 guns, three at each end, and four on each side. The battery consisted of two 7-inch muzzle loading, steel-banded Brooke rifles, pivoted, one at the forward end, and the other at the after end of the casemate, with one 6.4-inch rifle of the same pattern and three 9-inch smooth-bore Dahlgren guns on each broadside; ten guns in all. It was intended that all gun ports should have 4-inch wrought iron shutters, but in the actions of March 8 and 9, only the bow and stern ports were so fitted. At that time, too, the Brooke rifles were not provided with solid shot, or *bolts,* as they were denominated by Commander Brooke. Later, in the month of March, while the *Merrimac* was being repaired at the navy yard, solid, wrought iron shot were made for these guns. They had been tested on an experimental target, composed of plates corresponding to the *Monitor's* armor, and it was believed by the Confederates that in another action these shot would penetrate it.

Other naval construction was undertaken by the Confederates which cannot be followed in this chapter. For the time the *Merrimac* overshadowed all else.

The Federal government in June, 1861, appointed a board to examine the Stevens battery and report on the expediency of its completion, with the cost necessary. Although the report was not made until the end of the year, it was adverse; but without waiting, Congress in August authorized the Navy Department to provide for the construction of one or more armored ships or floating batteries, the exact words of the Act being:

That the Secretary of the Navy be, and he is hereby authorized and directed to appoint a board of three skilful naval officers to investigate the plans and specifications that may be submitted for the construction or *completing* of iron or steel-clad steamships or steam batteries, and, on their report, should it be favorable, the Secretary of the Navy will cause one or more armored or iron or steel-clad steamships or floating steam batteries to be built; and there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, the sum of $1,500,000.

It will be noted that the Act authorized the completion of the Stevens battery if the Navy Department thought it expedient, but the Department at once issued an advertisement asking for bids from responsible persons for vessels of not less than 10 nor more than 16 feet draft, armament from 80 to 120 tons weight, with provisions and stores for from 165 to 300 persons (according to armament) for 60 days, with coal for 8 days. The designs must provide two masts. Bids should be accompanied by general descriptions and drawings of the vessel, armor, and machinery, with estimates of cost and time for completion. Twenty-five days were allowed for presentation of plans from date of advertisement. It is probable that the light draft desired (to enable the ships to enter southern harbors and rivers) was one of the reasons why the completion of the large, deep draft Stevens battery was deemed inexpedient, at the same time taking into consideration the fact that the Confederates had no Navy.

The Board appointed on August 8, 1861, made its report on September 16. Some of its opinions are of interest:

The construction of iron-clad steamships of war is now seriously claiming the attention of foreign naval powers. France led, England followed, and is now somewhat extensively engaged in the system, and other powers seem to emulate their example though on a smaller scale.

Opinions differ amongst naval and scientific men as to the policy of adopting the iron armature for ships of war. For coast and harbor defense they are undoubtedly formidable adjuncts to fortifications on land. As cruising vessels, however, we are skeptical as to their advantage and ultimate adoption. But whilst other nations are endeavoring to perfect them, we must not remain idle.

The Board, although commenting upon the great range and penetration of rifle guns, considered that 4.5-inch plates were the heaviest required. Parties in England were ready to undertake construction of ironclads on reasonable terms, but the Board felt that outside of difficulties which might arise in connection with their delivery, *"every people or nation who can maintain a Navy should be capable of constructing it themselves."*

Of the plans submitted, the acceptance of three was recommended,

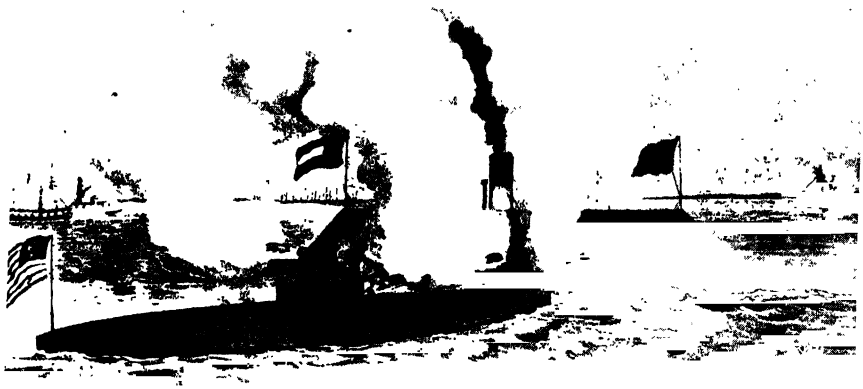


FIG. 96.—*Monitor* and *Merrimac*. (*By Currier and Ives. Photo from Rear Admiral Henry Williams, U. S. Navy*)

the total cost of which would be within the $1,500,000 authorized by Congress.

The first of the three recommended, but the last for which contract was made, was that of John Ericsson of New York for a floating battery which the Board thought would be shot and shell proof. He offered to build it for a price of $275,000. Length, 172 ft.; beam, 41 ft.; depth of hold, 11½ ft.; time, 100 days; draft, 10 ft.; displacement, 1,255 tons; speed per hour, nine statute miles.

After the Navy Department approved the Board's recommendation, which although the first in order, was the third accepted, Ericsson named his vessel the *Monitor,* as a warning. In his own words:

The impregnable and aggressive character of this structure will admonish the leaders of the Southern Rebellion that the batteries on the banks of their rivers will no longer present barriers to the entrance of the Union forces. The iron-clad intruder will thus prove a severe *monitor* to those leaders. But there are other leaders who will also be startled and admonished by the booming of the guns from

the impregnable iron turret. Downing Street will hardly view with indifference, this last Yankee notion; this *Monitor.*

To the Lords of the Admiralty, the new craft will be a *monitor* suggesting doubts as to the propriety of completing these four steel-clad ships (*Warrior, Black Prince, Defence,* and *Resistance*) at three and one-half millions apiece.

On these, and many similar grounds, I propose to name the new battery, *Monitor.*

The second ship recommended for acceptance was an armored, wooden gun-boat, the *Galena,* of about 1,200 tons, draft 10 feet, speed 12 knots, armor 4 inches, to be completed in four months. The *Galena's* sides tumbled home at an angle of nearly 45 degrees. On a gun deck covered with iron bars and plates, she carried the very heavy battery of two 100-pounder rifles and sixteen 9″ smooth-bores. Her armor did not survive its first battle (Drewry's Bluff, May 15, 1862).

The third ship was the wooden *New Ironsides,* much larger than the *Monitor* or *Galena,* designed for a displacement of about 3,300 tons, draft 13 ft., length 220 ft., beam 60 ft., speed 9½ knots, armor 4 inches, to mount a battery of sixteen 11-inch Dahlgrens, two 200-pounder Parrott rifles, and four 24-pounder howitzers.

Compared with the *New Ironsides* or the *Galena,* the *Monitor's* battery of two 11-inch Dahlgrens seemed insignificant. When completed, her displacement was about 1,000 tons. Ericsson had estimated about 1,200. Unlike the *Galena* and *New Ironsides,* the *Monitor's* hull was iron. She resembled the *Merrimac* only in that her deck was nearly awash. In all other respects she was radically different. Her armor covered her entire side, extending from below the water line to the height of her free-board (about three feet). It was made up of five layers of one-inch plates bolted together and to the wood backing. The deck was covered with two layers of one-half inch plates. She did not carry a ram, but her armored stem made her suitable for ramming. The guns were installed in a cylindrical turret, twenty feet in diameter, armored with eight layers of one-inch iron plates, with a flat roof of railroad iron. Like the *Merrimac,* she had an armored pilot house, but its location near the bow prevented "ahead and sharp on the bow" fire from the turret. Her gun ports were smaller than those of the *Merrimac,* which had to be wide enough for at least a limited train of the guns, while the *Monitor's* guns—and this was her most distinctive feature—were pointed by training the turret, which was mounted on a spindle and revolved by steam power. The bottom of the turret had very small clearance above the iron plated deck, and to decrease friction, a bronze ring of the same circumference as the turret was let into the deck.

Although work on the *Monitor* started about five months later than

that on the *Merrimac,* and the hull and engines had both to be fabricated, she progressed at such a rate that the dates of completion of the two ships were almost identical, the *Monitor* being in the lead. She started from New York, in tow, on March 6, 1862, two days before the *Merrimac* left the Norfolk Navy Yard.

The captain of the *Monitor* was Lieutenant John L. Worden, who entered the Navy as a midshipman in 1834, and became a lieutenant in

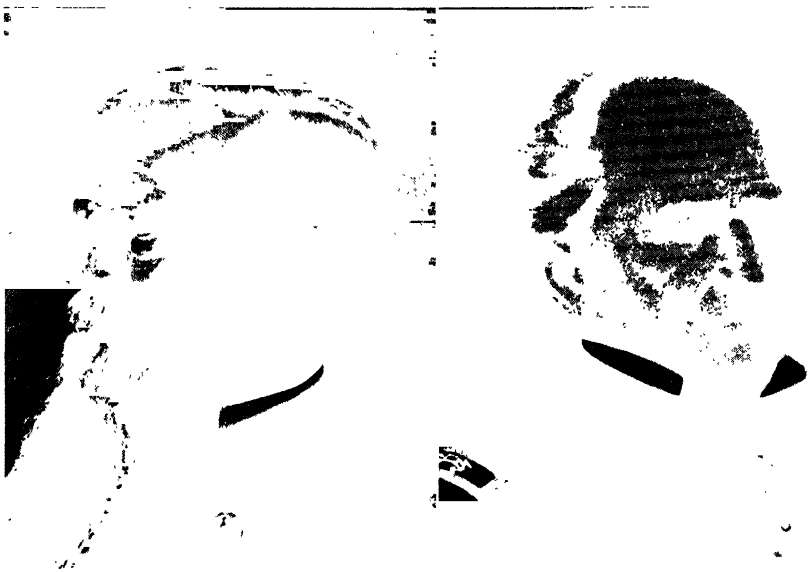


FIG. 97.—John L. Worden. (*Courtesy Office of Naval Records and Library*) Franklin Buchanan. (*Courtesy U. S. Naval Academy Museum*)

1846. At the outbreak of the Civil War in April, 1861, he was sent to Pensacola with despatches for the commanding officer of the squadron off that port. On his return he was arrested near Montgomery, Alabama, on April 13, and held a prisoner of war at Montgomery until November 14, 1861, when he was paroled and ordered to report to the Confederate Secretary of War at Richmond, Virginia, from which place he was sent to Norfolk, Virginia, to report to General Huger in command of the Confederate Forces. General Huger, in turn, delivered him to Admiral Goldsborough in command of the Federal Naval Forces at Hampton Roads, where he was exchanged for a Confederate prisoner, Lieutenant Sharp. On January 16, 1862, he was ordered to command the *Monitor,* thus having nearly two months to familiarize himself with the ship and

her working before he sailed in her from New York for Hampton Roads

Chief Engineer A. C. Stimers of the Federal Navy, who had superintended the machinery installation of the *Monitor,* was on board as a volunteer and during action operated the steam engine which revolved the turret. He had been chief engineer of the *Merrimac* on her last cruise and was very familiar with that ship, also.

The captain of the *Merrimac*, Franklin Buchanan, had been formerly an officer of the Federal navy. He was a much older man than Lieutenant Worden, having entered the navy as a midshipman in January, 1815. He reached the rank of lieutenant in 1825, commander in 1841, and captain in 1855. At the time of his resignation from the U. S. Navy he had had 46 years' service, being, at least in point of service, the second oldest naval officer to cast his lot with the Confederates. Buchanan was employed in the Confederate Navy Department in the early months of the war. He was given command of the *Virginia* (*Merrimac*) on February 24, 1862, somewhat more than a month after Worden took command of the *Monitor.* He was ordered to take command of the Confederate naval defenses of the James River and to hoist his flag on the *Virginia,* or any other vessel of the squadron. The squadron was composed of the *Merrimac, Patrick Henry* (a side-wheel steamer mounting eight guns, formerly known as the *Yorktown,* and later to become the school ship of the Confederate Naval Academy at Drewry's Bluff), the *Jamestown* (later the *Thomas Jefferson*), the *Raleigh,* a small gunboat, and the *Beaufort* and *Teaser,* steam tugs. Except the *Merrimac* and *Patrick Henry* none of these vessels mounted more than two guns. The *Patrick Henry* had her boilers and machinery partially protected by one-inch iron plates and V-shaped iron shields at the ends of the spar deck to deflect raking shot. She mounted two 10-inch and six 8-inch smoothbores.

The orders Buchanan received from Secretary Mallory indicate the great hopes which the possibilities of the re-christened *Merrimac* had kindled in the minds of the Confederate authorities, The Secretary wrote:

> The *Virginia* is a novelty in naval construction, is untried and her power is unknown, and hence the Department will not give specific orders as to her attack upon the enemy. Her powers as a ram are regarded as very formidable and it is hoped you will be able to test them. Like the bayonet charge of infantry this mode of attack, while the most destructive, will commend itself to you in the present scarcity of ammunition. It is one also that may be rendered destructive at night against the enemy at anchor. Even without guns the ship would, it is believed, be formidable as a ram. Could you pass Old Point and make a dashing cruise in the

Potomac as far as Washington, its effect upon the public mind would be important to our cause. The condition of our country and the painful reverses we have just suffered demand our utmost exertions, and convinced as I am that the opportunity and the means of striking a decisive blow for our Navy are now for the first time presented, I congratulate you and know that your judgement and gallantry will meet all just expectations. Action, prompt and successful, just now would be of serious importance to our cause.

Unfortunately for the Secretary's hopes, the *Merrimac's* draft of 22 feet forbade any attempt to cruise as far as Washington, and not only this, but she had to be navigated with great care to prevent grounding in the waters adjacent to Hampton Roads.

The *Merrimac* cast off from the Navy Yard, Norfolk, about noon on March 8, 1862. She was escorted and assisted down the Elizabeth River by the *Beaufort* and *Raleigh*. When she cleared the main channel and at about two in the afternoon entered Hampton Roads, off Sewell's Point, she had in sight her former sister ships *Roanoke* and *Minnesota,*

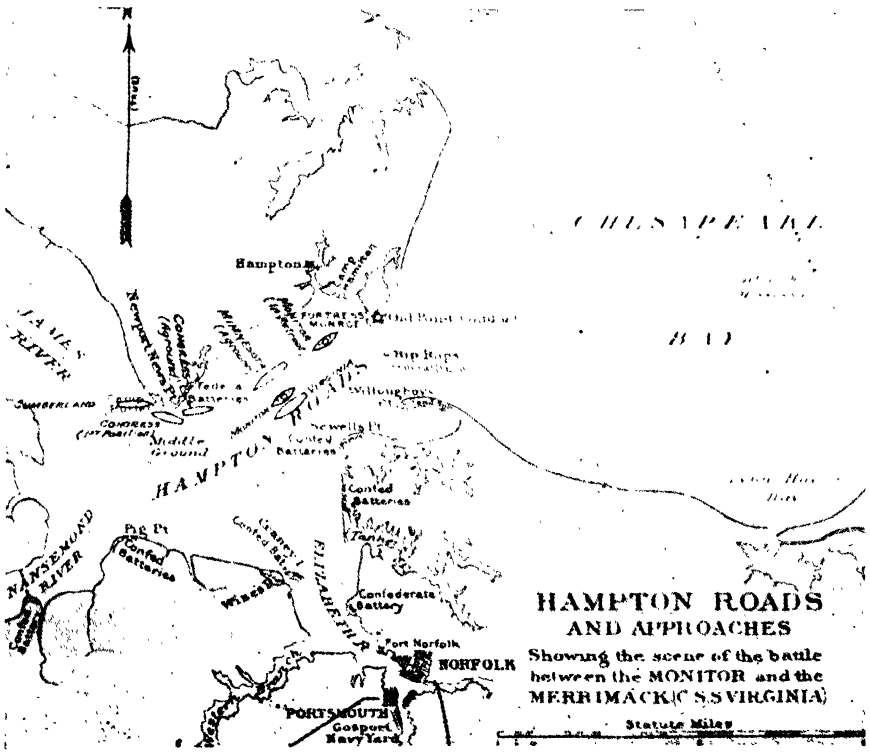


FIG. 98.—(*Courtesy Virginia Historical Society*)

lying off Fortress Monroe; the *Roanoke* with a broken shaft. At the same anchorage were several small Federal ships.

At anchor off Newport News, were the *Congress* (44) and the *Cumberland,* formerly a 44 but at this time mounting heavier, though fewer guns. The *St. Lawrence* (44) had entered the Capes and was under way, in tow, for Hampton Roads.

Buchanan, not wishing to bring his ship under the guns of Fortress Monroe, steamed towards Newport News and opened fire, first on the *Cumberland* and then on the *Congress,* both ships lying at anchor.

Passing the *Congress,* the *Merrimac* rammed the *Cumberland* under the starboard fore channel, almost at right angles. The *Cumberland* began to fill, and at the end of 35 minutes sank, with her colors flying.

The *Merrimac* was unharmed by the fire from the *Congress* and *Cumberland,* but in ramming the latter she carried away her ram and sprung a leak in the bow. After ramming the *Cumberland,* she steamed up the James River, in order to turn and ram the *Congress.* The latter slipped her cable and made sail to escape. She grounded in such a position that the *Merrimac* could not ram her, but was within easy gun range.

At 150 yards the *Congress'* guns produced no effect upon the armor of the *Merrimac,* which was presently joined in the gun attack by the *Patrick Henry* and the *Jamestown.* The *Congress* was so seriously damaged, despite the aid she received from the Federal shore batteries, that she was forced to haul down her flag.

The *St. Lawrence* and *Roanoke,* under sail and assisted by tugs, and the *Minnesota* under steam, stood up from Hampton Roads to the aid of the *Congress* and *Cumberland.*

The *Minnesota* grounded and could not be gotten off. The *St. Lawrence* and *Roanoke* also grounded, but only for a short time. Both these ships returned to Hampton Roads. The *St. Lawrence's* broadsides were considered by Lieutenant Jones of the *Merrimac* as more nearly effective than any other attacks made upon her that day, but they were without serious results. The *Minnesota* had grounded in a manner that permitted her to use her broadside, but her shells were ineffective. She had been gravely injured by a raking fire from the *Patrick Henry.*

During the action, and while directing the destruction of the *Congress,* Captain Buchanan was wounded by a rifle ball fired from the shore. He was succeeded in command by his first lieutenant, Catesby ap R. Jones, who after the *Congress* was fired to prevent her from being re-floated, continued the attack on the *Minnesota* until dusk, when he

withdrew his ships to an anchorage off Sewell's Point, where a strong Confederate battery afforded protection from Federal attack.

The *Merrimac* had installed—a heritage from sailing ship days, prior to the use of explosive shell—a furnace for heating shot, and was furnished with some 9-inch shot of large windage, to enable them to be loaded after heating. Buchanan ordered their use against the *Congress,* as a means of setting her on fire.

The *St. Lawrence* and *Congress* each carried ten 8-inch shell guns and forty 32-pounders. The *Cumberland* mounted one 10-inch smooth-bore, one 70-pounder rifle, and twenty-two 9-inch smooth-bores. Thus, her battery compared not unfavorably with those of the *Minnesota* and *Roanoke* of more than twice her tonnage. These ships, at this time, mounted two 10-inch smooth-bores, twenty-eight 9-inch smooth-bores, and fourteen 8-inch smooth-bores.

Buchanan knew that the *Cumberland's* guns were heavier than those of the *Congress* and as heavy as those of the steam frigates. He determined to test his ram against the *Cumberland's* hull and his armor against her guns at point blank, knowing that if they survived this test, he would have no difficulty with the *Congress* and would be able to meet the *Minnesota* and *Roanoke* on even terms.

Considering the tidal currents and the restricted channel, it is not evidence of bad seamanship that the *Roanoke* and *St. Lawrence* grounded under sail, even with the assistance of tugs, but there was some evidence of treachery on the part of the *Minnesota's* pilot when he put that ship aground, under steam, in a channel that must have been well known to him. He was believed to be in the pay of the Confederates and was dismissed from the service.

The *Merrimac,* as well as the Federal frigates, had narrow channels in which to move. According to Confederate accounts, the *Cumberland,* at the time of the attack, was held across the channel by an ebbing tide and a contrary wind which exposed her starboard side to the *Merrimac's* ram.

The *Monitor* reached the Capes of the Chesapeake on the evening after the action, after a rough passage from New York. Orders had been given to send her to Washington for the protection of that city, but the senior naval officer at Hampton Roads, Captain Marston of the *Roanoke,* directed her to remain and she anchored close to the grounded *Minnesota,* about midnight, after a day of battle and in a night of suspense.

An hour before sunrise, one of the *Merrimac's* pilots saw, silhouetted

against the background of the still burning *Congress*, a strange looking craft which he proclaimed to be the *Ericsson*. So the *Merrimac's* crew were not surprised, at daylight, to see the *Monitor* at anchor near the *Minnesota*.

Lieutenant Jones of the *Merrimac* got his ship under way about 8:00 A.M. and steered for the *Minnesota* to complete her destruction. The battle opened with the *Merrimac* firing on the *Minnesota* at about 2,000 yards. The *Minnesota* returned the fire with a complete broadside, which included a 10-inch pivot gun. Her captain—Van Brunt—said that his broadside "would have blown out of the water any timber-built ship in the world, but against the *Merrimac* it was absolutely ineffectual."

The *Merrimac* then opened on the *Monitor* at about 600 yards as she moved out from her anchorage near the *Minnesota*. Her broadside had no more effect on the *Monitor* than had the *Minnesota's* upon *Merrimac*. On the other hand, the *Monitor's* 170-pound shot fired at point-blank caused no damage to the *Merrimac*.

Worden attempted to disable the *Merrimac* by ramming her stern but failed. The ships grazed and the *Monitor's* shot, fired almost in contact, crushed in the *Merrimac's* iron and wooden backing, but failed to penetrate. After each discharge, the turret was turned away while reloading. Jones remarked that it appeared to be under perfect control.

> We wondered how proper aim could be taken in the very short time the guns were in sight . . . . The *Virginia*, however, was a large target and generally so near that the *Monitor* did not often miss. It did not appear to us that our shell had any effect on the *Monitor*. We had no solid shot. Musketry was fired at the look-out holes.

Jones attempted to ram the *Minnesota*, but grounded. After getting off he steered to ram the *Monitor*, and did strike a slanting blow which did no damage.

The *Minnesota* kept up her fire when the *Monitor* was not in range, and the *Merrimac* returned it when her guns would bear.

This strange combat lasted more than two hours, when Worden steamed into shallow water to replenish his turret ammunition supply.

As he returned to the battle, a shell from the *Merrimac* hit one of the bars of the *Monitor's* pilot-house. Fragments of iron and powder from the explosion came through the bars of the pilot-house peep-holes, blinding and wounding Worden. The force of the concussion partially lifted the top of the structure. The damage appeared to be serious.

The *Monitor* sheered off and the captain was taken below. Lieutenant Dana Green, second in command, and turret officer, was informed and

took command. He found the damage not serious enough to withdraw, but turning back to renew the battle, he saw the *Merrimac* standing for Norfolk. Her captain reported that the *Monitor* had withdrawn to shallow water out of range and that the pilot had informed him that if he did not cross the bar at noon, he would not be able to do so until the afternoon of the next day. He had lost his ram, an anchor, and all of his boats; had had the muzzles of two guns shot off, and there was a leak at the bow. After conferring with his officers, he had decided to steam for Norfolk, to make repairs and finish uncompleted work, particularly port shutters.

The excitement engendered at the seat of the Federal Government and throughout the northern seaboard states, prior to, and after the result of the first day's action became known, and even after the withdrawal of the *Merrimac,* was without parallel and can scarcely be understood at this distance in time.

The consternation and the demand for immediate action toward destruction of the *Merrimac* grew out of greatly exaggerated ideas of her potential powers. They were not shared by the naval officers of either service since they could gauge her capabilities better than others, but they particularly obsessed the Federal Secretary of War, who was frantically demanding action by the navy and had also taken steps on his own initiative to achieve what he considered vital, both for the destruction of the *Merrimac* and the protection of the Federal Capital at Washington. For the latter purpose, he proposed to sink obstructions in the Potomac, but was dissuaded by the Secretary of the Navy. For the former, he attempted to appoint a committee of New York men to advise upon means for the *Merrimac's* destruction and tentatively engaged Cornelius Vanderbilt to take charge of the work.

The Secretary of the Navy describes the mental condition of the Secretary of War—which was probably that of many other partially informed citizens—as to the powers of the *Merrimac.* Of the special Cabinet meeting called by President Lincoln to consider what should be done after the demonstration of the *Merrimac's* offensive powers, he writes:

> The most frightened man on that gloomy day, the most so, I think, of any during the Rebellion, was the Secretary of War. He was at times almost frantic, and as he walked the room with his eyes fixed on me, I saw well the estimation in which he held me with my unmoved and unexcited manner and conversation. The *Merrimac,* he said, would destroy every vessel in the service, could lay every city on the coast under contribution, could take Fortress Monroe. McClellan's mistaken purpose to

advance by the Peninsula must be abandoned and Burnside would inevitably be captured. Likely the first movement of the *Merrimac* would be to come up the Potomac and disperse Congress, destroy the Capitol and public buildings; or she might go to New York and Boston and destroy those cities, or levy from them contributions to carry on the war . . . . In all that painful time my composure was not disturbed, so that I did not perhaps as fully realize and comprehend the whole impending calamity as others, and yet to me, there was throughout the whole day, something inexpressibly ludicrous in the wild, frantic talk, action and rage of Stanton as he ran from room to room, sat down and jumped up after writing a few words, swung his arms, scolded and raved . . . . He went repeatedly to the window and looked down the Potomac . . . the view being uninterrupted for miles—to see if the *Merrimac* was not coming to Washington.

This tension was of course relieved when the news of the battle between the *Merrimac* and the *Monitor,* on March 9, was received in Washington. On March 17, Secretary Mallory wrote to Buchanan, inquiring, "Can the *Virginia* (*Merrimac*) steam to New York and attack and burn the City?" In reply, Buchanan wrote,

The *Virginia* is yet an experiment, and by no means invulnerable as has already been proven in her conflict on the 8th and 9th inst., when two or three of her heavy beams and plating were crushed in by the enemy's shot and shell. The *Monitor* is, from the best information I can obtain from the officers of this ship, her equal . . . . Should she encounter a gale, or a very heavy swell, I think it is more than probable she would founder. . . . Ships drawing twenty-two feet of water are frequently obliged to remain outside of New York Bar a week or more, before they are able to enter. I have passed the Bar in a frigate drawing twenty-one feet of water and have stuck . . . .

Assistant Secretary of the Navy Fox wrote to Welles on the evening of March 9, after witnessing the battle between the two ironclads,

The performance of the *Monitor* to-day against the *Merrimac,* shows a slight superiority in favor of the *Monitor.* She is an ugly customer, and it is too good luck to believe we are yet clear of her.

While at the Norfolk Navy yard, work on the *Merrimac's* port shutters was completed, leaks were stopped, additional hull protection was put in place, and her two disabled guns replaced. Her draft was increased to 23 feet by the additional armor. She returned to Sewell's Point, April 11, under command of Commodore Tattnall, also a former officer of the U. S. Navy, with a well established reputation for efficiency and gallantry. He had entered the Navy as a midshipman in 1812 and reached the rank of captain in 1850. Tattnall's plan, if the *Monitor* offered battle, was to board, with the aid of the *Merrimac's* tenders, blind the steersman and turret crew by throwing wet sails over the pilot house and turret, and render the men below helpless by throwing combustibles down the ventilator.

On their side, the Federals had assembled a large fleet at Hampton Roads with the object of destroying the *Merrimac,* and had told off certain ships whose duty it was to ram at all hazards, and in addition a river boat, the *Baltimore,* of very light draft, was especially designated to run her bow over the submerged deck of the *Merrimac* and hold the latter ship helpless, while the others achieved her destruction. By special order of President Lincoln, dated March 10, it was directed that the *Monitor* . . . "be not too much exposed and that in no event shall any attempt be made to proceed with her, unaided, to Norfolk," and it was further ordered that "if vessels could be procured and loaded with stone, they be sunk in the channel to Norfolk to prevent her [the *Merrimac's*] egress."

The *Monitor* did not offer battle on April 11, which prevented the *Merrimac* from carrying out her boarding plan. On that day the *Merrimac* was fired upon by the *Naugatuck* several times, but fired only one shot in reply and then returned to an anchorage at Craney Island, below Lambert's Point.

The Federals, on May 8, began a bombardment of the Confederate batteries at Sewell's Point. The *Merrimac* came to the assistance of the batteries, and the Federal vessels, including the *Monitor,* retired. The attack was renewed on the following morning, but on the approach of the *Merrimac,* the Federal vessels again retired, the *Monitor* having orders to fall back into fair channel way and only engage the *Merrimac,* seriously, in such position that the *Minnesota,* Goldsborough's flagship, together with the merchant vessels intended for the purpose, could run her down if any opportunity presented itself.

On this occasion, the *Merrimac* anchored off Sewell's Point. The next day, May 10, Federal soldiers were landed at Willoughby's Point and threatened Norfolk so seriously from the rear that Sewell's Point, the city, and the Navy yard were abandoned. This left the *Merrimac* no other alternative than to retire from the Elizabeth River. Her draft of 22 feet made it impossible to take her up the James any great distance above Newport News. She was therefore abandoned and set on fire by her own crew, the same day the Federal troops landed. She blew up on the morning of May 11, to the great relief of the entire North.

The *Monitor,* with the ironclads *Galena* and *Naugatuck,* was sent up the James to attack Confederate Batteries at Drewry's Bluff, as an aid to the land campaign against Richmond. They were forced to withdraw. The *Galena* and *Naugatuck* were badly damaged. The *Monitor's* injuries were minor. She was sent to the Washington Navy yard for repairs and to exhibit her to the high officers of the Government.

Late in December, she sailed, under convoy, for service in the North Carolina Sounds. While en route, she foundered in a gale off Cape Hatteras, carrying down half of her officers and crew.

Such is the brief history of the *Monitor* and *Merrimac*. But the action between them had momentous effects both on the conduct and result of our Civil War and on world naval construction. Their names, and the battle associated with them, remain household words throughout the United States.

Although neither seriously damaged the other, and although it was known that 4-inch armor—even when well backed—would not keep out 68-pound solid shot when fired at short range with full charges, the Admiralties of the world were deeply impressed. Some were led to believe that the *Merrimac's* inclined armor, though but four inches, made her, to an extent, invulnerable. It is a matter of history that the *Monitor's* 11-inch Dahlgren guns, which were limited to a charge of fifteen pounds, could have been, and afterwards were, allowed double that charge. Fired at the *Merrimac* with a charge of 30 pounds, the results would have been different and the Civil War might readily have had an earlier ending.

On the whole, the 8-inch armored revolving turret made a greater impression abroad than the inclined armor of the *Merrimac,* and the potentialities of the *ram* which sank the *Cumberland* were everywhere admitted.

The fact that the *Monitor* and *Merrimac* failed to materially injure each other when mutually attempting to ram, made little impression. The *Merrimac* did sink the *Cumberland* and soon ramming duels in the upper Mississippi had equally fatal results.

A tactical maxim that it was fatal to expose a broadside to a ram in changing formation in the presence of an enemy was formulated in France (Bouet-Willaumez).

Before Congress had authorized the Navy Department to make contracts for ironclad floating batteries, the War Department saw the need of armed vessels to oppose the forts built by the Confederates on the Mississippi, Tennessee, and Cumberland Rivers.

Commander John Rodgers of the Navy was sent to report to the Commanding General of the Mississippi Valley, John C. Fremont, for the purpose of creating a river navy.

Three river steamers were purchased and armed at Cincinnati with 8-inch shell guns and in July bids were requested by the War Department for seven ironclad gunboats.

Mr. James B. Eads, a boat builder at Carondelet, Missouri, secured

the contract for all seven. Hulls were to be delivered ready for armament in 65 days from date of contract, August 7, 1861.

They were to draw 6 feet of water, carry 13 heavy guns, be plated with 2.5-inch iron, and have a speed of 9 miles an hour—stern wheelers. Their dimensions were: length 175 ft., beam 51½ ft., superstructure, somewhat like that built later on the *Merrimac,* sides and forward end sloping at an angle of about 35 degrees. The after end completely covered the paddle wheel astern.

The forward end of the superstructure or casemate was pierced for three guns, each side for four, and the after end for two, making thirteen

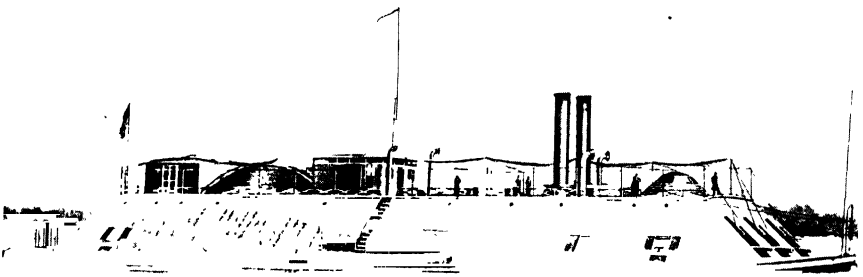


FIG. 99.—U. S. Iron Clad Steamer *Essex.* (*Courtesy Office of Naval Records and Library*)

guns in all. Some were 70-pounder rifles, others 32- or 42-pounders; whatever guns that could be had from the army or navy were mounted.

Eads also converted two government "snag" boats to ironclads. These were double-hulled boats—longer, slower, and deeper draft than the seven craft built. They mounted heavier batteries and thicker armor—3½ inches of iron, well backed. One paddle wheel, between the hulls, covered by the casemate, was to give a speed of five knots. Their draft was nine feet.

These were not rams. J. R. Spears in his *History of Our Navy* quotes some one unnamed as calling them "the ships of the line of the battle on the Western Waters."

They antedated the *Monitor* and *Merrimac.* Those built by Eads were the *DeKalb, Carondelet, Cincinnati, Louisville, Mound City, Cairo,* and *Pittsburg.* The converted "snag" boats were the *Benton* and *Essex.* The *Benton* mounted 16 guns, of which the heaviest were two 9-inch Dahlgrens. The *Essex* mounted one 10-inch, three 9-inch, and a number of smaller guns.

All played important roles in obtaining and holding control of the Mississippi and its tributaries in cooperation with the army.

On February 6, 1862, the *Essex* (Captain W. D. Porter), *Carondelet* (Captain Henry Walke), *St. Louis* (Captain Hiram Paulding), and *Cincinnati* (Captain R. N. Stembel) forced the surrender of Fort Henry on the Tennessee River in Kentucky after a bombardment lasting more than an hour.



FIG. 99a.—Commander W. D. Porter. (*Copyright, "Photographic History of Civil War"*)

The squadron of four was commanded in person by Flag-Officer A. W. Foote, the senior naval officer in the upper Mississippi. Foote led in the *Cincinnati*. He opened fire at 1,700 yards and advanced steadily until the range was about 500. The four ironclads brought their forward guns (3 each) to bear against about the same number in the fort. The heaviest gun in Fort Henry was a 10-inch, the most powerful a 60-pounder rifle.

After about 50 minutes' firing, a 60-pounder rifle pierced the *Essex's* forward armor and entered one of her boilers, killing Master's Mate Britain in its flight. Hot water and steam badly scalded 29 men, including Captain Porter, and killed the man at the wheel. More than half of those scalded died. Other losses were small.

Gunpowder mines were planted by the Confederates down stream from the fort. The attack was delayed on account of a heavy storm which flooded the river. Floating trees carried away the mine moorings. The mines came to the surface and some were picked up by the ironclads.

On February 14, 8 days after the capture of Fort Henry, Foote joined with the army under General U. S. Grant in an attack on Fort Donelson on the Cumberland River, also in Kentucky, nearly southeast and 12 miles overland from Fort Henry. On this occasion, Foote was in the *St. Louis* and had the *Carondelet, Louisville,* and *Pittsburg* in company.

The day preceding the joint attack, the *Carondelet* threw 184 shells

on or at the fort from a sheltered anchorage, 2,500 yards distant, and was struck once by a shot from the fort.

As at Fort Henry, Donelson had mounted twelve guns which would bear on the ironclads. These were in two batteries about 32 feet above the river. Below the fort, where the attack began, the river was wide enough to permit the four ironclads to approach in line.



FIG. 99b.—Four Picked Men of the *Essex*. (*Copyright, "Photographic History of Civil War"*)

Foote, at about 3:00 P.M. February 14, opened with all four ironclads at 2,000 yards and steamed in to 400 yards at 4:30. The battle seemed to be won, but at this moment Foote and the pilot were seriously wounded and the wheel smashed. Out of control, the *St. Louis* drifted down stream as did the *Louisville,* also disabled at the same time.

This caused the Confederates to return to their guns. They soon seriously damaged and disabled both the *Carondelet* and the *Pittsburg,* which also drifted down stream. Fortunately, General Grant continued the battle and the fort surrendered to him ten days later.

The squadron's loss was 54 killed and wounded; no ship was struck less than 20 times and the flagship 59. Pilot houses were smashed and three pilots were mortally wounded; but the armor, on the whole, held out. The principal failure was in the steering gear.

Foote's injuries eventually caused his relief by Captain C. H. Davis, May 9, nearly three months after the battle against Fort Donelson.

In the meantime, and after long consideration and careful preparation, Foote, at the request of General John Pope, sent the *Carondelet* to run past Island No. 10—a perilous undertaking.

Island No. 10 (later washed away by the river) was at the curve

of a 180 degree westerly bend in the Mississippi some 35 or 40 miles south of Cairo, Illinois, and almost in the extension of the boundary between Kentucky and Tennessee.

The main channel was on the outer (Tennessee) side of the bend. On the island, covering the channels, the Confederates had four batteries mounting 23 guns and on the Tennessee shore six batteries mounting 32 guns.



FIG. 100.—Commander Henry Walke. (*Copyright, "Photographic History of Civil War"*)

Captain Walke prepared the *Carondelet* for the dash with great care. Extra planks were placed on decks and these covered as far as could be with chain cable. The pilot house was wrapped with 18 inches of rope; wood was piled over the boiler and engine; the exhaust was turned into the paddle-box to deaden the noise. A barge loaded with hay was lashed to the port side—considered the most dangerous.

Walke got under way in a heavy thunderstorm at 10:00 P.M. on the night of April 10. In the open stood a man at the lead and a messenger to whisper the word to the pilot house. As the *Carondelet* ran with the current at best speed, the forcing of her fires caused her stack to "torch" before she reached the batteries. Lightning also betrayed her, but at the same time blinded the men in the batteries and the *Carondelet* went safely through.

Earlier, in the gunboat *Tyler,* Walke had earned a reputation for taking his ship boldly under enemy guns. He carried this record throughout the war.

Foote had mortar boats in the river above Island No. 10. Pope captured New Madrid and Tiptonville below, under Walke's protection. The capture of Tiptonville cut off all supplies. Island No. 10 surrendered May 7.

Foote was relieved by Captain Davis May 9. Davis took his mortar

boats and fleet of nine less the *Essex* and *Louisville* down river to prepare the attack on Fort Pillow on the Tennessee shore, some 50 or more miles below Island No. 10.

On May 10, the *Cincinnati,* Captain Stembel, towed a mortar boat into position and the bombardment of Fort Pillow began. The *Cincinnati* took station as mortar boat guard, the remainder of Davis' flotilla three miles up the river.



FIG. 100a.—*Arkansas. Carondelet. (From Spears' "Our Navy," Charles Scribner's Sons, New York)*

The Confederates had organized a "River Defense Flotilla" from river boats (tin-clads) with cotton bale and timber protection and iron plated bows for ramming.

Each ram mounted at least one gun. Captains were mostly river pilots. Eight of these craft were stationed off Fort Pillow. Although not ignorant of their presence, Davis seems to have felt the *Cincinnati* secure, but an hour after the mortar opened fire the rams appeared.

The *Cincinnati* slipped her moorings and opened fire. One ram, the *General Bragg,* ran above her and turning, rammed her on the quarter. Injured by the *Cincinnati's* guns, she gave up the fight and went down river. The rams *Price* and *Sumter* attacked with their guns and small arms and the *Sumter* rammed at the same spot as did the *Bragg*. Captain Stembel was badly and his executive mortally wounded.

Coming to the *Cincinnati's* aid, the *Carondelet* drove the *Price* out of the fight. The *Mound City* ahead of the *Carondelet* was rammed by the *Van Dorn* and had to be run ashore. The *Pittsburg* came down to the *Cincinnati's* assistance and helped her into shallow water where she sank. By this time, the *Cairo, Benton,* and *St. Louis* had arrived. The rams went down the river. Davis had been seriously caught napping.

While the fight was going on, the mortar boat, acting Master Gregory,

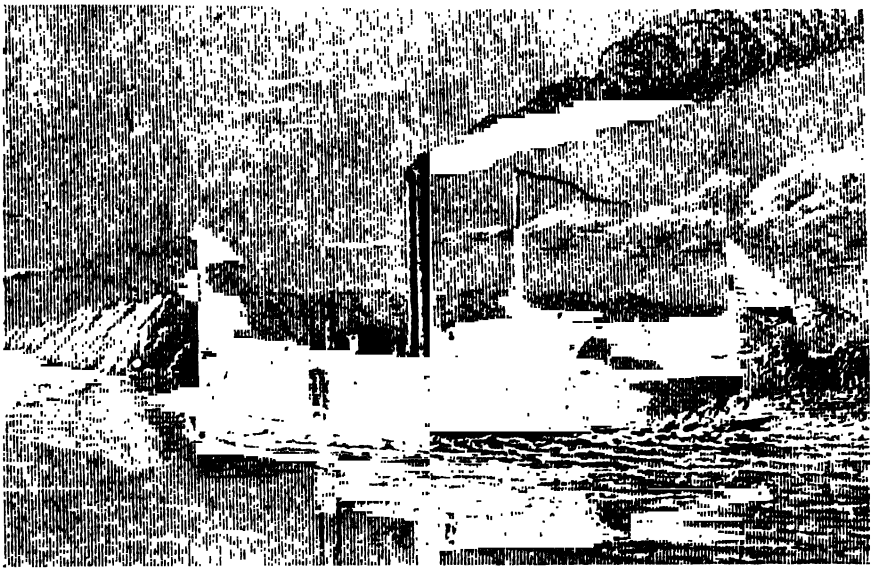


FIG. 101.—*Queen of the West.* (From a drawing by Rear Admiral Walke, May 15, 1862.) (*From Porter's "The Naval History of the Civil War," Sherman Publishing Company, New York*)

continued to throw its shells at the fort. This attack continued daily. The *Cincinnati* and *Mound City* were raised and repaired.

Soon the Federals had a ram fleet of seven. These were river steamers converted to rams by the War Department—stern side wheelers (tin clads) commanded by Col. Charles Ellet, Jr., who was directed to cooperate with Flag Officer Davis.

Fort Pillow, exposed to attack from the rear by the Federal army, was evacuated June 4.

Ironclads and rams immediately dropped down river to Memphis in the wake of the Confederate rams, which took shelter below the city.

Losing no time, Davis and Ellet, early in the morning of the 6th,

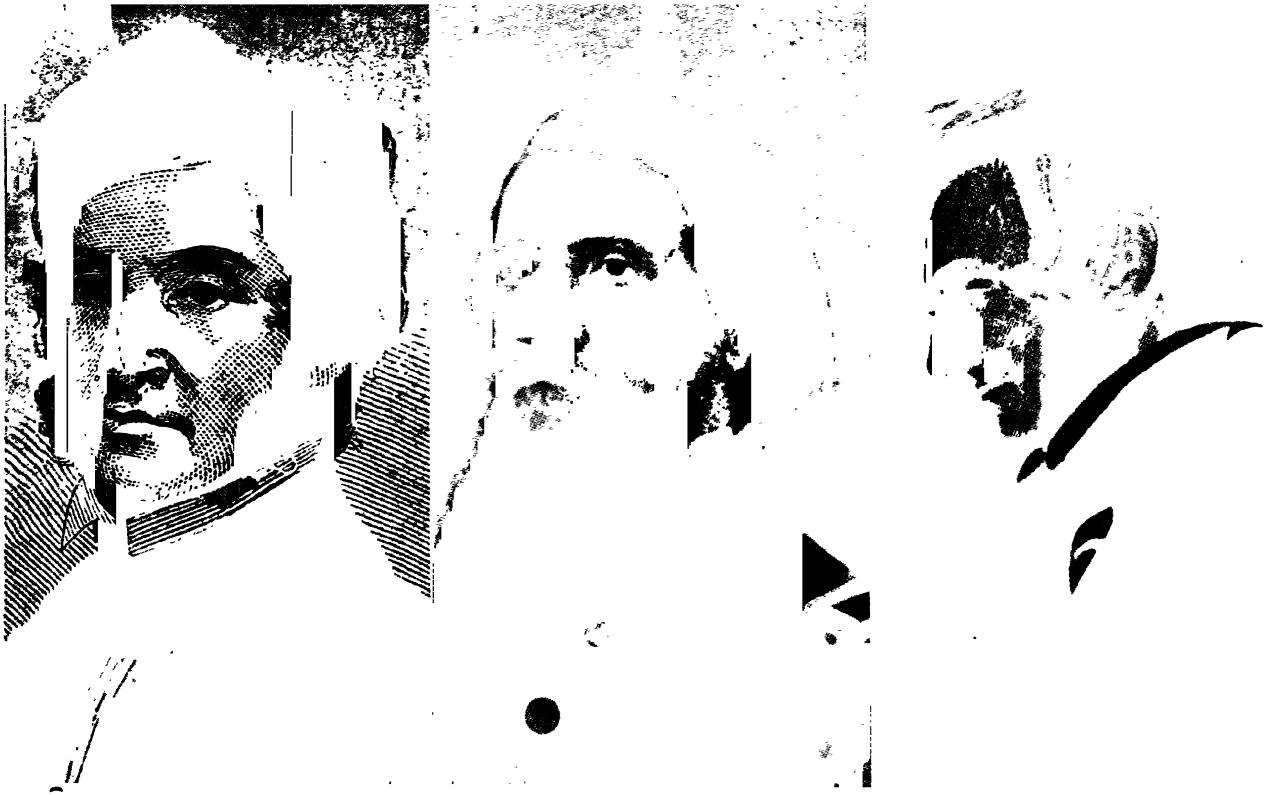


FIG. 101a.—Charles Ellet. (*From "Harper's New Monthly Magazine,"* February, 1866) Brig. Gen. Alfred W. Ellet, Commander of the Mississippi Marine Brigade. Col. Charles Ellet, Jr., Originator of the Naval Ram, who Built and Commanded the Mississippi River Ram Fleet. (*From Crandall's "History of the Ram Fleet and Marine Brigade," Society of Survivors*)

dropped down river, ironclads leading, rams in rear, and as soon as firing began, Ellet opened the "Battle of Rams." Ellet in the *Queen of the West* was accompanied by the *Monarch* and trailed by the *Lancaster* and *Switzerland*. Neither of the last two were in the battle. The *Lancaster* ran aground and the *Switzerland* misunderstood signals. The *Queen of the West* and *Monarch* came out of the smoke on the advancing Confederate rams, the *General Lovell* leading.

The *Lovell's* pilot changed her heading; she was struck amidships by the *Queen of the West* and sank. As the *Queen of the West* backed off, she was rammed by the *Beauregard,* and had to be run ashore to keep from sinking.

The *Beauregard* and *Price* then attempted to ram the *Monarch* from opposite sides, but missed and the *Beauregard* rammed the *Price* which had to be run ashore. While clearing herself from the *Price,* the *Beauregard* was rammed by the *Monarch* and at the same time struck by a shot from the *Benton,* which pierced her boiler. Thus disabled, she was towed by the *Monarch* towards the Arkansas shore where she sank. Four other Confederate rams attempted to escape but only one, the *Van Dorn,* succeeded. The *Thompson* was sunk by gun fire; the *Bragg* and *Sumter* were forced to surrender. Confederate accounts say the *Bragg* was rammed and the *Sumter* was run ashore.

By 11:00 the battle was over, Memphis under the guns of the ironclads, and the way open to Vicksburg.

These ramming conflicts in narrow waters were in the nature of mêlées with chance results. On this occasion, gun fire from the ironclads was an important factor. Some of the Confederate rams mounted 64-pounder bow guns and possibly smaller ones, but the ram was their principal weapon.

We turn now to events in the lower Mississippi, long in the making. An important part of Federal strategy was to cut the Confederacy in two by control of the Mississippi as far north as Cairo.

At the end of May 1861 the paddle frigate *Powhatan,* Commander David D. Porter, son of the famous David Porter of the *Essex,* was stationed on blockade duty off the Southwest Pass, and the screw frigate *Brooklyn,* Captain Charles Poor, off Pass a'l' Outre. The South Pass appears not to have been closely watched. In any case to chase, board, examine ships, and keep supplied with coal and provisions was beyond the capabilities of any one blockader at any pass.

Evasion of the blockade was easy. The Confederate commerce destroyer *Sumter,* Captain Raphael Semmes, escaped to sea June 30 and

many in-bound ships eluded the blockade. The Federal government decided to abandon the outside blockade and station a small squadron in the river at the head of the passes, where, though exposed to attack from up stream, nothing could move up or down without permission.

Four ships were assigned to this duty under Captain John Pope in the screw sloop of war *Richmond,* heavily armed with ten guns in her broadside, the small *Water-Witch,* a side-wheeler, and two sailing ves-



FIG. 101b.—The *Queen of the West* and the *Vicksburg. (From "Harper's New Monthly Magazine," February, 1860)*

sels, the sloop *Vincennes* and brig *Preble*—useful only for their guns and boats, a force sufficient to completely close the river.

This anchorage was neither pleasant nor healthy during the summer months, but the occupation made the blockade completely effective. No serious attempt seems to have been made by Captain Pope to keep himself informed of Confederate plans for annoying or destroying his force.

On May 21, the Confederate Congress had offered to pay to volunteers 20 per cent of the value of any Federal Government ship they might destroy.

With this incentive a company of New Orleans' citizens converted the twin screw tug boat *Enoch Train* into an armored ram mounting

in her bow one 68-pounder. The *Enoch Train* was 128 ft. long by 26 ft. beam, and 11 to 13 feet draft depending on load.

Her name was changed to *Manassas*. Her deck was completely covered by a sugar loaf shaped sheathing of 12″ of wood and 1½″ of iron. Her twin stacks were made telescopic so that they could be housed. To her bow was added a solid iron covered mass of wood 20 feet thick.

Access was through a covered hatch in the sugar loaf aft. The single gun was mounted on a sliding carriage to which the port-cover was attached. With gun and stacks housed and nothing except the pilot house aft, J. T. Scharf, the Confederate naval historian, said she resembled "half a sharply pointed eggshell."

She was commanded by Lieut. A. F. Warley, both before and after she was taken over by the Confederate Government.

Before daylight on the morning of Oct. 13, a Confederate flotilla led by the *Manassas* and accompanied by a tug with fire rafts made a surprise attack on the Federal Squadron lying quietly at anchor without pickets. The *Richmond* had a schooner along side.

The *Preble,* farthest up stream, saw a dark object driving down without any appearance of motive power. A lookout on a schooner near the *Richmond* hailed and reported "a rebel steamer coming down the river." Before any action could be taken, the *Manassas* rammed the *Richmond* at about nine knots with the current. The force of the blow, reduced by a glancing collision with the schooner, stove in the ship's side without serious results. Swinging with the current brought the ram nearly along side with a deformed bow and one engine disabled. Her future efforts were directed to stemming the current and getting in shore and up river. All Federal ships slipped their cables. The *Richmond* and *Preble* fired ineffectual broadsides in the direction of the *Manassas*. The *Vincennes* and *Preble* were ordered to proceed down the Southwest Pass. Sighting the fire rafts followed by some steamers, the *Richmond* drifted into the Southwest Pass; also the *Water-Witch*—well in the rear and clear of the fire rafts, which the wind had blown to the westward. The *Vincennes* first and *Richmond* later grounded on the bar at the mouth of the pass.

The Confederate flotilla which followed the rafts—the armed steamer *McRea* and four small gunboats—entered the pass to within gun range of the grounded ships but faced stronger batteries and after some firing returned up river. The next day the *Richmond* and *Vincennes* were at anchor outside the pass.

This affair was considered disgraceful by both Federals and Confederates—by the former because its well armed ships fled in a panic, and by the latter because its ram and fire rafts really accomplished nothing of value and the *McRea,* instead of getting to sea as a commerce destroyer, as was planned, returned up river.

The actions of Pope and his Captains—otherwise brave men—showed an unreasoning dread of the *Manassas'* powers, of which they had, no doubt, heard exaggerated accounts. Space is given to this occurrence, because it foreshadows future fears of rams and the extraordinary efforts made to destroy those which menaced Federal operations.

CHAPTER XL

U. S. CIVIL WAR *(cont'd)*

Farragut on the Mississippi 1862; Confederate Ironclads; Ironclads vs. Forts

CAPTAIN PORTER, while on blockade duty, is believed to have conceived the possibility of overcoming the river defenses which guarded New Orleans and of capturing that important city. His plan met favor in the Navy Department and with President Lincoln. Porter recommended his foster-brother, Captain David Glasgow Farragut, to command the fleet which would be necessary for this bold attempt. The Department approved and on Jan. 9, 1862, ordered Farragut to command the West Gulf Blockading Squadron with the *Hartford* as his flagship.

Captain Farragut was much senior in rank to Porter and 13 years senior in age. Born July 5, 1801, and appointed a midshipman in Dec. 1810, he had seen 50 years' service at the time he was given this important command. He was one of the senior officers of the navy, of the highest character and professional ability. Having made all possible arrangements with the Navy Department, Farragut in the sloop-of-war *Hartford* sailed from Hampton Roads, Feb. 2, 1862, for the base at Ship Island, arriving Feb. 20.

The experiences of Stringham at Hatteras Inlet and du Pont at Port Royal had shown that unarmored ships could maintain action against forts without fatal results, therefore, under fair conditions, could pass them close aboard without being destroyed.

Somewhat more than six weeks elapsed between Farragut's arrival at Ship Island and the complete assembly of his fleet at the head of the passes. Transports carrying 13,000 men under General B. F. Butler arrived in Mississippi Sound to await the results of the attack on the forts.

The heavy frigate *Colorado* was assigned to the fleet but could not be lightened enough to cross the bar at the entrance. Two others—*Pensacola* and *Mississippi*—had to take out their guns and other weights and then be assisted by tugs.

As finally assembled in the river on April 7, Farragut had in his command four heavily armed screw sloops-of-war, the *Hartford* (flag), Fleet Captain Henry H. Bell, Commander Richard Wainwright; *Pensacola,* Captain Henry W. Morris; *Brooklyn,* Captain Thomas T.

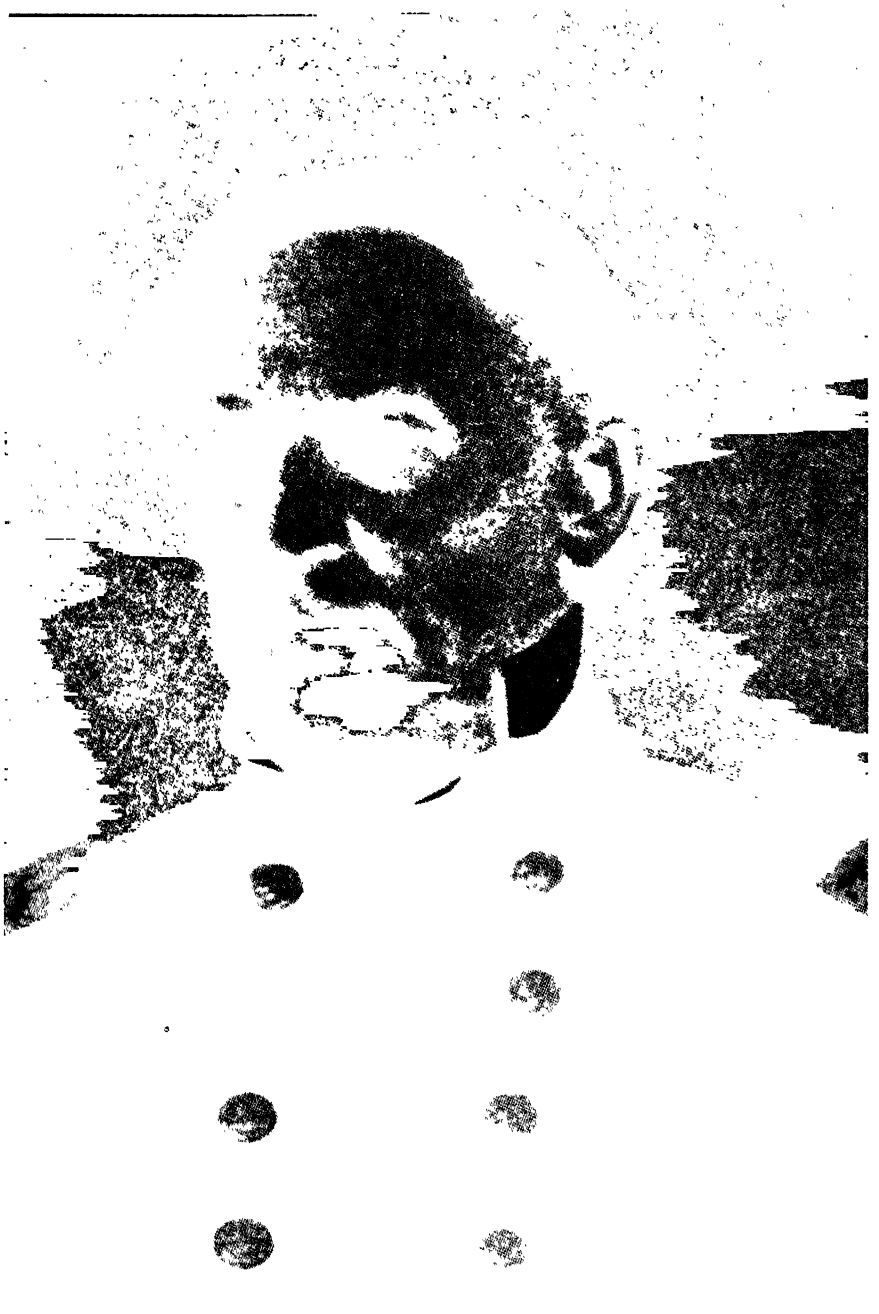


FIG. 102.—David Glasgow Farragut—the Man Who Dared. (*Copyright, "Photographic History of Civil War"*)

Craven; *Richmond,* Commander James Alden; side-wheeler *Mississippi,* Commander Melancthon Smith.

Smaller craft were the screw sloops *Oneida,* Commander S. Phillips Lee, *Varuna,* Commander Charles S. Boggs, and *Iroquois,* Commander John de Camp; the screw gunboats *Cayuga,* Lieut. Napoleon B. Harrison, *Itasca,* Lieut. C. H. Caldwell, *Katahdin,* Lieut. George H. Preble, *Kennebec,* Lieut. John H. Russell, *Kineo,* Lieut. George M. Ransom, *Pinola,* Lieut. Pierce Crosby, *Sciota,* Lieut. Edward Donaldson, *Wi-*

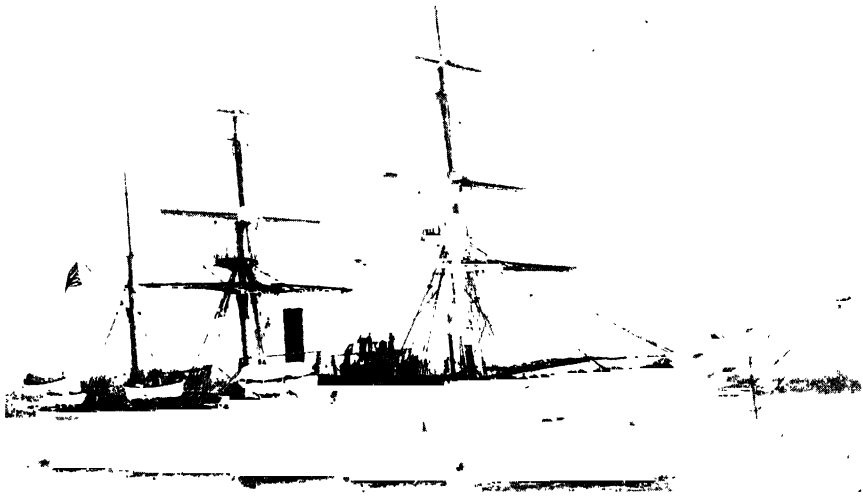


FIG. 102a.—U. S. S. *Hartford.* (*Official Photograph, U. S. Navy*)

nona, Lieut. Edward T. Nichols, *Wissahickon,* Lieut. Albert H. Smith.

These made up 17 ships with which it was proposed to attack and pass the batteries, and defeat any floating defenses the Confederates might produce.

In addition, for the purpose of bombarding the forts in preparation for the attack, there were 20 schooners, each mounting one 13-inch mortar, and 6 gunboats to tow, place, and protect the schooners. The mortar flotilla was commanded by Porter.

The *Colorado's* crew was reduced to fill vacancies in the fleet and her Captain Theodorus Bailey as senior Captain was given command of the division of sloops and gunboats detailed to head the attack. Ten days were spent in preparing the ships for the attack and placing the mortars for bombardment.

Each ship was trimmed down by the head so that, if grounded, her screw would be free to back off. Rigging and masts were stripped to topmasts, and spars were landed. Howitzers were mounted in lower tops with boiler iron protection from small arm fire. Bags of sand or coal were piled abreast of boilers and engines. Chain cables were secured out board for the same purpose. Guns and decks were whitewashed to

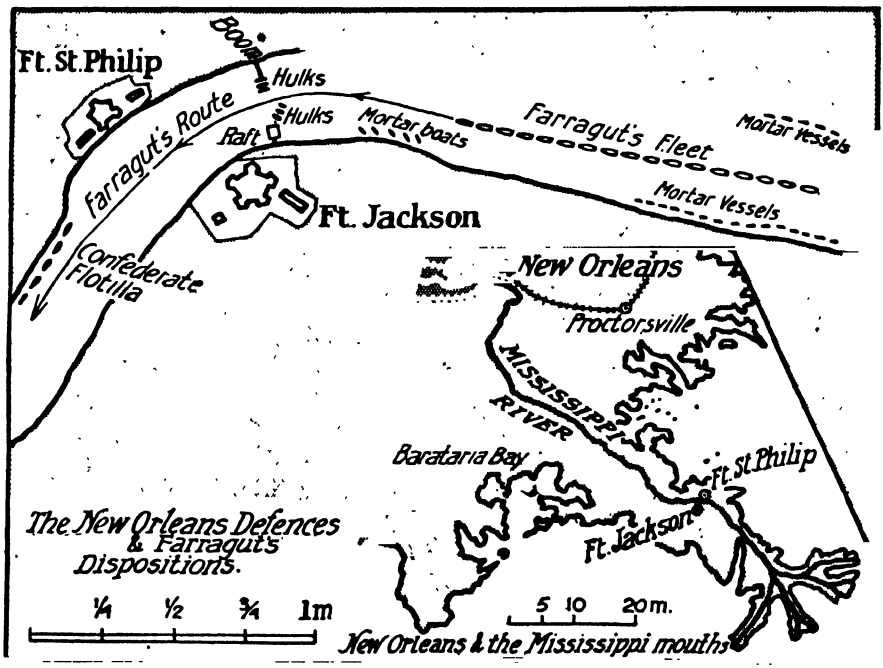


FIG. 103.—(*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

assist handling at night with dim lights. Ships' hulls were smeared with mud to decrease visibility.

When mortar boats were placed alongside the banks, limbs of trees were lashed to the schooner masts to conceal them.

The Confederate forts, Jackson on the port and St. Philip on the starboard side of the river going up, mounted with the water batteries somewhat more than 100 guns, of which about half were 24-pounders. The other half were largely 32's and 42's smooth bores, and two or more 7-inch rifles.

Fort St. Philip was up stream from Fort Jackson and less heavily armed. (See chart.)

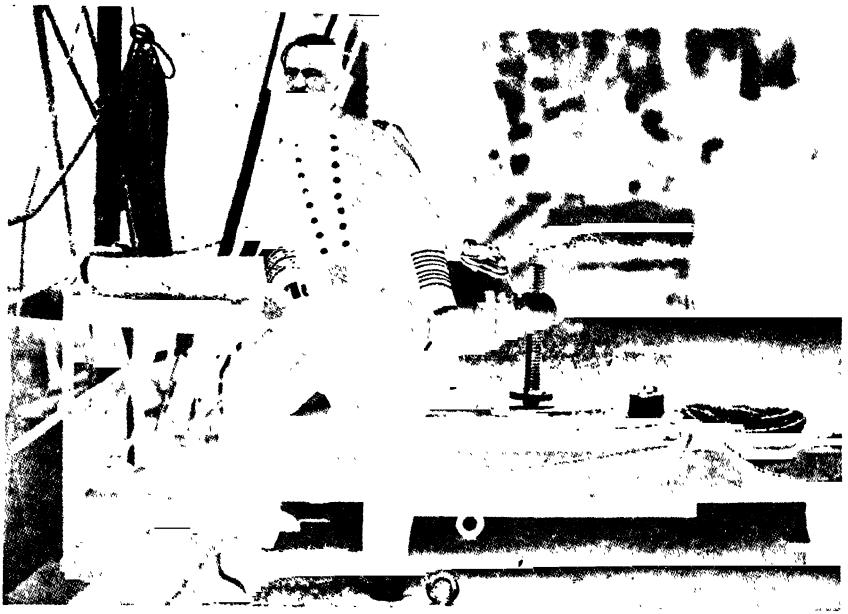


FIG. 104.—Admiral David D. Porter, whose bomb-vessels backed the fleet.



FIG. 104a.—Clearing the way—deck on one of Porter's mortar schooners.
(*Copyright, "Photographic History of Civil War"*)

To prevent or delay passage, hulks had been sunk on both sides of the river at Fort Jackson, leaving a passage between them, across which was stretched a heavy chain supported on rafts and schooners anchored in the stream. A few days before Farragut's attack, and when it was believed to be imminent, the ironclad *Louisiana,* whose engines were incomplete, was towed into position above Fort St. Philip and moored to the river bank. The *Louisiana's* broadside of eight guns was made up of rifles and smooth bores powerful enough to pierce any of Farragut's hulls with shot and shell.

In addition, a heterogeneous flotilla of steamers including the *McRea* and *Manassas,* some rams of the River Defense Flotilla, and a large number of fire rafts, were assembled well above the barrier.

The battle was opened by the mortars which at 10:00 A.M. on April 18 began firing at Fort Jackson at ranges above 3,000 yds., each mortar firing once in ten minutes, with some interruption, for six days. At the end of three days, both Farragut and Porter felt that little damage had been done, but it was decided to continue the effort.

On the night of the 20th, Lieut. Caldwell in the *Itasca,* and accompanied by Lieut. Crosby in the *Pinola,* was sent at Caldwell's request to examine the barrier and if possible break it. Mortar fire was increased to protect the gunboats. They were detected and fired upon but not hit. There were no picket boats on guard and none of the defense flotilla in the vicinity.

After several hours of thrilling and perilous work, one of the supporting hulks or schooners was dragged clear of the chain; the latter sagged; the *Itasca* got above, turned, and picking it up on her bow, with the combined stress of the current and her engine, snapped it. The way was open, and no attempt was made by the Confederates to close the break.

Signal for the fleet to advance was made at 2:00 A.M., on the 24th. By 3:30 all were under way and Captain Bailey in the *Cayuga* passing through the barrier leading a column of eight—*Cayuga, Pensacola, Mississippi, Oneida, Varuna, Katahdin, Kineo, Wissahickon.* All eight were through before the Confederates were alive to the situation. The second ship was through the gap before a shot was fired. Then fires were lighted on the other bank. The fleet and forts opened with every gun that would bear; mortar fire was increased. Rafts were towed out, fired, and guided down river by tugs to envelop the oncoming enemy. The *Manassas* dashed at the *Cayuga* with her ram. The *McRea* and Confederate gunboat *Governor Moore* joined in the attack.

Bailey led close under the guns of Fort St. Philip. The fire from his small ships and from the large *Pensacola* and *Mississippi* was so overwhelming that St. Philip's gun crews took shelter.

The *Louisiana* joined in the action as soon as her guns would bear, and some of Bailey's ships passed so close aboard her that one fouled her off-shore mooring. The *Louisiana's* captain was mortally wounded and she had other losses, but her armor was not pierced by the point blank fire of Bailey's ships. The second division of three ships, Farragut leading in the *Hartford,* reached the barrier amidst the smoke and flame. 20 minutes after the first shot was fired. All three—*Hartford, Brooklyn,* and *Richmond*—passed through safely although the *Brooklyn* collided with and nearly capsized the *Kineo* of the first division, which had been delayed.

The *Hartford* changed course to starboard to avoid a fire raft and ran aground between Fort St. Philip and the *Louisiana.* The fire raft was shoved and held against her port side by the Confederate tug *Mosher.* Paint on the ship's side took fire and flames reached the rigging. Farragut for the first time was dismayed, but all ended well. The ship's fire party held the fire in check; the pressure of the tug and the water against the raft helped the *Hartford* back clear. The brave little *Mosher* was sunk with her crew. An eddy pointed the *Hartford's* head down stream and she lost some time turning up but succeeded.

Two of the six ships of the third division, under Fleet Captain Bell, got through the barrier—the *Sciota* and *Iroquois*—leaving four below injured or unable to get through before daylight. In the meantime, the *Manassas,* missing the *Cayuga,* tried for the *Pensacola,* missed a second time, and then steered for the *Brooklyn,* which, fortunately for the latter, she struck on the chain cable. The *Brooklyn* was uninjured. The *Manassas* turned up stream still seeking a victim.

By Farragut's order the *Mississippi* turned and attempted to run her down. The *Manassas,* sheering to avoid the blow, ran aground and was abandoned by her crew.

Her captain, Lieut. Warley, said that his intention after ramming the *Brooklyn* was to attack the ships below the barrier, but both forts were still firing and would not have distinguished the *Manassas* from an enemy. This decided him to turn up stream.

Several miles above the forts, another mêlée had ended. The *Varuna* of the first division had passed the *Cayuga* after meeting the *McRea, Manassas,* and *Governor Moore.* The first two went down stream, but the *Governor Moore,* Lieut. Beverly Kennon, followed the *Varuna,*

the latter chasing fleeing river defense rams. Kennon upon overtaking the *Varuna* emulated those British captains of the 18th century who opened stern ports in their ships by the fire of their own guns. At close quarters, he fired through his own bow to reach the *Varuna*. Captain Boggs put his helm hard a-port to bring his broadside to bear; he was rammed by Kennon and his engine immediately disabled. While the *Varuna* was dead in the water, the *Governor Moore* backed off and rammed again. The *Varuna* ran ashore and while there, was rammed again by the *Stonewall Jackson*. She soon sank. Other Federal gunboats wrecked the *Governor Moore,* which ran ashore and was burned. She refused to surrender. Her losses out of a crew of 93 were 64 killed and wounded. The *Stonewall Jackson* was driven ashore.

The battle was over. Farragut was above the forts with 12 ships ready for action and the way to New Orleans open.

His losses were 35 killed and 147 wounded. J. R. Spears in his life of Farragut says that no complete statement of Confederate losses was ever compiled. Having nothing to fear, Farragut anchored his fleet to permit men and officers to rest after a sleepless night and a thrilling two hour battle.

The next day, he passed the Chalmette river batteries without difficulty, anchored his fleet off the city, and sent Captain Bailey and Lieut. George H. Perkins of the *Cayuga* ashore to demand the surrender of the city. This was refused although no armed resistance was made. A general state of panic and hysteria existed.

Farragut, however, was patient. On the 26th he sent men to hoist the Stars and Stripes over the Mint, and warned the mayor he might have to fire on the city.

On the 28th he found it necessary to land marines and seamen to restore order and stop arson, pillage, and robbery resulting from general hysterical helplessness of city officials and citizens—women and men.

In the meantime the forts, cut off from supplies and subject to further attacks, surrendered on the 28th. The *Louisiana* was blown up by her own crew the same day. Her destruction preceded by twelve days that of the *Merrimac* in similar circumstances. Federal troops under General B. F. Butler were being brought up as fast as possible. On May 1, they landed and took control of the city.

Before the attack on the forts a British and a French frigate anchored above the head of the passes to observe operations. The British frigate followed the fleet to New Orleans and anchored near the *Hartford*. The reports of these foreign observers afloat, of consuls

and others ashore, and of the French and British diplomatic representatives in Washington profoundly affected the governments of both countries and, it was believed, altered the plans of Napoleon III, who had contemplated aid for the Confederacy.

An ironclad, the *Mississippi,* larger than the *Louisiana* and nearly completed, was set on fire, burned to the water's edge, and sank as Farragut approached the city on April 25. Farragut's report read, "The levee of New Orleans was one scene of desolation—ships, steamers, cotton, coal, etc., were all in one common blaze and our ingenuity was much taxed to avoid the floating conflagration." The *Mississippi* had been afloat but six days; she was raised, taken to New York, but not commissioned.

Porter asserted that if New Orleans had been left to perfect its defenses and finish its work of offense (meaning ironclads), the result would have been to give the South command of the Southern Coast.

Farragut said, "The rebel gunboats cannot stand before ours, but what they dignify by the name of ironclad rams is an article entirely different and had they succeeded in getting any of them on the Mississippi before our arrival, it would have proved a most formidable adversary."

Two floating batteries for river defense which were building at New Orleans were also lost by its capture.

Farragut's orders required him to proceed up river to complete the cutting of the Confederacy in two. Taking into consideration the draft and length of his ships and the lack of reliable pilots, Farragut regarded such action inadvisable at that time and so stated. However, he sent up seven gunboats under Commander Lee of the *Oneida.* Lee received the surrender of Baton Rouge and Natchez, but anchored below Vicksburg, when that well-fortified city refused to surrender.

Vicksburg by the river route is 400 miles from New Orleans, Farragut's only base for coal and other supplies, but, obeying his orders, Farragut brought up his heavy ships, with 1,500 troops in transports.

He found that large Confederate forces were available at Vicksburg to prevent landing and that his ships could not reach the heavy guns mounted on the high ground above the river. He returned to New Orleans, intending to take his fleet to attack Mobile, but receiving imperative orders he returned to Vicksburg, bringing Porter with 17 mortar schooners and the steamers for handling them. After a survey of the situation and preparations which consumed eight days after his arrival,

Farragut on June 18 had the mortars placed for bombardment and his ships ready to run the batteries and join Flag-Officer Davis, who had come down the river after the "Battle of the Rams" and the surrender of Memphis on June 6.

Before daylight on June 28 Farragut got under way and approached the city. He placed the *Richmond, Hartford,* and *Brooklyn* in columns well separated, with the *Oneida, Wissahickon, Sciota, Winona, Pinola, Kennebec,* and *Katahdin* in column to port and under the lee as much as possible of the heavy ships.

Mortar bombardment began at 4:00 A.M. Forts and ships opened fire. At 6:00 Farragut was above the city with five gunboats, the *Hartford,* and the *Richmond.* The *Brooklyn* and ten gunboats failed to get past the batteries but were not lost.

It was impracticable for Farragut to achieve anything of further value except in cooperation with an army, and it was evident that the War Department was not yet ready to attack Vicksburg or to occupy Memphis and the cities that had surrendered to Farragut's gunboat flotilla.

The Confederates had laid down two ironclads at Memphis—the *Arkansas* and *Tennessee.* When the fall of Fort Pillow was imminent, the *Tennessee* was destroyed on the ways and the *Arkansas* hastily launched and towed up the Yazoo, a sluggish stream entering the Mississippi from the east not far above Vicksburg.

Under the direction of her captain, Isaac N. Brown, work on the *Arkansas* was vigorously continued at Greenwood, Miss., a town on the Yazoo about 100 miles above its mouth.

Neither Farragut nor Davis appears to have been informed of the *Arkansas'* state of completion or of her capabilities. It was known that she was in the Yazoo and that falling water might hold her there indefinitely. And for the same reason Farragut's heavy draft ships might have to remain where they were. After two weeks' waiting for orders from the Navy Department as to future operations, Farragut decided to make an effort to destroy the *Arkansas.* In the meantime, being about ready for battle, Captain Brown was meditating an attack on the Federal fleet. On July 14 he brought the *Arkansas* below the boom which barred passage in the river. The *Arkansas* had twin screws. She was designed for a speed of about 8 knots on a draft of 11.5 feet. Her casemate mounted 10 guns and was modeled after that of the *Merrimac.*

Davis was directed to send the *Carondelet,* ironclad, and *Queen of the West* and *Tyler,* rams, up the Yazoo. On the morning of July 15

the *Queen of the West,* leading, met the *Arkansas* coming out at full speed.

Brown avoided Col. Ellet's ram, drove the *Carondelet* ashore, and chased the *Tyler* out of the Yazoo in a running fight. He surprised the Federal fleet at anchor, without steam to get under way to attack, or to obstruct his movements.

Brown did not attempt to ram, but stood down river plying his guns, and hit with at least one shot every ship he passed. One hour after he came out of the Yazoo, he was safe under the guns of Vicksburg, damaged but intact, having run the gauntlet of some 20 ships and avoided the attack of the ram *Lancaster.* His loss out of a crew of 200 was 10 killed and 15 wounded. Though struck many times, his armor of railroad iron was pierced but twice. The Federal fleet's loss was 42 killed and 69 wounded.



FIG. 105.—Commander Isaac N. Brown, C.S.N. (*From Scharf's "Confederate States Navy," W. H. Shepard & Co., Atlanta*)

Admiral Farragut reported the result of the day's action "with deep mortification." He feared that the *Arkansas* would run down to New Orleans and recapture the city. He resolved to use every means to compass her destruction, and to put his fleet at once between her and New Orleans.

Getting under way in the evening, he again ran the batteries of Vicksburg with his fleet, leaving Davis' flotilla above the city. Each ship gave a broadside to the *Arkansas* in passing, but without fatal effect.

Farragut anchored below Vicksburg, and on the 16th directed mortar fire on the city, hoping to strike the *Arkansas* whose position was approximately known. However, her berth was frequently shifted without interrupting repairs. After five days, despite steady bombardment, she was partially ready for action.

Farragut and Davis now approved the offer of W. D. Porter, a brother of D. D. Porter, to destroy the *Arkansas* with the *Essex,* following a night bombardment of Vicksburg by all ships above and below the city.

The *Essex* steamed down to the attack on the morning of July 22. She was followed by Col. Ellet with the *Queen of the West.*

Steering straight for the *Arkansas* and using his bow guns, Porter managed to strike but a glancing blow which did little damage. However, one of his shot when along side pierced the *Arkansas'* armor, killing or wounding 14 men. Porter headed down stream under heavy fire and joined Farragut below the city.

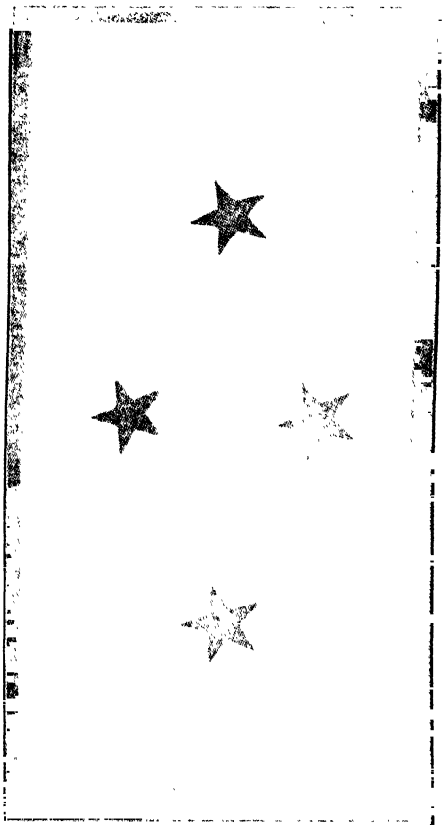


FIG. 106.—Admiral Farragut's flag. (*Courtesy U. S. Naval Academy Museum*)

Ellet, following the *Essex* in the attack, struck the *Arkansas,* backed off, and struck again without seriously injuring her. He retreated up stream with his ship nearly a wreck. The *Arkansas* was still a menace.

The Congress on July 16 had created the grade of Rear Admiral in the Navy in Farragut's honor, and at the same time honored du Pont and Davis with the new rank.

Farragut wrote that he would have given his admiral's commission, just awarded, "to have gotten up to the *Arkansas.*" But the army was not prepared to join in an attack on Vicksburg, so Farragut was ordered to return to New Orleans and Davis was sent up river. The Confederates were left in control.

Thus encouraged, they undertook to recapture Baton Rouge and planned for the *Arkansas'* aid in dispersing the ships, including the *Essex,* Farragut had sent to support the garrison. Brown was ill on shore. On the two hundred mile run down to Baton Rouge the *Arkansas'* engines failed and she ran ashore, Aug. 5. Getting off the next day, she found the *Essex* coming up to meet her. Her engines again gave trouble and she was run ashore and

set on fire, either by shell from the *Essex* or by her own crew. She blew up at ten A.M., after a lurid life of 22 days.

The next day Farragut reported, "It is one of the happiest moments of my life that I am enabled to inform the Department of the destruction of the *Arkansas;* not because I hold the ironclad in such terror, but because the community [nation] did."

The heroic Brown, sick on shore when the *Arkansas* steamed away from Vicksburg, had warned against the trip until her engines were in good order. He followed by rail and resumed command of the crew after his ship was destroyed.

The fortunes of war had decreed brief careers for the *Merrimac, Louisiana, Mississippi,* and *Arkansas.* Other Confederate ironclads were to meet the same fate. Some of them deserve mention. The *Atlanta* was smaller than the *Merrimac* but like her was based on the hull of a sea-going ship, the blockade-runner *Fingal* which had brought a large cargo of munitions into Savannah, Georgia, in November, 1861. Unable to get to sea again, the *Fingal* was re-built above the water line on the pattern of the *Merrimac* and armed with two 6-inch and two 7-inch Brooke rifles, so mounted that three could fire on either side.

She was commissioned as the *Atlanta* July 31, 1862, at which time there were no Federal ironclads in Admiral du Pont's blockading squadron, and the ships which composed it were as much concerned over her imminent appearance as Farragut had been over the *Arkansas,* about two weeks earlier. However, the main ship channel from Savannah to the sea was partially blocked by sunken hulks, and no determined attempt was made to get the *Atlanta* through this—or any other—channel, for nearly a year, by which time a number of monitors had been added to Admiral du Pont's fleet.

Finally, on June 17, 1863, Lieut. W. A. Webb, C.S.N., attempted to get to sea with the *Atlanta* via the Wilmington River channel leading into Wassaw Sound. Here du Pont had stationed the two monitors *Weehawken* and *Nahant* for just such an emergency. They mounted 15" guns and carried armor which the *Atlanta's* Brooke rifles could not pierce, while their 300-pound shells could pierce the *Atlanta's* armor.

People from Savannah came out on steamers to see the battle, fully expecting the *Atlanta* to win. Unfortunately for the *Atlanta* she grounded after a few ineffectual shots and the *Weehawken,* approaching to point blank, with five shots only pierced the *Atlanta's* armor killing and wounding her men and wrecking her pilot house. Webb surrendered. The action lasted but fifteen minutes. The *Atlanta* was raised,

repaired, commissioned, and joined the blockade in February, 1864.

Monitors had been tested against forts in the preceding months. On February 28, 1863, Captain Worden in a new monitor, the *Montauk,* destroyed the Confederate cruiser *Nashville* lying under the guns of Fort McAllister at the mouth of the Ogeechee River. The *Montauk* was impenetrable to the guns of the fort at 800 yds. On this and previous occasions she had been struck some 60 times.

On April 7, Admiral du Pont in the *New Ironsides* with the monitors *Weehawken, Passaic, Montauk, Patapsco, Catskill, Nantucket, Nahant,* and the small armored *Keokuk,* entered Charleston harbor to attack Fort Sumter. This was a daylight attack. Ships could not be maneuvered in the narrow waters with any degree of precision and although the monitors could fire on almost any bearing and only needed to be kept clear of each other, the advantage was with the forts.

Accounts state that 69 guns could be brought to bear on the ships, principally from Forts Sumter and Moultrie. The bombardment lasted an hour, during which time the ironclads fired but 139 rounds and were struck over 400 times by the guns of the forts—at ranges of from 800 to 1,000 yards. On the whole the armor was not pierced except on the *Keokuk,* where it was less than three inches thick. She drifted closer than was intended and was struck 90 times in half an hour. Her armor was riddled and she sank next day.

No other ships were permanently damaged although turrets or steering gear failed on five ships. The *Weehawken* (Captain John Rodgers) which led the attack was injured by the explosion of a mine under her bow.

Du Pont knew the harbor was mined. To clear the channel, a sort of torpedo catcher raft was pushed ahead of the *Weehawken.* The flagship, on account of her draft, had less freedom of movement than the monitors and the Confederates reported that she lay for an hour over a mine containing 3,000 pounds of gunpowder that they tried vainly to explode.

Du Pont stressed the necessity of combined operations of ships and troops against sea coast batteries. Later, he summed up the situation at that time by saying, "Ability to endure is not a sufficient element wherewith to gain victories; endurance must be accompanied with power to inflict injury upon the enemy."

Subsequent similar attacks on Charleston defenses under Admiral Dahlgren also failed, although supported by troops and landing forces of sailors and marines.

Forts Sumter and Moultrie remained in Confederate hands until near the end of the war. The defenses of Charleston were all evacuated or surrendered to the army under General Sherman and the navy under Admiral Dahlgren on Feb. 18, 1865, and several preceding days. In the meantime the *Weehawken* went down at her anchor in heavy weather off the harbor on Dec. 6, 1863. The *Patapsco* struck a mine in harbor on the night of Jan. 15, 1865, while covering mine clearing efforts. She sank so quickly that more than half of her crew of 109 were drowned.

When in battle the *Merrimac* had some smaller ships in company. The *Arkansas* and *Atlanta* fought alone. There remains one other Confederate ironclad whose life span at least was longer than any of the other three and which resisted for a time all attempts to destroy her.

This was the *Albemarle,* an ironclad whose keel was laid in a cornfield at Edward's Ferry on the Roanoke River, North Carolina, in January, 1863. Above water the *Albemarle* resembled the *Merrimac,* but she had a barge (flat-bottomed) instead of a ship hull. She was 122 ft. long, 45 ft. beam, 8 ft. draft, with twin screws, casemate 60 ft. long covered by 4 inches of railroad iron backed by 10 inches of wood. For armament she had two 100-pdr. rifles mounted so that one could fire forward or on either beam, the other aft or on either beam.

The Federals had obtained control of Albemarle and Pimlico Sounds early in the war. It was this control which forced the Confederate evacuation of Norfolk and the destruction of the *Merrimac* in May, 1862. The Sounds were patrolled by shallow draft gunboats, heavily armed but not armored, with the exception of the little iron-hulled and armored *Naugatuck,* 110 ft. long by 20 ft. beam, with twin screw, semi-submersible, built by Col. John Stevens' sons and presented to the Government. It does not appear to what extent Federal troops controlled the country inland. Edward's Ferry was some 80 miles up river. During the year that the *Albemarle* was building, several requests were made to the War Department to destroy her on the ways but no steps were taken to do so. The fort and the town of Plymouth, near the mouth of the Roanoke, were occupied by Federal troops. A line of piles across the river was driven to prevent passage.

When word was received that the *Albemarle* was approaching completion, two gunboats, *Southfield* and *Miami,* were anchored one on each side of the channel with a chain supported between their bows.

Should the *Albemarle* get through the line of piles, it was expected that her bow would pick up the chain and the pull on this would bring the gunboats close alongside, where their heavy shot and shell could

smash through her armor. Each mounted a 100-pdr. rifle and several 9-inch Dahlgrens.

From the time her keel was laid until she came into action, the *Albemarle* was under the superintendence and then under the command of Lieut. J. W. Cooke, C.S.N. Her rate of building was slow on account of scarcity of materials. Her keel was laid in Jan., 1863, but she was not launched until April 1, 1864. She went into action 18 days after taking the water.

Coming down river on the 19th, high water carried her over the pile obstruction. She ran past Plymouth, steered directly for the *Southfield,* rammed and sank her. The *Miami* may have been drawn alongside; in any case her captain, C. W. Flusser, was killed by the rebound of a fragment of one of his own shells from the side of the *Albemarle.* His ship was badly injured. The *Albemarle* was out and master of the Sounds. Her movement had been concerted with Confederate land forces. These attacked Plymouth April 16 and forced its surrender on the 20th. Captain Cooke then had a base from which to operate. The Federals, on urgent orders from the Navy Department, called all their forces to bottle up or destroy the new menace.

Under the command of Captain Melancthon Smith, eight gunboats were assembled off the mouth of the Roanoke prepared to attack the *Albemarle* or to mine the mouth of the river.

Cooke came out May 5 with his two-gun armored craft to meet Smith's squadron, which was formed for the attack in two columns of four each: *Mattabesett* (flag), *Sassacus, Wyalusing,* and *Whitehead; Miami, Ceres, Commodore Hull,* and *Seymour.*

Four of these were large double-enders. Three of the double-enders each mounted two 100-pdr. Parrotts and four 9-inch Dahlgrens. The squadron carried eight 100-pdrs., eighteen 9-inch, and numerous smaller guns.

Smith had plans to ram, to board, or to torpedo the *Albemarle,* in addition to exerting the power of his guns at short range. Cooke's first movement was an abortive attempt to ram Smith's flagship, leading the starboard column, while all guns that would bear were concentrated on his ship.

Firing ceased for the time required for the *Miami,* leading the port column, to attack with a spar torpedo. This attempt failed also. The *Sassacus* then rammed the *Albemarle* abaft the casemate, but only injured herself. The *Mattabesett* tried to foul her propellers with a seine. After a mêlée of several hours, the *Albemarle* upon the approach of darkness

withdrew into the river, having sustained without serious injury between 150 and 200 rounds from each class of heavy guns. One of her two guns was disabled and her smokestack was pierced, which cut down her speed.

Foiled in his attempts to disable, capture, or sink his enemy, Smith mined the river entrance and stationed a guard-ship to oppose any attempt to clear it.

The *Albemarle* came down on May 24 and caused the guard-ship *Wyalusing* to withdraw, but apparently did not clear the mine field. She returned to Plymouth, where a bold attempt to destroy her was made the same night by volunteers from the *Wyalusing*. They carried two 100-lb. torpedoes and exploding gear to a point above the ironclad on the opposite (north) side of the river, then swam across with a line, hauled the torpedoes across, tied them together with a long bridle and an electric cable, and guided them down river, hoping the bridle would foul the ironclad's bow and the current would pull the torpedoes alongside where they could be exploded electrically. Charles Baldwin and John W. Lloyd swam the river. Baldwin drifted down with the bridle to guide it across the *Albemarle's* bow, while Lloyd paid out the line and cable. Baldwin was sighted and fired upon just before he reached the ship. Lloyd cut the cable, swam to the north side, and escaped with his companions. Baldwin and Allen Crawford, fireman, who was to explode the torpedoes, also re-appeared after four days in the woods and swamps eluding searchers.

Cooke was promoted and ordered to other duty. His successor was Lieut. A. F. Warley, of *Manassas* fame.

The *Albemarle* was now surrounded by double booms at her Plymouth moorings. Scharf, the Confederate historian, says that no attempt to move her was ever made and no explanation ever offered for her inactivity except that she was waiting for the completion of another ironclad building on the Tar River, which runs into Pimlico Sound.

The Federal government was still much concerned. Special torpedo launches were built in New York for the express purpose of attacking the *Albemarle* and other Confederate ironclads. One of these reached Albemarle Sound in October, brought from Norfolk by Lieut. W. B. Cushing, who requested and received permission to attack the *Albemarle* with the launch, which carried a spar torpedo.

The Confederate river picket post was on the wreck of the *Southfield*, a mile down river from the *Albemarle*. On the night of Oct. 28 Cushing towed an armed boat to attack the post while he speeded up the river

to attack the *Albemarle*. He passed undetected and arrived off his victim without an alarm being given. Here he was dismayed to find that the boom was farther from the side of the ram than the length of the spar carrying his torpedo. He was also seen from the ram. Without hesitating, he turned away, far enough to get up speed, then turned again for the boom under fire. His launch rode over it. His torpedo went under the ship, exploded when he pressed the key, and opened a hole in her bottom. The water wave from the explosion swamped the launch and all hands went overboard, while the cutter was pulling away down the river. The *Albemarle* sank. Two of Cushing's crew were drowned. He and one other escaped. Eleven were captured. Cushing swam away down stream, landed in the swamp, hid during the day, found a boat in the evening, and rowed off to the *Valley City,* a small Federal gunboat.



FIG. 107.—Lieutenant Cushing in 1864. (*From "The Navy," June, 1913*)

The feeling of relief in Washington was keen. The Secretary of the Navy wrote a special letter of commendation in which he stated that this was the fifth time the Navy Department had had occasion to express approbation of Cushing's conduct. He was then twenty-one. He died ten years later. The fame of his exploits endures.

The *Albemarle* was raised and towed to Norfolk, but not commissioned.

CHAPTER XLI

U. S. CIVIL WAR *(cont'd)*

Battle of Mobile Bay; Mines and Torpedoes; Federal Ironclads

ADMIRAL FRANKLIN BUCHANAN, after recovering from the wound received during the first day's battle in the *Merrimac,* was for a time stationed at Richmond, the Confederate capital, as the senior Confederate naval officer and adviser to Secretary Mallory. Towards the end of that year, (1862) he was given command of naval forces based on Mobile Bay.

A Federal attack in force was expected, in order to capture Mobile and completely close the port. Farragut had recommended this after the capture of New Orleans, but except for a fairly close blockade, more than two years elapsed before his plans were fulfilled.

By June, 1863, Buchanan had a small squadron in commission and was building gunboats and ironclads, not only in Mobile, but well inland on the Alabama River at Selma and Montgomery, 200 miles from the sea.

The most important of the Confederate craft was the armored ram *Tennessee 2nd,* laid down at Selma in the fall of 1863, completed in March 1864, and with great difficulty—using pontoons to lighten her draft—brought down to Mobile.

On a draft of 14 feet, beam of 48 feet, and length of 209 feet, the *Tennessee* carried on her sides and casemate, respectively, five and six inches of iron armor, heavily backed by wood. She mounted two 7-inch and four 6-inch Brooke rifles, four of which could be fired on either side.

She arrived at Mobile ready for service on May 18, 1864. Buchanan came on board, hoisted his flag, and stood down to Fort Morgan which guarded the main ship channel. His intention was to make a surprise attack that night on the blockading ships, none of which was armored. When in water deeper than his normal draft, Buchanan cast off the pontoons, but he later grounded near the fort at low tide and did not get off until too late to attack that night.

No explanation has been offered, or reason given, why Buchanan never took his flagship to sea. The most important part of his plan was to capture Fort Pickens and re-open Pensacola Bay to Confederate

shipping and then proceed north around Florida or up the Mississippi to New Orleans. He may have felt that he needed a faster consort to second the six-knot *Tennessee.* This might have been the *Nashville,* an armored side-wheeler, considerably larger than the *Tennessee,* built at Montgomery and brought to Mobile, but not completed. Or it may have been that he believed Farragut, who was off the port when the *Tennessee* arrived, had mined the seaward end of the main ship channel, making egress, as well as ingress, dangerous.



FIG. 108.—The Confederate Ironclad Ram *Tennessee.* (*Copyright, "Photographic History of Civil War"*)

Whatever the cause, Buchanan remained inside of Fort Morgan for more than two months, drilling his crew and perfecting the staking and mining of the water between Fort Gaines to the westward, and Fort Morgan, with the exception of a 300 foot channel, close under the guns of the latter.

These two months were utilized by Farragut in getting his squadron re-enforced by ironclads and obtaining troops to invest both forts by land.

Exaggerated reports of the size, invulnerability, speed, and offensive power of the *Tennessee* pervaded the North to an equal—if not greater—extent than had been produced, first by the *Merrimac,* and afterward by the *Louisiana, Mississippi, Atlanta,* and *Albemarle.*

Farragut determined to run past Fort Morgan by daylight and to attack the *Tennessee* in the bay. His experience in action against forts was already unique and extensive. He had successfully run by Forts Jackson and St. Philip without losing an important ship. He had twice passed the Vicksburg batteries without serious losses. Only at Port

Hudson had he failed; getting by with but one vessel, his flagship, and losing the *Mississippi.*

The failure at Port Hudson was, in part, due to the more than right-angled turn which had to be made under fire and at night. He had taken the precaution to secure a gunboat to the port side of each of his large screw ships for the Port Hudson effort, to increase the chance of keeping propelling power, but the *Mississippi's* side-wheels had prevented lashing another ship alongside to assist her in turning.

Farragut determined to attack Mobile in daylight and to send in his wooden ships lashed together in pairs. The weaker ships were lashed on the side away from Fort Morgan, and the stronger ones, which must pass close aboard the fort, were protected by every available means—sand-bags and coal in-board, and anchor chains over side, abreast the engines.

The last of four monitors assigned to his fleet—the *Tecumseh* arrived August 4. Farragut attacked the next day.

The *Tecumseh* and a sister-ship, the *Manhattan,* mounted two 15-inch guns in a single turret. The *Chickasaw* and *Winnebago,* lighter craft, double-turreted monitors brought from the Mississippi, mounted two 11-inch in each turret.

The division of four monitors, the *Tecumseh* leading, was formed for the attack a little ahead of the squadron of seven pairs of wooden ships, led by the *Brooklyn,* with the *Hartford* (flag) second in column.

The ships, position of each in formation, and their captains were:

1. *Tecumseh* ..... Captain T. A. M. Craven.
2. *Manhattan* ..... Commander J. A. Nicholson.
3. *Winnebago* ..... Commander Thomas H. Stevens.
4. *Chickasaw* ..... Lieutenant Commander George H. Perkins.
5. *Brooklyn* ..... Captain James Alden
6. *Octorara* ..... Lieutenant Commander Charles A. Greene.
7. *Hartford* ..... Rear Admiral D. G. Farragut.
   Captain Percival Drayton.
8. *Metacomet* ..... Lieutenant Commander James E. Jouett.
9. *Richmond* ..... Captain Thornton Jenkins.
10. *Port Royal* ..... Lieutenant Commander Bancroft Gherardi.
11. *Lackawanna* ..... Captain John B. Marchand.
12. *Seminole* ..... Lieutenant Commander Edward Donaldson.
13. *Monongahela* ..... Commander James Strong.
14. *Kennebec* ..... Lieutenant Commander W. P. McCann.
15. *Ossipee* ..... Commander William P. LeRoy.
16. *Itasca* ..... Lieutenant Commander George Brown.
17. *Oneida* ..... Commander J. R. Mullaney.
18. *Galena* ..... Lieutenant Commander Clark H. Wells.

The description of the Battle of Mobile Bay which follows is based on the narrative of one of the participants, the late Admiral Charles Clark, U.S.N., as found in his *Fifty Years in the Navy*. Clark was an ensign in the *Ossipee*, 15th ship in the attacking column.

On the morning of August 5, the tide was running flood and there was a westerly wind which would carry smoke into Fort Morgan. Making the signal to get under way at 5.30 A.M., Farragut's battle line was formed and in motion at 6.35, and at that moment, the *Tecumseh*, the ship at the head of the leading (monitor) division, opened fire.

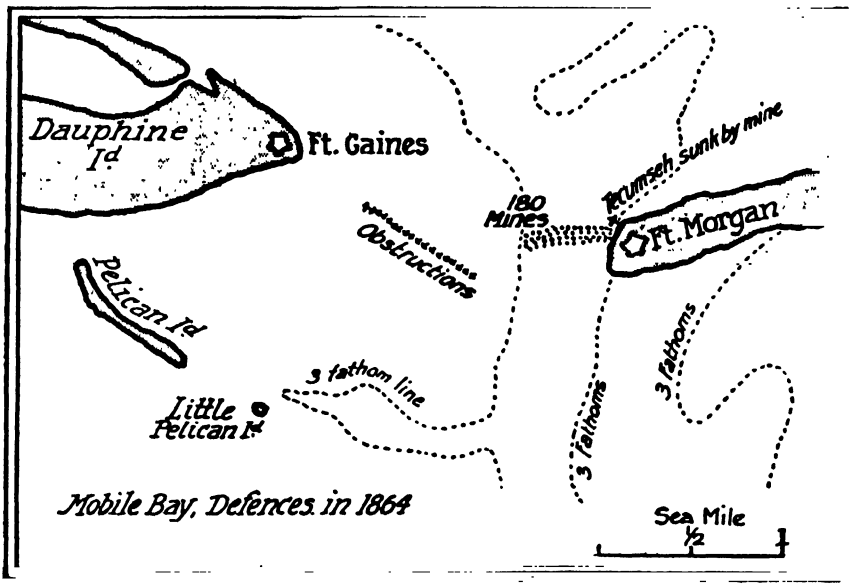


FIG. 108a.—(*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

General Page, in command at Fort Morgan, formerly a naval officer, withheld his fire for ten minutes, and then opened on the *Brooklyn*, leading the wooden ship squadron. The *Brooklyn* at once returned the fire and five minutes later the *Hartford's* guns came into action.

Admiral Buchanan, in the *Tennessee*, took station on the east side of the channel, inside the fort and mine field, with his head to the westward. The *Tennessee* was supported by three gunboats, *Morgan*, *Gaines*, and *Selma*, also on the east side of the channel and in position to rake incoming ships.

There was little room to maneuver in this part of the bay. Ships enter-

ing had to steer close under the guns of the fort to avoid the mine field and then bear to port to keep in the channel. The fort and all ships fired every gun that would bear, except the *Tecumseh,* which reserved its second salvo for the *Tennessee* and also intended to ram.

Farragut's vision from the *Hartford's* deck being obscured by smoke, he took a position in the port main rigging, under the top, whence he could see the fort, his own fleet, and the Confederate ships. As his monitors could make but seven knots, the *Brooklyn* and the ships following her closed up on them. It was at this time that the *Tecumseh,* which was close in shore, found the *Tennessee* a little on her port bow, and forgetting or ignoring the buoys marking the mine field, steered over them. One, or more, of the mines exploded and she sank almost immediately with the loss of nearly all on board, including her captain.



FIG. 109.—Quartermaster Knowles, who lashed Farragut in the rigging at the Battle of Mobile Bay. (*Copyright, "Photographic History of Civil War"*)

The *Brooklyn* at once stopped and backed her engines, with the result that the *Octorara,* still going ahead, threw the *Brooklyn,* bow to starboard, across the channel and towards the *Winnebago* and *Chickasaw,* which she had overtaken.

The channel was blocked. The *Hartford* and ships astern crowded up. Farragut hailed Captain Alden, "What's the trouble?" The reply came, "Torpedoes!" "Damn the torpedoes!" shouted Farragut. "Go ahead!" With the *Hartford's* helm to starboard, he passed under the *Brooklyn's* stern, ordered full speed, and steamed across the mine field where the *Tecumseh* had just struck, followed by the rest of his fleet, including the *Brooklyn.*

Buchanan tried to ram the *Hartford* as she passed, but failed, as did like attempts on some other ships, except the *Monongahela,* which was struck a glancing blow that did no damage. The Confederate gunboats retreated up the bay. One was captured, one had to be run ashore and burned, and one escaped. The *Tennessee* anchored near the fort, uninjured, although every one of her opponents had attacked her at close range.

Several miles above the fort there was a maneuvering area of deep water. Here Farragut anchored the *Hartford* at 8.30 and sent his men to breakfast; the other ships doing likewise as they came up. All had received injuries, notably the *Hartford* which had many men killed and wounded, but all (except the *Oneida* which was disabled by a shot through a boiler) were under their own power.

While Farragut and his flag captain were planning another attack on the *Tennessee,* she was reported as being under way and steaming towards his fleet. He at once signaled his heaviest ships to attack with guns and to ram at full speed. During the mêlée which ensued, Buchanan's leg was broken by a bolt from a port shutter which had been struck by a shell from the *Chickasaw.* His ship was rammed by the *Monongahela,* by the *Lackawanna,* and by the *Hartford.* Her armor was pierced for the first time by a shot from the *Manhattan's* 15-inch gun, fired with a charge of 60 pounds of powder. Her smoke-stack was shot away as well as her rudder-chains. She could neither steam nor steer.

The *Hartford* and *Ossipee* were in position and approaching to ram, when the *Tennessee's* captain, J. D. Johnston, surrendered her to Commander Le Roy of the *Ossipee,* which unable to check its way had lightly collided with her. The *Tennessee* was making water and three of her guns could not be fired on account of jammed port shutters. Farragut's losses were 52 killed, 170 wounded, 120 drowned. The *Tennessee's* loss was but 2 killed and 10 wounded. The fire from Fort Morgan caused most injury to Farragut's men and ships.

The *Tennessee* was repaired in time to help the Union fleet in the bombardment of August 23, which, combined with the attack by the troops under General Granger, resulted in the surrender of Fort Morgan.

Practically uninjured by Farragut's first attack, Buchanan could have gone to sea, but slow as they were, the *Manhattan, Winnebago,* and *Chickasaw* were faster by a knot than the *Tennessee,* and at least as seaworthy. In his report, Buchanan said he had coal for but six hours'

steaming. He does not mention any accessible source of supply. He could not go anywhere in the bay where the monitors could not follow. They were as invulnerable to his shot as his ships was to theirs, while their projectiles outweighed his. They had ten guns to his six and eventually would pound his ship to pieces.

Fort Morgan would be invested by land and sea, and as the Federal monitors were invulnerable to its guns, it would eventually fall. Without pontoons to decrease his draft, he could not return to Mobile. With these hard facts to face, Buchanan could think of nothing but to attack again and do all the damage possible before being captured or destroyed.

After the surrender of Forts Morgan and Gaines, Farragut cleared the main ship channel of mines, sweeping up 21 successfully, but losing one man killed and 13 wounded in a boat's crew when one exploded.

After the battle, which he considered the most desperate he had fought since the days of the old *Essex,* Farragut occupied the bay with a considerable squadron, but made no attempt to capture the city of Mobile until the following year.

The battles with the *Albemarle* and *Tennessee* showed that the invulnerability of ironclads extended to ramming—at least by wooden ships. European nations were confirmed in their practice of combining armor with the ram in major construction.

The *Tennessee* was taken to New Orleans and sold there in 1867. Her active life in the Confederacy covered but 78 days.

It can fairly be said that the *Atlanta* and *Tennessee* were entirely ready for the actions in which they were lost. On the other hand the *Merrimac, Louisiana, Arkansas,* and *Albemarle*—especially the last two—might have achieved more by longer preparation. But time pressed; they felt they could not wait. Four days more for the *Louisiana* at New Orleans might have enabled her to steam to meet Farragut when he reached the city.

As the weaker power, the Confederates soon turned to underwater devices—mines and torpedoes to hamper, deter, and destroy their opponents. Mines were then called torpedoes. Attempts were made to use them early in the war.

In October, 1862, a Torpedo Bureau was established in Richmond and a Naval Submarine Battery under the command of Captain M. F. Maury was organized. Maury was soon succeeded in command by Lieutenant Hunter Davidson. Torpedo stations were established at Richmond, Wilmington, Charleston, Savannah, and Mobile, with sub-stations at other points, especially on the Mississippi.

The *Atlanta* was the first ship to be fitted with a spar torpedo. The use of anchored mines, electrically fired from shore positions, was extended, especially for harbor defense. Some of the mines laid contained as much as a ton of powder.

Small craft to carry spar torpedoes, as distinguished from mines, were built in several ports, notably Mobile, Charleston, and Richmond.

On October 5, 1863, off Charleston, one of these *Davids,* as they were called, exploded a torpedo in contact with the hull of the *New Ironsides,* near the stern, about three feet below the water-line. The charge—65 pounds of powder—exploded against four and one half inches of armor, backed by 27 inches of wood. The damage was not vital, but started leaks which forced the withdrawal of the ship for repairs.

A few months later, February 17, 1864, off the same port, the screw sloop-of-war *Housatonic* sank in four minutes after being struck nearly amidships by a spar torpedo, rigged out from the bow of the submersible *H. L. Hunley.*

The *Hunley* was built as a hand-operated submarine, intended to dive under a ship and explode a towed torpedo against the hull. Four crews had been lost in experimental trials.

On this occasion permission to use her was granted only on condition that she be operated on the surface, with a spar torpedo. Her commanding officer was Lieutenant G. E. Dixon of the 1st Alabama Infantry, She carried a volunteer crew of five seamen and one artillery officer. Although she sank the *Housatonic,* the *Hunley* also sank with all on board. The Federals built two torpedo boats, *Mystic* and *Spuyten Duyvil,* but they never saw service.

Admiral Buchanan had been especially active in planning mine defenses for Mobile Bay, both fixed and floating. Other demonstrations of their destructive possibilities had occurred, but the sinking of the *Tecumseh* in thirty seconds was a catastrophe of nation-wide importance and was soon followed by the sinking of the *Albemarle.*

Subsequently the Federal squadron in Mobile Bay lost a troop transport, five gunboats, and two monitors (*Osage* and *Milwaukee*) from contact with mines, fixed or floating.

In all, Federal losses from mines and torpedoes were: one sloop of war, six monitors, and nine transports. Thirteen gunboats were seriously injured or destroyed. One ironclad and one frigate were injured.

The full record of both Federals and Confederates in ironclad construction is valuable enough to be summed up here, largely because of the effect on the ships built by other countries and the battle tactics prescribed.

From the start both Governments were thoroughly alive to the possibilities of ironclads. Secretary Welles, in December, 1861, urged Congress to provide funds for twenty, in addition to the three, *New Ironsides, Galena, Monitor,* then building.

Secretary Mallory had not only undertaken the conversion of the *Merrimac* but had started building ironclads in other southern ports. In January, 1862, having neither sufficient shops, tools, nor materials,

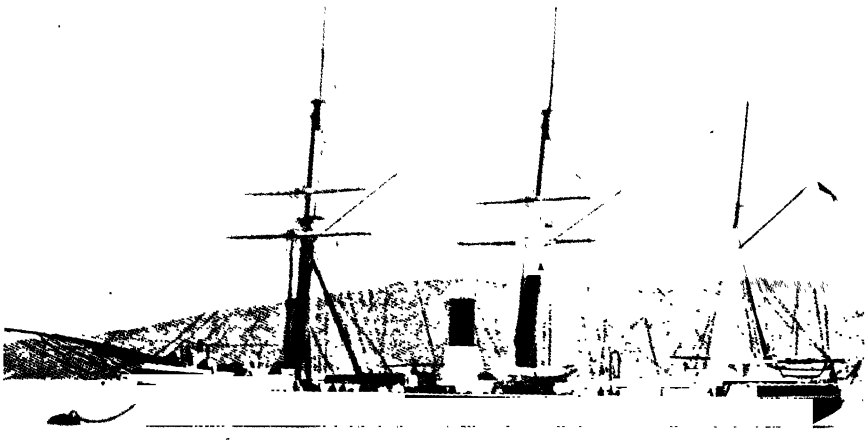


FIG. 110.—H. M. S. *Wivern,* one of the Laird rams. (*Imperial War Museum Photograph. Copyright Reserved*)

he determined to supplement the South's meager shipbuilding facilities by obtaining ironclads abroad. For the purpose he had a most efficient naval agent, Captain James D. Bulloch, a former naval officer.

In March, 1862, Bulloch made a contract with the firm of John Laird of Birkenhead, England, for two double-turreted monitors, nationally and internationally known as the "Laird rams."

It can be fairly said that Bulloch and Laird's design was in advance of any yet adopted. It incorporated the best features of ironclads being built in France, England, and America. The designed displacement, slightly less than 3,000 tons, made them smaller than the *Gloire* (French), *Warrior* (English), *New Ironsides* (Federal), *Merrimac* (Confederate), but considerably larger than the *Monitor*. Other particulars were: length 230 ft., beam 42 ft., draft 16 ft., speed 10½ knots, armor belt 4″ extending from stem to stern, stem designed for ramming. Turret armor was 5″, as compared with the *Monitor's* eight 1-inch plates.

Each turret mounted two 9″ rifles, as compared with the first monitors' 11″ and later monitors' 15″ smooth-bores. The turret weight was taken on deck rollers. This was a decided improvement.

One ram was due for delivery in March, the other in May, 1863. These dates could have been met and the Confederate hopes of raising the blockade might have been realized. The rams were actually completed, but as the result of vigorous protest by the Federal government, they were not permitted to sail. Instead they were seized and taken into

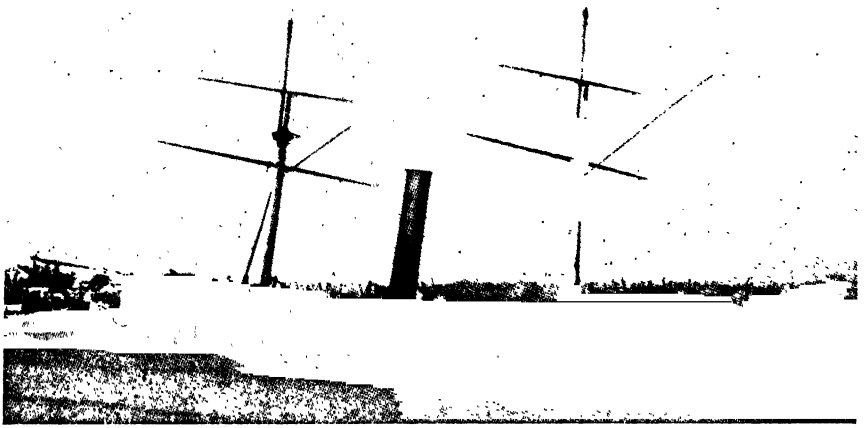


FIG. 111.—The *Stonewall,* a dread Confederate Destroyer. (*Copyright, "Photographic History of Civil War"*)

the British Navy. As the *Scorpion* and *Wivern,* they were on the British navy list until the end of the century.

Another ram, built for Bulloch in France, also made history. This was the *Stonewall.* She was of 1,300 tons, wooden hull, twin screws, 13 knots speed, four inches of armor. A long ram (see photograph) was part of the ship's structure. Her guns were one 300-pdr. and two 150-pdr. Armstrong rifles.

The *Stonewall* had had one actual and one fictitious owner before she hoisted the Confederate flag under the command of Captain Thomas J. Page, C.S.N., off Quiberon, France, January 24, 1865.

Confederate hopes, which fell after the successive destruction of each of her ironclads and which were dashed by the seizure of the "Laird rams," rose again with possession of the *Stonewall.*

Her construction in France had been made the subject of vigorous

protest by the Federal Government. It was believed that she might successfully challenge Federal supremacy on the Atlantic coast. Two ships both heavily armed, the *Niagara* and *Sacramento,* were sent to watch her movements and bring her to action.

Early in February Page put into Ferrol, Spain, to repair a leak. The *Niagara* and *Sacramento* put into Corunna, nine miles distant. On March 24 Page came out and showed himself off Corunna practically challenging the enemy to come out and fight; but the Federal ships made no move. Page sailed first to Lisbon, and thence to Nassau in the Bahamas, where he learned that the war was over. He then took the

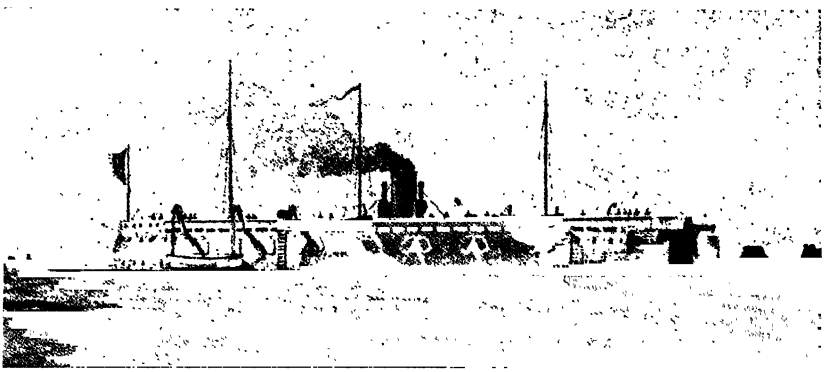


FIG. 111a.—United States Steamer *New Ironsides.* Showing the vessel as she appeared off Charleston, S.C. (*Courtesy Office of Naval Records and Library*)

Stonewall to Havana and surrendered her to the Governor, who in turn delivered her to the Federal Government by which she was later sold to Japan.

The *Niagara* was the most heavily armed of any Federal frigate—in fact of any frigate afloat—mounting twelve 11-inch Dahlgren guns. The *Sacramento* also mounted two 11-inch Dahlgrens and one 150 pdr. rifle, in addition to 9-inch guns. The 11-inch, with a charge of 30 lbs. of powder then permitted, would have pierced the *Stonewall's* armor. The *Stonewall's* twin screws, her speed, and her ram were her only real advantages. The two heavily armed Federal ships could have met her on more than equal terms. Captain Craven's only defense was that he deemed it imprudent to risk wooden ships against an ironclad ram. The history of the *Stonewall* is important as showing how even officers of proved courage were, as in this case, so convinced of the futility of attacking ironclads that action was deliberately avoided and Page permitted to go on his way.

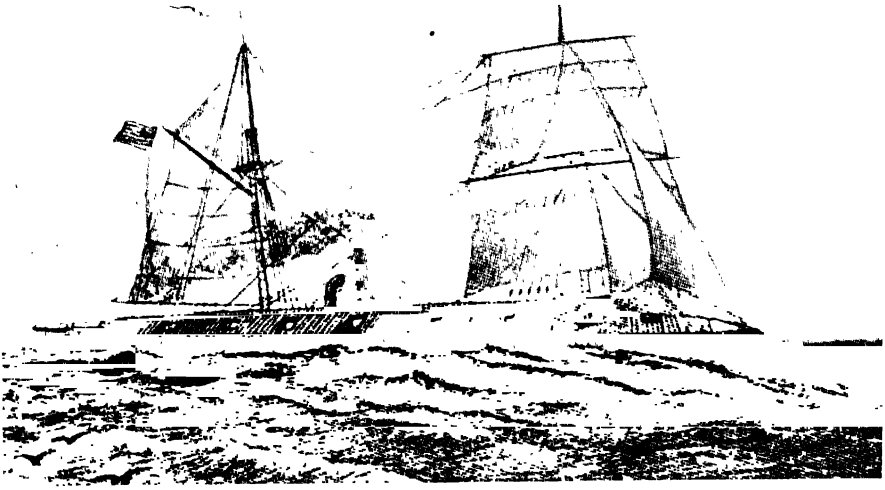


FIG. 111b.—U. S. S. *Dunderberg*. (*From Bennett's "The Steam Navy of the United States." Copyright Frank M. Bennett*)



FIG. 111c.—United States Steamer *Onondaga*. (*Courtesy Office of Naval Records and Library*)

During the war the Federal Government laid down in all some 74 armored ships, of which 61 were of the monitor type. Ericsson for a time strongly opposed two turrets, but some double-turreted ships were built to match the "Laird rams," and the *Roanoke,* sister ship and victim of the *Merrimac,* was cut down and given three turrets.

The *New Ironsides* sustained some 400 hits without serious injury during the actions against the Charleston fort and Fort Fisher. In service until after the war, she was lost by fire in 1866.

Another casemate ship, the *Dundcrberg,* was of nearly twice the *Ironsides'* tonnage and of greater speed and heavier armor, but no heavier battery. She was laid down in 1862 but not completed in time to be of any war service. She was sold to France after the war. She mounted 15″ guns but her battery was in weight of broadside lighter than that of the *New Ironsides.* Her strength was believed to be in her speed of 15 knots and her enormous 50-foot ram, the influence of which was evident in French naval design for several decades. France also purchased the large double turreted monitor *Onondaga.*

Many ironclads other than those described were built in the Confederacy. Not less than 32 inclined casemate armored ships, resembling the *Merrimac* in their arrangement of guns and armor but of much lighter draft, were laid down in the ports and rivers of Virginia, North and South Carolina, Georgia, Alabama, Louisiana, and Tennessee.

The ironclads of both sides—especially those here described—were internationally known. Their existence had a greater effect on the public at large and on naval thought than their actual value warranted. But consideration of their potentialities had the result of making the ram an essential part of the design of every armored and many unarmored ships throughout the world, in the succeeding forty years.

How best to employ the ram became the dominant problem of naval tactics.

CHAPTER XLII

BATTLE OF LISSA; TACTICAL DEVELOPMENTS POST CIVIL WAR

In 1866, about a year after the end of civil war in the United States, war broke out between the two principal naval powers in the Eastern Mediterranean—Austria and a partially reunited Italy.

Italy had 10 ironclads of above 3,000 tons, 8 of the ten with iron hulls. The two wooden-hulled ships were United States built, of 6,000 tons and carrying 7″ of side armor. Both mounted heavy batteries of Armstrong rifles: The *Ré d'Italia,* two 8″ and thirty 6″, the *Ré de Portogallo,* two 10″ and twenty 6″. Five of the 10 ironclads carried the almost standard 4.5″ armor and mounted 8″ Armstrongs. These ships were of about 4,500 tons and could be used as rams.

Three of the ten were rams: the *Formidable* and *Terrible,* built in France, of about 3,000 tons each, carrying batteries of 6″ Armstrongs; and the *Affondatore* of 4,000 tons built in England. The latter was a double-turreted ship resembling the "Laird rams" with the addition of a prominent ram. Each turret mounted one 10″ Armstrong (300-pdr.). Much was expected of her. Mr. H. W. Wilson, author of *Ironclads in Action,* says she embodied in effect the structural teaching of our Civil War.

In June, 1866, Italy, in alliance with Prussia, declared war on Austria.

At that time, the *Affondatore* was still in the hands of the builders, but Italy's nine ironclads were materially much superior to the seven that Austria had in commission. Two of these lacked their Krupp rifle batteries which they could not obtain, and were armed with smoothbores. The armor of all seven was near the standard 4½ inches. Their heaviest guns were 60-pounder rifles. Two of them were of 5,000 tons displacement; three of 3,600 tons, and two of 3,000. All had wooden hulls.

The Italian ironclads outclassed the Austrian in all respects. In addition, Italy had more and heavier wooden steam frigates than Austria. Austria had one ship of the line, the *Austrian Kaiser* (92).

The Italian commander-in-chief, Count Persano, was sixty years of age and had been Minister of Marine. His active naval life had been in the Sardinian navy and his principal war service against forts.

The Austrian commander-in-chief, Baron Tegethoff, was thirty-nine. His only war service had been against the Danes, in a naval battle off Helgoland in 1864.

It fell to these two admirals, differing in age by some twenty years, to test ironclads against ironclads at sea. The *Merrimac* and *Monitor,* the *Tennessee, Manhattan* (and others) when they fought, were in restricted waters where maneuvering was almost impracticable. Monitors and the *New Ironsides* had attacked forts and withstood their fire for hours at a time. But the tactics of a pitched battle between ironclads at sea were yet only theoretical.

For six weeks after the declaration of war, the Italian fleet was in port, or assisting operations on shore. On July 16, Admiral Persano put to sea, not to search for the Austrian fleet, but to attempt the capture of Lissa, a fortified island in the Adriatic, off the coast of Dalmatia. The *Affondatore* joined the fleet on the 19th.

Admiral Tegethoff, on the other hand, was diligently training his fleet, both in maneuvering and in gunfire. He had been at sea, late in June, searching for the Italian fleet which was then in port.

Learning of Persano's movements against Lissa, he appeared off that island on the morning of July 20, where he sighted Persano's fleet, somewhat scattered, and with ammunition supply reduced, after three days' unsuccessful operations.

Persano, in the *Ré d'Italia,* had time to collect and form his fleet before Tegethoff, attacking, reached gun range.

When the battle opened, the Italian ironclads were in column, heading northeast. The wooden ships were in two parallel columns, the heads of these columns bearing southeast (abeam) of the center of the column of ironclads. The small *Varese,* the *Terrible,* and one other ironclad were well in the rear of their position in column. The *Formidable* had gone into port to replenish her ammunition.

The enemy bore approximately northwest from Persano's flagship, which was in the center of his column.

Tegethoff had formed his fleet in two double échelons. His flagship, the *Ferdinand Max,* led the ironclad formation and was steering about southeast for the center of the enemy formation. His unarmored ships, also in double échelon (Fig. 112) were about 1,000 yards in the rear. He was completely capped by the ragged Italian column, whose speed is not given. Wilson says that Tegethoff's fleet speed could not have exceeded nine knots.

Tegethoff believed his formation to be a good one for ramming, while

at the same time he had one broadside of each ship clear. His general plan was to "rush on the enemy and sink him"—not quite like the ramming attacks on the *Tennessee,* but sure to bring on a mêlée.

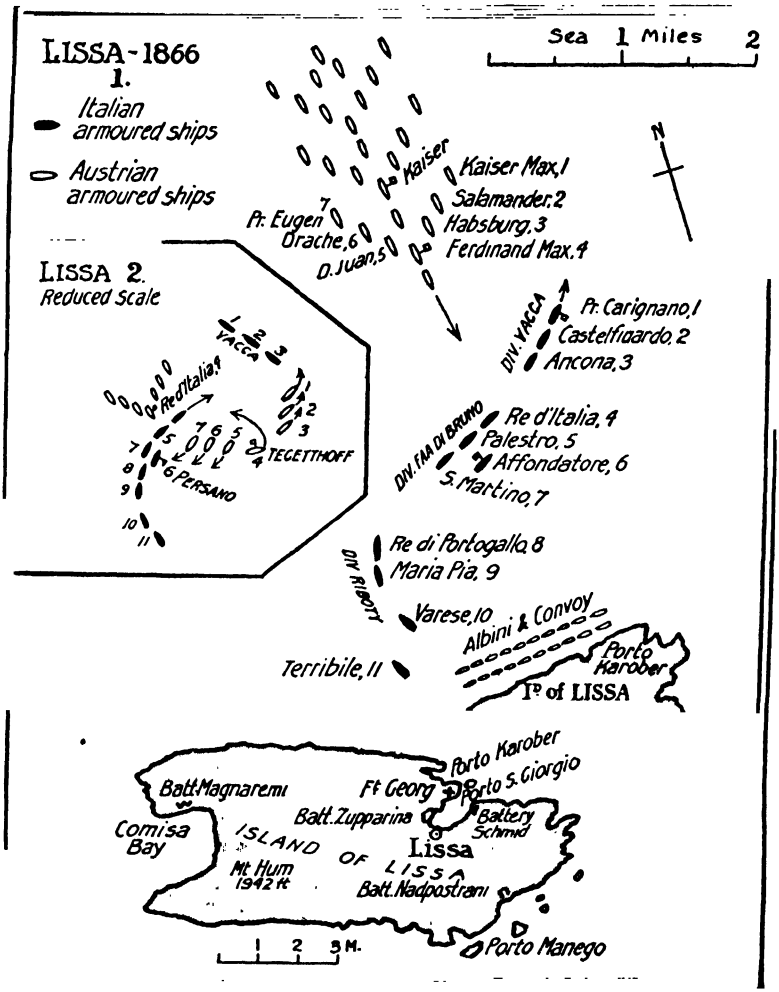


FIG. 112.—(*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Before the Austrians reached gun range, Persano stopped the *Ré d'Italia,* fourth ship in column, and shifted his flag to the *Affondatore.* The stopping of the *Ré d'Italia* soon opened a wide gap between her and

the leading Italian division of three ships and caused all astern of her to stop also.

The entire Austrian ironclad formation steamed through this gap, each ship with one broadside bearing on an enemy.

The Austrian unarmored ships changed course to the southward to attack the Italian unarmored column, lying almost stationary off the island from which the battle takes its name.

Tegethoff, with his ironclads, turned to starboard to attack the *Ré d'Italia* and the ships astern of her, using guns and rams. From that time, no clear account of the sequence of events can be given, but only the final results.

After having lost her rudder as the result of one ramming attack, the *Ré d'Italia* was rammed by Tegethoff in the *Ferdinand Max* at a speed of about eleven knots. She sank almost immediately. Her captain, when he realized his ship was lost, shot himself.

After Persano had joined the *Affondatore,* he steamed towards his unarmored ships, apparently to give them some instructions. Returning, he steered for the unarmored *Kaiser* (92), which was leading the Austrians to the attack of the unarmored Italians. But before coming into contact with the *Kaiser,* Persano flinched and turned away.

The *Kaiser,* a wooden ship of the line, rammed the ironclad *Portogallo* without seriously injuring her. Persano again approached to ram, but again turned away, after killing many of the *Kaiser's* crew by gunfire.

The *Affondatore* made three other attempts or feints on Austrian ships, the *Prince Eugene, Salamander,* and *Palestro,* without success. The *Portogallo* attempted to ram the Austrian *Don Juan,* also without success. Other than the sinking of the *Ré d'Italia,* all damage was from gunfire. The Italian *Palestro,* disabled, blew up, after being taken in tow.

Fire was opened about 10:50 and ceased at 12:10. The *Palestro* blew up at 2:30. The Italians lost 612 men on the two ships sunk. Losses on other armored ships were very small: Italy 8 killed, 40 wounded; Austria, 3 killed, 30 wounded. Other unarmored ships: Austria lost 38 killed, 138 wounded.

The two fleets separated, neither wishing to renew the battle. The advantage lay with the Austrians. Persano was severely criticised for failing to make the *Affondatore's* ram effective. He was eventually relieved from command.

The *Affondatore* suffered injuries in smoke-stacks, masts and armor

and sprung a leak at the water-line. On August 6, while attempting to ride out a gale in the roadstead of Ancona, she foundered. Later, she was raised and formed part of the Italian navy until after 1900. Her ram—perhaps a partial copy of those of the *Dunderberg* or *Stonewall* —was more pronounced than those of the Laird rams.

Wilson said that "Tegethoff sought a general mêlée, partly because he had no long range guns, and had he engaged at a distance the Italians would have crushed him. An additional reason for risking a mêlée was that he believed his fleet was better trained and disciplined than the Italian fleet and therefore less likely to fall into disorder or confusion.



FIG. 112a.—Baron Wilhelm von Tegethoff. (*From Lewis' "Famous Old-World Sea Fighters," Lothrop, Lee & Shepard Company, Boston*)

Few, if any, tactical maxims can be evolved from study of the battle of Lissa. The result was another confirmation of the primary battle maxim, "Attack!" but no rules govern a mêlée and no theorists on naval tactics since the advent of ironclads have included the mêlée in their studies.

No important engagements with or between ironclads took place for more than a decade after the battle of Lissa—we must seek what can be found in the signal books and other records of the time.

The writings of the leading authors to be discussed cover a period of years. Some of them had had the benefit of experience in war, but these were in the minority.

In 1855, the French admiral Bouet-Willaumez published his *Batailles de Terre et de Mer* and attached to it a *Projet de Tactique Navale* for screw steamships. This book met the approval of the French Admiralty which two years later issued *Provisory Tactics* for steamships, based on the *Projet de Tactique Navale,* the first detailed publication of its kind for broadside screw ships of the line.

In its nomenclature, a fleet was not less than twelve ships. Any lesser number, above *two,* was called a squadron, although normally a squadron was composed of four ships. Squadrons were numbered from right

to left. The usual terms, van, center, and rear, for major sub-divisions of a fleet were not employed.

The Commander-in-Chief was free to take any position. Simple formations were column, line, and line of bearing.

Compound formations were: column, double or triple; indented line, double or triple; groups of three or four ships forming a triangle or quadrangle; line of groups; and column of groups.

Because of the difficulty of keeping it, Bouet-Willaumez considered line of bearing a temporary formation only.

He made changes of direction by both rectangular and oblique movements and by wheeling on the center, as a pivot, although he recognized the difficulty of ships going astern (Moorsom).

When changing front by oblique movements he prescribed neither angle of change nor speed, depending largely on "the seaman's eye" of his captains.

Bouet-Willaumez considered column of groups (peletons) as the best formation for route steaming. He thought it dangerous for steamers to be in each other's wake at night.

Later (1883) a French officer said steaming "peletonnés" meant steaming by groups without order, each ship keeping near the chief of its group, which it was not allowed to pass.

In the Provisory Tactics of 1857, no thought was given to groups as battle formations.

In evolutions, ships which had to lose distance, slowed. Those which had to gain distance maintained speed. The Admiral set the speed by signaling his number of turns.

In 1858 and 1859, a squadron under Admiral Des Fosses tested the provisory signal book of 1857, and from the results, The French Admiralty in 1861 compiled a tactical signal book which remained in force without much change until 1879.

The tactical signal book of 1861 omitted indented formations, on which many French officers set great store. Groups in line and column were retained and the stations of ships in groups with reference to the group leader were prescribed.

A guide (régulateur) was also prescribed: right or left ship of a column; right or left ship of a formation; head of column, or the commander-in-chief.

The method of executing signals for "change of front" was much improved over the "seaman's eye" when a maneuver required oblique movement. The ships turned together on half of the points signaled. Changes greater than 60 degrees were not to be made at one time.

Flank ship maintained standard speed. Ships towards pivot governed speed in order to maintain bearing during maneuver.

In 1865, Bouet-Willaumez commanded a squadron of evolution composed of nine ironclads, sub-divided into three squadrons, or groups of three ships each.

1st squadron. *Solferino* (flag), *Couronne, Provence.*
2nd squadron. *Normande* (flag), *Invincible, Gloire.*
3rd squadron. *Magenta* (flag), *Heroine, Flandre.*

By permission of the Admiralty, he issued for trial some tactical orders, supplementary to those in the official signal book.

He did not attempt to revive indented line or column. He considered rectangular movements for armored ships less appropriate than oblique movements. "Oblique movements are more appropriate to their strength which is forward, and to their weakness, lying in their sides, pierced with ports, against which a ram, striking normally, would prove a disaster."

This is not good reasoning unless maneuvers at point-blank were in view.

To hasten the completion of an evolution he authorized increase of speed above standard by a ship or squadron. He established eight knots as standard speed for evolutions, and directed that ships be prepared on signal to record turns of screw and coal expenditure; to check turns hourly against the log in order to ascertain turns per knot in calm weather; also to keep deck and engine room clocks in agreement and to file all data for reference.

Ships were given permanent numbers in formation and the ship with a higher number (le plus fort) must give right of way to one with a lower number (le plus faible).

He considered steaming in "groups" as "at once, an order of navigation, an order for attack, and an order of flanking."

Based on the standard speed of eight knots, he published the time required to execute each evolution and each was illustrated by a diagram, accompanied by instructions and notes.

He said very truly, that rules of procedure are subordinate to the elements—wind and sea, to the prescribed speed, and to the movements of the guide. These modified all formulas indefinitely.

His conclusion was, that the best table to consult and the best instrument to utilize, was the eyes of the captain and officers. He cautioned them to remember the rule that the ship with the lower number had the right of way, and with this in mind, each was to "chasser son poste."

He warned all that his new oblique movement required greater skill on their parts, but that he was accustomed to trust them.

In his directions for taking times and keeping records of turns and log speeds, Bouet-Willaumez was thoroughly modern. Some instruments of that day—course-finders, speed-indicators, etc.—were as carefully designed as those we have now. About the same date, an English naval officer, Pellew, was recommending compass cards marked in degrees (outside the rose), to assist accuracy in steering in formation.

Under way, in squadron, Bouet-Willaumez directed each ship to compare its turns per minute with those of the flagship, which he signaled. This having been done for a number of speeds, the admiral, on getting under way, always signaled the number of turns the flagship would make.

His rules for conducting and drilling a squadron would be considered thoroughly up to date now.

As is well known, Louis Napoleon devoted much thought to the navy and naval material. When he crossed the Mediterranean to Algiers, in his yacht, the Squadron of Evolution received orders to accompany him, at full speed. The skill shown by the captains and the precision of all evolutions as the result of Bouet-Willaumez' training, brought the latter many compliments from the Emperor.

Bouet-Willaumez was the first to apply the designation "interval" (*intervalle*) to the distance between adjacent sub-divisions of a fleet in formation, and he directed that the word "distance" should apply to that between two adjacent ships in the same sub-division.

He introduced a new order of sailing based on Hoste's "carré navale," which the admiral believed was also a good order of battle. His naval square, as applied to his own fleet of nine, was formed, whenever in column, of squadrons or line of squadrons (three ships each), the Admiral's flagship was the center ship of the second squadron, with distance and interval so regulated that there was a ship at every four points from the flag.

Maneuvers in square formation consisted merely of simultaneous changes of course by all ships. In a squadron of five, the square would be formed with a ship at every eight points from the flag (center) i.e., at each corner of the square.

When in square formation, ships were named by their bearing from the flag; as North, Northeast, etc. Each ship retained its name until the formation was changed.

The Admiral was once asked three questions:

(1) What was the value of such a formation preparatory to battle?

(2) As an order of battle?

(3) If only useful as a preparation for attack, how shall we deploy from it?

These questions went to the heart of the matter. The Admiral replied, but his answers were not made public.

During the Franco-Prussian War of 1870, Bouet-Willaumez, as Commander-in-Chief, appeared in the North and Baltic Seas with a strong French fleet, blockading Prussian men-of-war in their ports and halting German sea commerce. He was relieved from command on account of illness, and died in 1871 at the age of sixty-three. He can be credited with introducing, or creating, the means of steam fleet control.

His successor in command of the squadron of evolution was Admiral Gueydon. Gueydon and one of his captains, Lewal, endeavored to still further replace the "seaman's eye" with tables of angles and rules for every maneuver.

Captain Lewal, in his rules, took account of the fact determined by the Russian admiral, Boutakov, that a ship's course during the earlier portion of a turn is a spiral, only the latter portion approximating a circle. Such refinements, however, were of no practical value.

Lewal tried to demonstrate that a group of three ships is the best battle unit.

For steaming, maneuvers, and a ramming attack, he advocated formation as an equilateral triangle; for defense, a flanking formation; and occasionally for attack, a 30 degree line of bearing.

For gunfire and for changing direction: No. 2 at two cables (60 degrees) on port quarter of No. 1. No. 3 at two cables (60 degrees) on starboard quarter of No. 2. (i.e., in wake of No. 1.)

Admiral Gueydon's successor was the well known author and naval historian, Admiral Jurien de la Gravière. He took command in 1868, with orders to make recommendations for revision of the signal book.

In 1870, some of his recommendations were published.

One of his conclusions was that an admiral should not be at the center of his fleet, but at the head of the column or one of the wings. He should change his station, or take station out of formation, at will and should not have a special relieving ship as provided in French official tactics.

He believed the ram to be the principal weapon of armored ships and favored oblique, as against rectangular movements for rams; thus agreeing with Bouet-Willaumez, but advancing no reasons for his belief.

He recommended that indented formations be restored and that each fleet have a reserve squadron.

He considered *maneuvers* as movements requiring variable speeds and variable helm angles. *Evolutions* were movements made with constant speed and standard helm angles.

He felt that an admiral, having informed his captains of his plan of attack; of the signals he proposed to make to carry it out; having given orders whether to turn to starboard or port after passing through the enemy; and having conducted his fleet to the attack, must then rely on the personal initiative and bravery of his captains.

After the breaking of the original formation, signals were useless. The passing through effected, each ship able to do so was to turn as quickly as possible to renew the attack.

De la Gravière's battle plan, like Tegethoff's, was the "charge through" and a mêlée.

Returning to Bouet-Willaumez, his *Projet de Tactique Navale* of 1855 did not modify a publication issued by the French Admiralty, the same year, usually called *Tactique Navale.*

Captain Augustus Phillimore, R.N., who translated it in 1859, calls it *The System of French Naval Tactics,* but the French Admiralty stated that the object of the book was "to collect a summary of the Standing Orders for the Navy of France" and also to "reproduce those traditions which have been consecrated in their Navy."

The book informed junior officers that familiarity with it would be expected in their examinations for promotion. It combined fighting instructions with tactics and signals.

The "relieving ship," which De la Gravière later recommended for discontinuance, was a tender to the flagship. Its duties were definitely prescribed:

> This ship, distinct from the *reserve,* will keep herself outside the line; her general duties will be, unless ordered to the contrary, to take the Admiral's place in the line when he quits, and to assist him in the fight.

The only rule for maneuvering this ship was not to hamper the fleet. Distance, unless otherwise ordered, was two cables, reckoning from main-mast to main-mast.

The French Admiralty disclaimed any attempt to

> fetter Admirals by any directions as to the manner of engaging hostile fleets, but . . . a number of different formations . . . suited for the purpose are put before them from which to make their choice.

These instructions date from 1857. Ramming was not then a fact and ironclads, except the Stevens battery in America, were not yet laid down, but one French definition forecasts ramming:

61. A Fleet is formed in *order of attack* when the ships neglect to present the front of all their artillery to the enemy; [in order] to close as rapidly as possible; to fight within pistol shot; *sink him with a violent shock;* set fire to, or carry him by boarding.

Other definitions read:

A fleet is ranged in *battle* when it presents the front of all its artillery at the enemy.

The line ahead is the "Line of Battle" of vessels whose principal strength is in their artillery and who have that artillery ranged on each side, according to the longitudinal plan of the ship.

The closer a line of battle is, the stronger it becomes.

Some of the instructions were intended for both steam and sailing ships. The above is one of these, and it continued to the effect that *distance* "ought to be reduced as much as prudence and the necessity of free movement will permit."

In two Articles, captains of ships were cautioned not to disturb the formation by "brusque" movements or maneuvers, whether under steam or sail.

From the time of Villehuet, boarding had been urged, as peculiarly suitable to French temperament.

Article 71 reads, "When once a battle has begun or the mêlée established, each captain who thinks he can board the enemy with advantage ought not to hesitate to execute this maneuver."

Curiously enough, but in line with French sailing tactics, no mention is made of a battle, ship to ship, in a parallel attack, as contemplated by British fighting instructions in the days of sail.

The French Admiralty only predicated attacks at an advantage and enumerated five of these, as "The principal warlike movements one Fleet can undertake against another Fleet":

1. To defile on one portion of the enemy's fleet, so as to disable it with superior forces.

2. To double on one of the extremities of the enemy's fleet so as to put one portion of this fleet between two fires.

3. To cut off from the main body of the enemy's fleet any portion of his forces, so as to surround them.

4. To break through the enemy's fleet at several points, so as to bring on a general engagement.

5. To board the enemy when once the mêlée takes place in the engagement.

As already said, it is important to note that no provision is made for a parallel attack, ship to ship, but only for attacks at an advantage.

The first, second, and third methods of attack are sailing ship meth-

ods. Steamships, theoretically, could carry them out with ease and certainty, but only against a passive enemy.

The fourth method is the same as that recommended by Howe to ensure a decisive engagement.

Comment has been made on the fifth method.

Signals were provided for counter-marching in line of battle or reversing course in succession from ahead; also for reversing course in succession from the rear, or going about together.

What appears to be a new signal—or at least, not practiced since described by Hoste—was one for simultaneous going about by squadron leaders, followed in succession by the ships of their squadrons. It must be kept in mind that French squadrons corresponded to our divisions. They were small sub-divisions of a fleet.

Reversing course by following division leaders is a very valuable maneuver. It was not then prescribed in British signal books, nor in our own.

In 1860, Admiral Penhoat illustrated by diagrams the evolutions and methods of attack in the signal book of 1857. The admiral added some recommendations of his own. One of these was a plan for concentration—massing a large number of ships on a small number of the enemy.

For "bâtiments destinés d'agir par le choc" (rams) he recommended double line as the best attack formation.

Penhoat believed in a fleet formation by squadrons of eight ships, divisions of four ships, and pairs. Pairs maneuvering together mutually supported each other and could combine to attack one ship of the enemy.

In 1858, the United States Navy Department issued a signal book to replace that of 1813.

The new book recognized three orders of steaming:

(1) Fleet in single line or column. Changes of front in line to be made on starboard or port ship as pivot.

(2) Fleet in groups. Diagram shows three groups of seven ships each. Leaders of groups in line. There was nothing that indicated this was to be an attack formation.

(3) Fleet in double column. (A cruising formation.)

Comment on the new signal book is best taken from the opinions of Commander James Ward, U.S.N., who the following year published a *Manual of Naval Tactics.*

Ward said he found it unnecessary to print the diagrams prepared

for his manual because the new book contained them. He considered the book was almost beyond criticism and congratulated the Board of Revision (of the 1813 book) on the results of their work.

Ward called Paul Hoste the standard author, "whose system as the basis of all established signal books is most worthy of study."

He recommended that the diagrams be published separately and issued to the service. He considered this might be done "without violating that reserve in which the signal book ought most carefully to be guarded . . ." as otherwise juniors could not study and become familiar with them before reaching command and "the access which command gives to the signal book." But as signal books at that time were evidently for captains alone, his recommendations were disapproved.

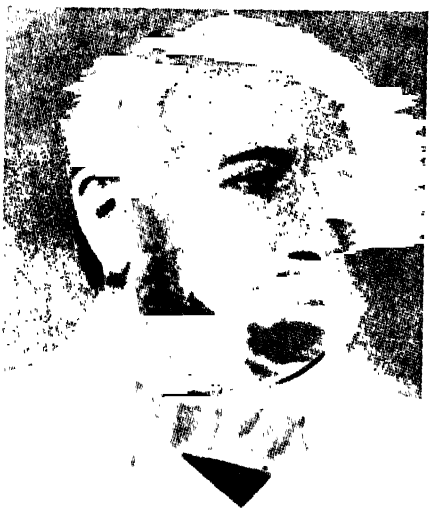


FIG. 113.—Lieutenant James Harmon Ward, U. S. Navy.

Of the three orders of steaming, he said: "These several orders, in their theory, wholly disregard the winds, waves and currents, treating them as of no effect, as not even existing." As a seaman, whose life was spent (mostly in sailing ships) in utilizing, or opposing, all three, ignoring them was worthy of notice. Further,

> The orders [of steaming] are formed on what is technically known as a "line of bearing" which is wholly arbitrary, except as it relates to the direction of an enemy, and is simply and literally, the line of "bearing by compass" on which steam fleets are formed.
>
> It is not, therefore, to be confounded with the "line of bearing" for sailing fleets which . . . is not arbitrary, but has a fixed relation to the direction of the wind. [By this he meant the port and starboard close-hauled lines.]

Ward then made a most important generalization which bears repetition. It was soon forgotten, but later re-discovered. He enunciated a great tactical maxim for maneuvering steam fleets in the presence of an enemy:

> Whatever the course steered may be, the line of bearing is meant to be perpendicular to the direction of an enemy, when one is near . . . from which direction an attack may be apprehended, or in which to make one may be contemplated.

He considered that a group formation, on a course at right angles to the line of bearing of group leaders, was suitable for both making and receiving an attack. But the line of bearing of group leaders was "meant to be perpendicular to the direction of the enemy, if he is sufficiently close."

Ward illustrated groups of five, instead of groups of seven, as found in the signal book. Each group consisted of a leader, with two ships on each side, bearing five points abaft the leader's beam.

While Ward was preparing his material for the press, Sir Howard Douglas published his *Naval Warfare with Steam,* a part of which so impressed Ward that he published it with notes, as an appendix to his own work.

Sir Howard thought that movements of steam ships—to some extent —could be approximated to those of armies on a level plain. He was strongly in favor of échelon (45 degree line of bearing) as a fighting formation.

The difficulty of keeping position in sailing on a line of bearing was recognized by all tacticians, but some thought that the advent of steam removed this difficulty. Some officers still think so, but ample experience has shown that it is not simple, nor easy to maintain, and is, therefore, a poor battle formation except in a modified form.

Thus, at the inception of steam tactics, we find France and America approving group formations—the French, provisionally.

According to Captain Phillimore, neither groups, nor a "relieving ship," had been thought necessary by the British.

Neither the signal book of 1858, nor Ward's *Manual,* makes any reference to ramming.

A new signal book was issued by the Navy Department in 1864, but though the ram had been frequently employed in action for two years, this book contains no recognition of the fact.

Neither of the words "group" and "échelon" appears in the 1864 edition, but there is a signal for "line of groups."

A reserve was recognized and five signals given for directing *reserve* ships.

In 1864, by authority of the Navy Department, Commander Foxhall A. Parker, U.S.N., published *Squadron Tactics Under Steam.* These were the result of his experience in command of the Potomac Flotilla, which consisted of gunboats assigned to patrol in the Potomac and that part of Chesapeake Bay and its tributaries south of the Potomac.

Parker was an admirer of Sir Howard Douglas, and believed, with

him, that the advent of steam made possible the adaptation of military to naval tactics.

It was his opinion that Sir Howard's *Naval Warfare* and the French *Tactique Navale* were the only works on steam tactics deserving consideration.

James Ward was the first commander of the Potomac flotilla and the first Union naval officer killed in the war. His death occurred on June 27, 1861, while in the act of sighting a 32-pounder on board the gunboat *Thomas Freeborn,* in an engagement with Confederate shore batteries on the south bank of the Potomac, below Washington.

Parker tested Ward's tactics in maneuvers with the vessels of the flotilla. His nomenclature, designating squadrons and divisions in the order of size, as parts of a fleet, reversed earlier usage and accords with present practice.

In 1867, *An Introduction to the United States Signal Code* was issued. It was illustrated. Flags, pennants, and lanterns were shown in colors, with instructions for using them in making signals. It contained plates showing the authorized orders of steaming and sailing. It also contained the "Rules of the Road at Sea" and a series of fighting instructions, though they were not given that name. An important part of its contents was how to use the signal book (of 1864).

The "Introduction" was prepared by Commodore Thornton A. Jenkins, U.S.N. Although Jenkins was familiar with all the battles of the Civil War and was Farragut's Chief of Staff in the Mississippi River campaign, he, in no instance, employs the verb "ram." He does use the phrase "When dashing at the enemy's line. . . ."

In Jenkins' opinion, the tactics of steam fleets was only in the experimental or formative stage:

> The evolutions or movements of steam fleets, divisions and squadrons, may, without doubt, be reduced by experiment and long continued practice to a sufficiently perfect and effective system to answer all useful purposes, but the great revolution in Naval warfare (caused first by the substitution of steam and the screw propeller for sail, and second, by the invention of the monitor and other classes of iron-clad vessels, and of rams, and the recent date of these great changes) has left the profession without any recognized nor authoritative guide, and consequently dependent for the present, mainly on professional principles in the management of fleets composed of such vessels, both for attack and defense.
>
> Although the able works of Paul Hoste, Clerk, Chopart, Ekins, and others may still be studied with profit and read with interest by naval seamen, they must give way to others, such as Sir Howard Douglas' Treatise on *Naval Warfare with Steam,* the *Tactique Navale* and *Tactique Supplementaire* of the French and the excellent work of Admiral Boutakov of the Russian Navy, *Nouvelle Bases de Tactique Navale,* which, however, leave many of the modern questions untouched.

He then quoted—evidently with approval—from Douglas,

The disposition of a fleet in divisions, consisting of double column in échelon in line of bearing, as shown in Plate XXV, may be considered as the general order of steaming in which a fleet should move, being thus, always ready to meet, or make, an attack.

Jenkins, however, disclaimed any desire to direct an Admiral as to what formations he should employ.

He agreed with Colomb (p. 684) in making no distinction between tactics and strategy, considering them intimately connected.

Differing from Parker, he followed British practice in designating squadrons as minor, and divisions as major sub-divisions of a fleet. He recognized a reserve division made up of the fastest vessels of the fleet for chasing, to protect convoys, the rear of the fleet, etc.

He gave rules for organizing convoys, but said:

It is not likely that the system of convoys . . . will ever again be resorted to for protecting merchant vessels at sea.

His views on the position of a commander-in-chief in battle seem to have been followed by Admiral Persano at Lissa, as quoted in the following:

Custom and long established usage have apparently made it the duty of the commander-in-chief of a fleet to lead into, or place himself in the front of battle, wherever that may be. There may have been peculiar reasons in the days of sailing fleets for the Admiral to lead, or to place himself in the hottest part of the fight, and among them, that elsewhere he would have little, or nothing to do, beyond merely looking on . . . . The brisk firing reducing the force of the wind, masts and spars being knocked about by the enemy's projectiles, and the vessels becoming unable from damage to obey orders, even if the Admiral found it necessary and had the means of communicating them; therefore, in the fleet sailing tactics, the Commander-in-Chief's functions practically ceased with the commencement of the action, and he, in his flagship, simply did his own fighting, trusting to the different commanders to do theirs, as in so many single combats.

The introduction of steamships in Naval Warfare has changed all this, and sooner or later, commanders-in-chief will be found possessing moral courage to view their functions as being in many respects analagous to those of the commander-in-chief of an army, and realize that steamships are as susceptible of being combined into formations for action and of being maneuvered so as to perform evolutions as sudden and successful as divisions and army corps in a field.

When this is fully realized the position of the commander-in-chief of a fleet in action will be where he can see to the best advantage the entire field of operations, from which he may direct by signal every desired movement. The flagship of the commander-in-chief, in time of battle, should not be placed in the battle formation. That vessel should be one not too heavily armed, but possessing adequate means of offense and defense, having great speed and capable of turning quickly, so that the ever varying movements and positions of the hostile fleet may be observed from the best point of observation for giving order by signal.

Colomb and Jenkins were of the same opinion in the foregoing respect, but neither then, nor since, has any tactician been able to determine exactly where the commander-in-chief *should be,* if not in the battle line.

Those who believed that the admiral could conduct his fleet into action, but could not conduct the action after the issue had been joined, did not have to speculate on any position, other than in the battle line.

Commodore Jenkins, as Chief of the Bureau of Navigation, issued the Introduction to the Signal Code with the authority of the Navy Department. The 207 articles under the heading "General Rules to be observed in Fleets, Divisions, and Squadrons," comprise our first extensive Fighting Instructions.

Parker's *Squadron Tactics Under Steam* of 1864 was an official publication. In 1869, he published *Fleet Tactics Under Steam.* The two formed the basis of our naval tactics for some years and were supplied to the Naval Academy as textbooks.

The textbook for tactics under sail was a translation of *Essays on Naval Tactics* by Captain Chopart of the French navy. Chopart's essays appeared in 1839, when he was a lieutenant. The translation for the Naval Academy was made in 1859 by William Harwar Parker, brother of the author of *Fleet Tactics Under Steam.*

Foxhall Parker was familiar with the works of Sir Howard Douglas, and like him, employed military terms, wherever possible, in his *Fleet Tactics Under Steam.* He deployed, wheeled, went right and left front into line, etc. He preferred single and double lines of bearing (échelons) as steaming and anchoring formations and was convinced that column as a battle formation was obsolete, though he included it in his tactics. To demonstrate its weakness, he discussed attacks on a column formation, with a reserve, by a fleet of the same number of ships—including a reserve—in line, line of bearing, and échelon.

Like nearly every author who condemned column, he forgot, or ignored, relative movement of opponents. He made his assumptions on the basis of a column practically dead in the water, of which, any part, or the whole, could be attacked at right angles. Whereas, in all tactical discussions, the only safe assumption is, that the enemy in column, or any other formation, can move or is moving at the same speed as the attacker.

Parker favored a reserve, if acting on the defensive, but when attacking, "I think the sooner the reserve is put in, the better."

Grenier had advocated guarding (with additional ships) the flanks

of a sailing fleet. Parker advocated guarding the flanks of a steam fleet in line. Perhaps this was based on the same belief that induced Bouet-Willaumez to advocate oblique movements, so that an ironclad should not expose her broadside to an enemy in battle.

Many of the conclusions of Parker and others, though they may have been sound when written, became obsolete with the increase of effective battle range.

Parker restored the terms "squadron" and "division" to their present meanings. He had given this nomenclature in the *Squadron Tactics* of 1864. Jenkins had reversed this to conform to British custom. Parker also substituted "column" for "line ahead" and "line" for "line abreast." These changes were also adopted and soon well established in our service.

The English equivalent for the French "intervalle" had not then come into general use. Parker used the term "distance" for the space between squadrons and divisions, as well as that between ships to which its application is now confined. His "distance" between fleet units in column or line, unless otherwise directed by signal, was the distance between single ships, multiplied by the number of ships in the unit (squadron or division) "to enable the fleet to deploy into line, with its vessels in their proper positions."

The standard speed of his flotilla was ten knots; steerage way, four knots. He introduced the speed ball, prescribing "red speed ball signals for every two knots of speed up to ten."

The fleet tactical diameter and the standard helm angle for each ship were to be determined by experiment. He looked forward to twin screws to assist maneuvering. (The small sloop of war *Pawnee* was one of the earliest twin screw ships.)

Parker criticized the *Tactique Navale* in some respects. He considered Boutakov's *Nouvelle Base de Tactique* (page 679) a work of greater scientific merit than any of its predecessors. The French said that Parker's book should have been called *Evolutions Under Steam* rather than *Tactics*. This criticism, no doubt, arose from the fact that he had tabulated 102 evolutions, with a signal, a diagram, and instructions for performing each and every one.

Among Parker's general instructions, are several to captains which show clearly that he had fighting in mind, with evolutions only a means of joining combat advantageously.

All ships of that date (1869), except monitors, carried some sails.

A captain, he wrote,

if disabled in machinery . . . should (when to windward) make all sail and bear down on an enemy for the purpose of disabling him, or carrying him by boarding, always keeping in mind that he might as well be captured, as to go out of action without taking an enemy with him.

. . . if a vessel take fire so badly as to endanger her neighbors, her commanding officer shall at once leave his station and steer toward the enemy and when it becomes apparent that he must abandon his vessel, he shall before doing so, take care that she is pointed fair for the enemy's vessels, so that she may blow up, if possible, in their midst.

For beginning a charge through, Parker advocated that the attack

should always be led by a vessel of great artillery and ramming power and should have abreast of it (a little in advance) the most formidable ram or torpedo vessel in the fleet which should strike, at full speed, one of the enemy's vessels, thereby sinking, or disabling it and opening a passage ahead of the engaged vessel for the attacking columns . . . .

Parker drew a distinction between a captain's duty in single combats and in fleet engagements. A captain's duty

requires him to engage every enemy he may fall in with, of equal force and to continue the engagement while it is in his power to do so. His duty, and the dictates of humanity, equally require that when resistance is no longer possible, he shall haul down his colors and confess himself vanquished.

. . . In fleet fighting, however, the case is widely different. Each vessel is but part of a whole, and cannot be considered whipped until the whole fleet is beaten. It becomes, therefore, the imperative duty of each captain of a fleet to fight his vessel while he has a gun to fire, a bow to ram with, or a deck to stand upon, for, however crippled he may be, so long as he fights he is rendering good service to his comrades by keeping an enemy from turning his guns upon them.

Bouet-Willaumez, Boutakov, and Parker established much of the nomenclature we now employ and evolved many of the methods necessary to produce co-ordinated movements of ships in formation.

Parker, like most of his contemporaries, felt that the flagship of a commander-in-chief should not have a designated station in attack formation, but should be free "to move about from place to place, as exigencies of the battle may require."

He thought two lightly armed vessels of high speed should accompany the flagship as despatch vessels and that the commander of the reserve should "have his vessels well together, near the Admiral's ship, on board of which he himself should remain (if circumstances will permit) until his services are required with his division, in order. . . ." The only saving clause here, is, "if circumstances will permit." With steamships, circumstances could never permit. The Commodore seems to have reverted in thought to a fleet of sailing ships, hove-to, or moving with steerage way only, with *time* at his disposal in which to consult and plan how to attack an enemy, already in sight.

He continues:

As for the Admiral, himself, after having formed such tactical combination as he deemed judicious for carrying out his plan of attack, or order of battle . . . when, after having disposed of his reserve and put every gun into action . . . he shall feel that victory is doubtful, then—and not till then—let him bear down into the thickest of the fight, and encourage, in his own person, his officers and men to fight courageously.

Attempts to assimilate ship movements to troop movements appear to have motivated the above advice which is more applicable to an army than to a fleet.

In 1873, a *Tactical Signal Book* supplemented the *Introduction to the General Signal Book.* It was based on Parker's *Fleet Tactics Under Steam* and made the latter, with some modifications, official. Some evolutions were simplified and signals for maneuvering *Rams,* the Reserves, and Torpedo vessels were added, although our government, at this time, possessed no torpedo boats.

In 1864, shortly after Parker's *Squadron Tactics Under Steam* appeared, the Russian admiral, Gregoire Boutakov, produced his *Nouvelle Bases de Tactique Navale.* It was translated by Lieutenant H. de la Planche, a French naval officer, and published by the French Ministry of Marine.

Boutakov's introduction, somewhat paraphrased, read, in part,

During the century and a half since Pére Paul Hoste laid the foundation of naval tactics, many volumes have been written on the evolution of fleets under sail . . . . The appearance of steam as a motive power has recently drawn the attention of mariners and scientists to the means of forming and handling steam fleets.

. . . among works of this kind, the most remarkable, without doubt is the *Essai de Tactique a Vapeur,* published by the French Admiral Count Bouet-Willaumez, in 1857 . . . . The French Government, the same year, published a small volume entitled *Tactique Navale* which each French naval officer was obliged to have in his possession. It contains evolutions for ships under sail, as well as under steam. The latter, quite like those of Count Bouet-Willaumez, but in greater detail.

This publication, the work of a commission . . . is corrected yearly, to accord with the experiences of the French squadron of evolution . . . it mentions very superficially, and in general terms what each ship should do in passing from one formation to another . . . and seems to show but a vague perception of the laws governing ships' movements. In 1861, I saw in England a translation of this book. [Phillimore's?]

In 1857, M. Biddlecombe, who had published in 1850 a very good and very short work on the tactics of sailing ships, published a book with the pompous title of *Tactics of steam fleets,* which our scientific naval committee did not think worthy of translation.

In 1858, appeared Sir Howard Douglas' *Reflections on the rôle of steam war vessels,* a remarkable book, in which the author attempts to give uniformity to land

and sea tactics, and to combine ships in formations which will make their gun fire comparable to that from encompassing fortifications.

In 1859, Commander Ward of the United States Navy published a *Manual of Naval Tactics* . . . . Nearly a third of this book is a reproduction of Douglas' work.

In 1854, by order of Admiral Kornilov, I formulated some evolutions for a division of steamers in the Black Sea. [This was during the Crimean War]. I attacked the problem in a manner as arbitrary and unsatisfactory as that of others who had wrestled with the subject. Afterwards, however, I stumbled upon the very simple idea that all maneuvers of steam vessels unavoidably have for their base, two geometrical lines, the circle and the tangent to the circle.

I formulated some movements along this line and tried them out in my small squadron in the Black Sea. In 1860, I was ordered to command the Russian squadron of evolution in the Baltic. This gave me time and opportunity to test my ideas with ships of the line. I found then it was very easy to determine the length [circumference] of a circle traversed by a ship with hard over helm, to calculate its radius and to make ships regardless of their size and construction describe equal circles. This furnished me with a solid base for further researches. I thought for the first time of the connection between the arcs and the tangents and later I called them co-ordinates, though not quite satisfied with the name.

Boutakov then tells how he passed the winter of 1860 and 1861 abroad, still working on his evolutions, through which he discovered what he called excentric, centrifugal, and centripetal circles and the laws of evolution for ships. In 1861, he published a list of one hundred evolutions for the forty gunboats serving in the Finnish archipelago, with signals for each, under the title, *Extrait d'un rudiment de tactique à vapeur.*

In the summer of 1861, he began his experiments to determine under what conditions one ship could ram another. He completed these during the summer of 1862, just after the celebrated battle between the *Monitor* and *Merrimac*. He felt that this would have been an opportune time to publish his results, but delayed until two years later (1864) in order to complete the work.

Boutakov claimed that by following his methods, each captain would know beforehand, for any evolution, how many points he ought to turn with the helm hard over, before righting it; when to decrease or increase speed, and he would also know the proper helm angle for every evolution.

The mathematics Boutakov employed and the theories he deduced to accurately pre-determine how ships could open or close to any given distance, are most elaborate, but of no real value, because he ignored the factors of wind and sea, influence of wakes, and rates of acceleration and deceleration of ships of different displacements.

It must be said, however, that despite over-emphasis on theory of movement, Boutakov laid a solid foundation for steam tactics. Firmly

impressed with the importance of using the ship, herself, as a weapon, he speculated on the feasibility of building ships with screws and rudders so mounted that they could not only turn quickly, but also steam and steer with equal speed and control in either direction. He did not envisage twin screws, which were used at the time his book was published, but principally on ships operating on the Mississippi River.

One French writer remarks that the book created a sensation in the maritime world. Another summed up Boutakov's tactical beliefs in substance, as follows:

His three simple orders of steaming were column, line, and a four point line of bearing [single échelon].

His compound orders were eleven in number.

(1). Double column. Interval between columns equal to one half of standard tactical diameter of the fleet (*rayon du cercle d'evolution*).
(2). Double column, indented.
(3). Double line. Interval between lines, one rayon, and distance between ships, one rayon. Flag of each line on the left.
(4). Double line, indented.
(5). Double line of bearing (coin), lines 90 degrees from each other, apex ahead.
(6). Double line of bearing, lines 60 degrees from each other, apex ahead.
(7). Same as (5), apex in rear.
(8). Same as (6), apex in rear.
(9). Line of bearing, right flank in advance.
(10). Line of bearing, left flank in advance.

In 1868, Boutakov, again in command of the Russian Squadron of Evolution, supplemented his theoretical studies on ramming by practical experience.

Six gunboats, of about 200 tons each, were fitted with all around fenders, heavy enough to prevent damage when colliding.

The ships of the evolutionary squadron were formed in a square, so that all might see.

Inside the square, two gunboats, each commanded by a captain of the squadron of evolution, were placed side by side, bow to stern, and started simultaneously, with orders to ram each other.

The position of each ram was fixed by cross bearings at frequent intervals, and the track of each was plotted until the instant of ramming.

All captains were required to command in turn, and a captain remained in command until rammed, or in other words, lost his command when rammed.

Every duel ended in ramming, but usually at small angles.

The shortest elapsed time to ram was five minutes; the longest, fifty minutes; the average, twenty minutes.

Each successive encounter was numbered consecutively on the track diagrams. One track, red; the other, blue.

The records and diagrams of twenty-one ramming duels were bound and made available for instruction of the personnel.

Advocates of ramming were confirmed in their belief.

In February, 1865, Admiral—then Commander—P. H. Colomb, R.N., (1831-1899) read before the Royal United Service Institution a paper on "Modern Naval Tactics."

Colomb, whose contributions to the study of naval tactics are well known and will be freely drawn upon, was at this time thirty-four years of age, with nineteen years' naval service. He had served in the Far East, in the Arctic, in the Baltic during the Crimean War, and for some years prior to 1865 had been employed by the Admiralty, in addition to other duty, on special service connected with gunnery, signaling, and the tactical characteristics of steamers.

His writings, from 1865 until his death in 1899, exercised great influence over British naval thought and practice.

In 1865, he had before him for his consideration the *Gloire* and succeeding French rams; the ramming duels of our Civil War, then drawing to a close; British experience with the *Warrior* and her sister ships and some subsequent British ironclad rams. He said (a partial repetition):

> The steady advance and final adoption of steam as a necessary appliance of naval warfare, has brought in its train a vast variety of changes . . . thirty-three years had steam been toiling upward in our fleet in times of peace, almost belying the few who steadily predicted its triumph, until . . . the Russian [Crimean] War . . . swept away, forever, the notion of a sailing fleet.
>
> I envy no naval officer who thinks the science of tactics is rightly placed in the shade to which our navy has tacitly condemned it.

Referring to the French official *Tactique Navale*, translated by Phillimore, he said that the French Evolutionary Signal Book, founded upon it, was corrected year by year, as the experience of the squadron of evolution indicated. This he recommended as a good practice. His advice is still sound.

He advocated the application of the principles of sailing tactics to steam tactics, rather than casting them aside and starting afresh on the basis of assimilating naval to military tactics. The complete directional control of steamships, and the apparently level plain on which they maneuvered, made assimilation of war at sea to war on land very attractive, especially to writers like Sir Howard Douglas.

Colomb seems to have been among the first to voice the desire, oft repeated, but never carried out, for direct control of the speed of ships

by placing "the control of the throttle valve in the officer-of-the-deck's own hand." He also imagined a speed indicator, operated by water pressure, automatically controlling the speed of ships and capable of being set to any standard speed. These refinements are not yet practicable; they are referred to, only to show that he keenly appreciated the necessity of maintaining *constant,* any given speed.

He also quoted the Russian admiral, Boutakov, who had experimented, and published his views, on the turning qualities of ships. In Boutakov's work, we first read of the importance of standard turning circles, tactical diameters, advance and transfer, though not in these words. Also of the relative positions of steamers, as within, or without, each other's turning circles; that is, where they could not, or could ram or be rammed.

Colomb proposed a standard "circle of evolution" for ships likely to be "acting in concert" and recommended that the standard helm angle to make the standard circle be marked on each ship's "tell-tale."

He used "column" for the usual British "line ahead." The British, normally, used "column" in the plural only. He frankly admitted that in his opinion, "column," as a battle formation, was dead.

> . . . in order to set aside any lingering affection for the old *line of battle* as a fighting order, let us recall the fact that the serious part of a future naval attack does not appear to be the guns, but the rams.
>
> Suppose an Admiral in command of a steam fleet, some ships of which are rams; can we not well imagine his exulting in the certainty of victory, the moment he saw a close line of battle, neatly drawn up in the most convenient position for the action of the new and terrible weapon. . . . I cannot believe we shall ever see the line of battle again . . . but instead, we want some form sufficiently loose to allow individual ships, by reducing, or increasing speed, to avoid the blow of a ram, without disturbing the general order.

Here, Colomb fell into the error of other writers of his day, and later. He underestimated the difficulty of quickly changing the speed of a mass of 10,000 tons, more or less. He, therefore, did not realize that change of direction, instead of change of speed—the rudder instead of the screw—must be relied upon to avoid a ram then, or a torpedo now.

He objected to angular formations—later popular as "double échelon"—on account of the difficulty of steaming in double or single line of bearing. But, as a battle formation, he hesitated between angular formations and indented column or indented line. He considered ". . . that the order in '*peletons*' or knots (groups) of French invention, does not seem worthy of occupying our time. . . ."

Colomb believed that the admiral of a fleet should be perfectly free

to "place the divisions of the fleet, where most convenient for the time being" (not as the signal book directed). He advanced the sound principle that

the tactician's business is to produce the necessary results by the speediest and simplest means. Every evolution he can cast aside as valueless, is so much clearing of the ground before him.

He seemed to consider movements as either strategy or tactics, making no distinction, in this respect, between naval tactics and naval strategy.

He asked this question, "Is it likely that with the evident tendency of numbers and increase of individual efficiency in our fleet, that we shall ever see a larger fleet acting in concert, than Nelson's at Trafalgar?" The World War, half a century later, answered this question in the affirmative. Commodore Jenkins' belief that convoys would never be needed again, was answered in the negative by the World War, and at the present writing.

Like many other authors, Colomb concerned himself with the station of a commander-in-chief in action and again his conclusions were not borne out by history. He wrote:

We, in the Navy, say . . . the Admiral's main duty is to set an example of personal bravery and lead in, or, at any rate, to place himself in the "fore-front of battle," the center of his line.

With sailing fleets . . . movement, or at any rate, combined movement, was not possible, soon after fleets joined in battle. The firing brought the wind down, the masts were shot away and the ships lay deprived of any power to obey orders, had such reached them . . . the fleet became disintegrated and fought out its victory in a succession of single combats [not completely true.] . . . in future actions the commander-in-chief will *not* take a position in the line. He will place himself in some swift, quick-turning vessel, not unarmed, nor unplated, but still, a *light* ship; the flagship of the future, where he can best view the movements of his own and the enemy's fleet and where his signals can at once be perceived from all quarters.

Unfortunately, the happy position that Colomb visualized, cannot be found, either outside, or between the opposing fleets. Howe had tried it off Newport in a frigate between the opposing columns; Rodney against De Guichen in the West Indies, both outside of and between. They did not repeat the experiment, and have had no followers in action, except possibly Persano.

Colomb realized that heavier guns increased effective range of hits and that armor decreased range of penetration. Our Civil War had demonstrated that—for the time, at least—armor had defeated the gun. This being a fact, he felt that ships could be more indifferent to raking

fire and could come to close quarters, comparatively unharmed. This favored the effort to ram with "the beak and armed stem with which all ships were being then fitted."

A year later, after the battle of Lissa, Colomb became almost a complete convert to the ram. Describing and discussing this battle before the Royal United Service Institution, he concluded that Tegethoff was not benefited by his angular formation, but was, in fact, hampered by it, when he came to change course. He also held that Persano's choice of column to meet a charge in line, was unfortunate, but he did not recommend any formation with which to meet a line of rams.

It appears that the Italians had discussed the question of ramming before the battle and concluded that they had nothing to fear. Therefore they took the best formation for effective use of their guns.

Naval opinion was divided. Colomb quoted one French admiral as saying that Tegethoff had "an unheard of piece of luck" and that in spite of the incontestable power of the ram, the gun remains the chief arm, and rules naval warfare.

Another, Touchard, said, "This beak is now the principal weapon in naval combats."

Colomb and others were considering better formations than Persano employed for receiving a ram attack, such as some form of column, or line, or indented line, on the opposite course from the attacking rams.

The term "charge through" had not yet been coined. Colomb used a partial equivalent, "pass through." He thought there would be "much passing and re-passing through the fleets" in future battles. He felt that

> the Admiral should not be part of his formation, nor the pivot upon which his fleet is to turn.
>
> I think he would be better away from the formation. But what his position may be, is quite another question.

In fact, after a charge through, the flagship would be just a ship.

Colomb was impressed by the results of Boutakov's ramming experiments, and some years later (1871-72) published the results of attempts he had made to deduce the principles of single ship combats between the most powerful ironclads of that time.

For his studies of 1871-72 he chose the offensive and defensive qualities of the *Monarch,* a British battleship of 8,300 tons, laid down in 1866, and which, at the time he wrote (1871) had been in commission about two years. The *Monarch* was a prototype of the modern battleship, carrying side, turret, and casemate armor, with her main battery mounted in turrets. Side armor varied from four to seven inches; belt

(narrow), eight to ten inches; turrets, ten inches; and thwartship bulkheads, as a protection against raking fire, five inches. Each turret mounted two 11-inch muzzle-loading rifles, whose projectiles weighed 548 pounds each. Fired with an initial velocity of 1,360 f.s. they would penetrate 14 inches of wrought-iron at the muzzle.

Her forecastle mounted two 9-inch M.L.R. and her poop, one 9-inch for broadside ahead and astern fire. The initial velocity of the 9-inch was 1,449 f.s. calculated to penetrate 11½ inches of wrought-iron at the muzzle.

A test showed that the *Monarch* could fire three rounds from each turret in five minutes. The twelve shot made nine hits at 1,000 yards, on a rock target, 60 by 600 feet.

From this, and other experimental firing, Colomb deduced that a *Monarch* against the broadside of another *Monarch* at 1,000 yards could not expect more than 15 per cent of hits in good weather. Further, that in the end-on position, the percentage of hits would be much less, and to all hits at 1,000 yards her vital parts were invulnerable.

To commence firing at 2,000 yards he considered a waste of ammunition. Two ships at 2,000 yards, approaching to ram at speeds of ten knots, will meet in three minutes. At best, but two rounds could be fired in the elapsed time. The chance of making any hits would be small, and of making a vital hit, almost zero. Therefore he would reserve his fire until, if his intended blow with the ram missed, he could deliver his entire broadside, point-blank, with the certainty of penetrating his enemy's armor.

Considering the approach, further, he was convinced that of two ships, continuing to approach bows-on,

> one or other ship will in such case, swerve at the last moment and pass broadside to broadside, without any result from either ram . . . for one ship to run against another, stem to stem, is no strategy, but rather, a reckless, blind trusting to chance.

Colomb assumed that the diameter of the smallest circle a ship could make in turning, was about five times her length. This is her "turning circle," and its diameter is now called her "tactical diameter." For a *Monarch* this diameter was about 500 yards.

Ships intending to ram should not approach head-on to a shorter distance than 2,000 yards, at which point each should bring his adversary about four points on the bow. Their courses would be then at right angles, or parallel, to each other. From that point, it would be a contest of skill; a duel on equal terms.

If both seek to ram, one will always succeed, and his opponent's gun fire (in a duel between two *Monarchs*) will not prevent him. Guns between two such antagonists, neither assist, nor prevent ramming.

Colomb concluded, therefore, that the smallest ram, without guns, that was as invulnerable to the *Monarch's* guns, as the *Monarch* was to her own guns, could, if of equal speed, meet her at sea on equal terms. He estimated that a 1,000 ton ram could be given the speed and armor required, and if this were true, the 1,000 ton ship, with its smaller turning circle, could always ram a *Monarch*. He was the first author to clearly define the relation of a ship's turning circle with her power to ram. He formulated the axiom, which may be written as follows:

> Ship A can be rammed by ship B and cannot ram ship B, when ship B is in ship A's turning circle, provided that ship A is not, at the same time, in ship B's turning circle.

Colomb said,

> It seems to me that the whole art and mystery of ramming, will be found to consist in this endeavour to get your adversary outside your own circle, while you remain in his.

Colomb's deductive reasoning brought him to the conclusion that the ram dominated action between single ships, but for fleet fighting he came to an entirely different conclusion, after examining all methods by which two fleets of rams could attack each other.

He remarked that following Admiral Boutakov's experiments,

> Russia has drawn up her scheme of naval evolutions on the avowed principle that the ram, and the ram, only, need be feared at sea.

The corollary to this belief was that armor had conquered the gun and that victory at sea could only come through the ram.

It is apparent that if two equal fleets, in line, bring each other ahead and steer opposite courses, they must pass through each other. Neither can ram, unless they determine to meet head-on. But each ship, except one on each flank can fire both broadsides in passing. There is neither ram nor gun advantage.

If each fleet turns to charge again, there is still no ram nor gun advantage.

If before passing, they turn to the same or opposite courses, there is no ram nor gun advantage.

If a fleet in column steers to pass through a fleet in line and any ship of the line attempts to ram one in column, she exposes her broadside to the ram of the ship next astern in column.

The fleet in column is exposed to the bow fire of the fleet in line, but unless a shot strikes at a greater angle than 45 degrees, from a range of less than 1,000 yards, no vital injury can result (Colomb's conditions). But each ship of the column will, in succession, at vulnerable range, fire into the two ships between which she passes.

Assuming a distance of 400 yards and speed of ten knots, a ship of the column would pass through the line every 45 seconds. At the rate of fire given by Colomb, while every column ship could deliver both broadsides, the adjacent line ships could deliver but one broadside, while exposed to three, and a part, at least, of that broadside might hit a friend.

On the whole there would be a gun advantage to the column. No ram advantage to either fleet.

If two columns approach on opposite courses, neither can ram, without exposing the ramming ship to a ram of the enemy. There is no gun advantage.

Colomb's conclusion was that there were no methods of attack which would give a ram advantage by an attack in line, or column, if the enemy maintained his position in line or column.

There were ways of attacking which would give a gun advantage. Briefly, there was a good defense against the ram in a fleet action which left the gun as the chief weapon, though the ram could dominate the formation.

Colomb pushed his researches into the possible tactics of attack and defense by groups, and pronounced against them. He favored "compactness and concentration in attack" with his *entire force*. He pronounced against reserves.

Commodore Parker's tactics recognized a half division, or section of two ships. In 1872, Captain Courbet of the French navy proposed the section as a basis of fleet organization. Chief of section and support, (Chef et Matelot) were to act always as a unit, and as an independent unit, after battle began. Signals would then be useless; maneuvering and fighting in units of two, precluded groups.

Another French officer thought that mutual protection required *groups* of not less than three ships. But he called his unit of three or four, in triangle or square, a division. Both these officers were convinced that the dominance of the ram over the gun was clearly established. Guns were accessories to the ram.

The German navy during the Franco-Prussian War (1870-71) felt itself too feeble to take the sea against France.

A German official naval bulletin of the time said that battle tactics should be based on the ram.

The battle unit would be "groups of not less than three ships." The fleet formation should be kept intact as long as possible. Groups were to maneuver, as such, under direction of the group leader. Distance between group leader and Nos. 2 and 3, one on each quarter, was 300 yards. The German Admiralty looked upon this as a compact and powerful group: the leader with all fire free; the écheloned ships, with one battery free, and unimpeded ahead and astern fire.

The admiral should be outside of the formation in a fast and powerful vessel.

The official battle tactics of the Italian and Austrian navies are not at hand, nor is it known what changes, if any, resulted from the battle of Lissa.

Other navies, Russia, United States, France, Germany, and England, agreed that the ram would be the principal weapon in battles between ironclads. That battle would begin with a charge by one or both fleets and would continue as a mêlée. Signals were useless, after action was joined.

There were few that believed with Colomb that a line of rams was a weak formation. The admiral, with his flagship, was to be free to move at will.

Our navy had left group formations out of its tactical signal book. Russia, France, and Germany advocated and provided signals for groups. England was beginning to favor them.

It is curious that *"peletons,"* a route march formation of Ramatuelle for sailing ships, should persist, and be transformed into many geometrical patterns, each of which had its advocates, as an attack or defense formation against *rams* and *guns*.

The facts, available to all naval tacticians to modify and support or supplement their conclusions, were the Stevens Battery, building, and intended to carry a ram; the Kinburn batteries and their performance in the Crimean War; the ironclads in service between the States and the results of their many battles; experiments with the ironclads of European navies; the powerful *Dunderberg* with its immense ram, which France purchased in 1866; the battle of Lissa, the same year; and last, but *important,* the conduct of the Russian ramming duels and their results.

The initial object of every tactician in every Admiralty was succinctly stated by Colomb, "to find out how a fleet could attain supe-

riority of position, assuming that material, morale, and speed were equal to those of the enemy." This superiority of position was to afford a ram or a gun advantage, or both.

In an essay read in 1872, Colomb gave some consideration to the effect on tactics of the spar torpedo, developed in our navy during the Civil War. The Harvey towing torpedo, a British invention, which was intended to make ramming dangerous and which Colomb felt would deter such attacks, though officially adopted in the British and United States navies, never proved that it could be developed into an effective weapon.

The Whitehead automobile, or "fish" torpedo, which eventually displaced all others, was the development, by Robert Whitehead, under Austrian government auspices, of a self-propelled torpedo, whose speed and depth and—eventually—course, could be controlled.

Colomb did not take the fish torpedo into consideration in his lecture of 1872, although it had been officially adopted in Austria in 1868 and manufacturing rights secured by England in 1870. France, Italy, and Germany followed the example of Austria and England.

It was some years before a Whitehead torpedo was brought to the United States, and many years before it became our standard torpedo. The direction and amount of its development and its effect on tactics will appear in subsequent chapters.

No nation could secure exclusive rights to the Whitehead, but all officials of all governments adopting it, who were in position to become acquainted with its details, were sworn to secrecy.

CHAPTER XLIII

THEORETICAL NAVAL TACTICS, 1870-1880. CHILEAN-PERUVIAN WAR, 1877-1881

AT THE close of the Civil War in 1865, the United States had the world's most powerful navy in ships built or building. To remove doubts of the seaworthiness of monitors, the *Miantonomah* cruised to Europe and the *Monadnock* was sent to the Pacific Coast of the United States via the Straits of Magellan.

But naval shipbuilding was stopped. The *Dunderberg* was sold to France, and also the new and powerful monitor *Onondaga*. Two other monitors were sold to Peru, and the *Stonewall* to Japan. The *New Ironsides* was burned. All other ironclads, except for a brief period in 1878, were laid up. By the end of 1873 our navy in personnel and active ships was smaller than that of practically every other world power. No new ships were laid down until 1883, no ironclads until 1890. Officers of the United States Navy could only theorize on naval tactics or study the theories of others. Fortunately such theories were at hand.

The British Royal United Service Institution dated from 1831, but no printed records of its proceedings were kept until 1857, when it determined to print and circulate a *Journal*. Volume I was issued in 1859. The *Proceedings* has been published regularly since that time. In them may be found much of the best naval and military thought on professional matters including tactics.

The first professional publication of our navy was the *Naval Magazine*, published by the Naval Lyceum at the Navy Yard, New York. Matthew C. Perry, then a Master-Commandant, was most influential in founding the Lyceum and fostering it. Although the magazine lapsed, after being published bi-monthly for the years 1836 and 1837, the Lyceum flourished until the outbreak of the Civil War. It was revived and re-organized in 1871, but more as a reading room and library than for professional purposes. It had a library of 5,000 volumes.

In 1842, a Lyceum, called the "Boston Naval Library and Institute" was formed at the Boston Navy Yard, and at several other yards as well. That at Boston was the best known and longest maintained, being incorporated under the laws of the State of Massachusetts.

In 1873, the United States Naval Institute was organized at the Naval

Academy, Annapolis, Maryland, with the object of providing a medium for the circulation of knowledge on subjects of interest to the profession and to bring those subjects under discussion.



FIG. 114.—Seals of Naval Publications.

From the first, the Institute published its *Proceedings* for circulation among its members. In its early days, it was divided into branches with headquarters at Annapolis. Each branch elected its own local officers and held its own meetings.

Since 1879, following the example of the R.U.S.I. in 1875, the Naval Institute has offered, yearly, a gold medal and a life membership in the Institute for the best essay on a professional subject. Prize essays are published in the *Proceedings*.

The branch societies gradually died out and the meetings at headquarters for reading and discussion of papers were discontinued. Papers were submitted to the Board of Control by mail and discussion was also by mail. The Board of Control publishes in the *Proceedings* those papers considered most suitable, and discussions of them. It also collects and publishes much other information of professional interest.

The principal purposes for which the New York Lyceum and the Naval Magazine were established have been richly fulfilled by the Naval Institute. It has had a successful history, up to the time of this writing, of sixty-six years.

Its *Proceedings*, supplemented by those of the R.U.S.I., and in a lesser degree by the *Revue Maritime*, founded in 1861, furnish an almost complete history of the evolution of naval tactics of the steam period.

Admiral Sir Geoffrey Hornby (1825-1895), at the time of which we

are writing, was considered the ablest tactician of the British Navy. His biographer says that by 1874, though the training of the British fleet in steam evolutions went on at considerable speed, the "Admiral was not yet able to attain his ideal; namely, absolute precision and safety, at eleven or twelve knots."

Admiral Hornby experimented with tactics under steam, when in command of the British Flying Squadron (1869-71), followed by three years in command of the Channel Squadron of ironclads. His predecessor in the Channel Squadron had done some experimental work with ships in groups.



FIG. 115. Seal from Vol. 1 "Journal of the United Service Institution" 1859.

Admiral Hornby appears to have been the first to lay down any concise system by which to arrange ships in "groups." Two of his formations for groups of three were:

(1). Second ship five points abaft starboard beam and two cables from leader. Third ship, six and one half points abaft port beam and four cables from leader.

(2) The same formation, except second ship is abaft port beam and third ship abaft starboard beam of leader.

The British Admiralty approved evolutions by groups in 1874 and incorporated them in its Signal Book of 1879.

Practically the entire European naval world had by that time officially adopted the "group" idea, or principle, as a means of attacking with the ram, and also parrying ram attacks, as contrasted with line, single or indented, for the charge and mêlée.

In 1874, the British Junior Naval Professional Association offered a prize for the best essay on naval tactics. The award was to Commander Gerard Noel, R.N., with high compliments to the essays presented by Professor John Knox Laughton of the Royal Naval College and Lieutenant Campbell, R.N. All three authors favored group formations.

More than a decade later, in 1885, Commander Noel re-published his essay, without change. There had been, in the meantime, no war to test the group theory, but the steady development of the first torpedo and torpedo boats had intensified the doubts of the opponents of groups.

In his prize essay of 1874, Noel had disposed of torpedoes by saying that the *Harvey towing torpedo* was too dangerous to friends to be put over when in line of battle, as it exploded on contact. He felt that if electrical firing (controlled) could be substituted, it might be of some value.

He considered the outrigger (spar) torpedo to be a boat weapon only and that "fish" torpedoes required special vessels which did not yet exist.

As a major reason for advocating groups, he said, "Ships of the line, maneuvering as a fleet, cannot alter course and turn in every direction, with the sole intention of ramming the enemy." This was saying, in effect, that if the ram was the principal weapon, it could be used most effectively by small portions of the fleet maneuvering together, instead of the fleet acting as one unit.

He recommended groups of three only, and proposed five forms in all. Four of these were those prescribed by Admiral Hornby and already described. Two others were merely slight variations from these of no discernible value. All four can be described as forms of deeply indented column. His fifth form was *column, natural order* at two cables.

He offered two approach formations only: (1) Line of groups; (2) Groups in double column. The first was applicable if the enemy was in extended front; the second, if he exposed a narrow front.

Each group leader could alter his formation at will, but preserve distance and bearing from the commander-in-chief, or when in column of groups, from the leader of the foremost group.

Attack by line of groups was the "charge through." Ships would then go about and re-form, if possible.

Attack by groups in double column was, in his own words:

> Approaching in column of two divisions, an enemy's fleet exposing a small front; the object will be, to make it pass outside your nearest leading division . . . that division is firing broadside and moving directly ahead, keeping all the enemy's ships well enveloped in smoke and doing all the damage it can with guns. . . . [Noel believed that at this time, *guns* had overcome *armor*.]
>
> In the meantime, the second division . . . will turn eight points toward the first division, and in column of groups in line abreast, will pass astern of the first (firing) division and charge the enemy along its whole line. . . . This is the time to use the ram. . . .

Interval between group leaders was to be eight cables (960 yards). Whether this interval was between columns of groups, or standard interval between group leaders, is not clear. By any interpretation, it was an *open* formation.

Noel believed that a fleet, well drilled in other respects, with standardized speeds and helm angles, could be made proficient in group tactics in a week.

He did not assign the flagship of the commander-in-chief to any group, but contented himself with a very general statement as to that officer's station in battle:

> I am strongly of the opinion that his place is at the head of the line. . . . I would not compare him with the Commander-in-Chief of an army, but rather with one of the gallant leaders of cavalry charges.

Commander Noel applied his tactical principles in an imaginary battle between an enemy of equal strength and a British fleet of 18 ironclads, 6 cruisers, 2 despatch vessels, and 4 torpedo boats. Except for the torpedo boats, which he proposed to obtain from small, fast merchant ships, Great Britain actually had in commission a fleet of the type which composed his supposed fleet.

Noel did not specify what he considered battle range. Professor Laughton thought it should be not much greater than *400 yards*. Like Noel, he stressed the strength of groups of three, as a battle unit, but advocated the closest possible order of steaming—100 yards. He said,

> The peleton should learn to advance as one, to wheel as one, each ship with known helm angles, and at exact rates of speed, describing her appropriate circle, etc.

Like so many other writers Professor Laughton overestimated the possibilities of ship control. He saw some value, as an order of sailing, in the Naval Square of Bouet-Willaumez, but did not recommend it as a battle formation, saying,

> I would again urge my conviction that formations by peletons, in échelon, in column, or in supplementary line ahead, or abreast . . . are the orders of battle which a well exercised fleet will find most advantageous.
>
> *Professional opinion is everywhere with me in refusing to admit the line ahead as a tactical formation. . . .*

The essay of Lieutenant Campbell was less definite than those of Noel and Laughton, concerning the conduct of a fleet during the approach, and in action. He was an ardent advocate of groups, and suggested that all tactical signals in the British Signal Book of 1867 be canceled, and a fresh approach made to the subject of tactics. "The time for working entirely with a single ship as a unit has passed and 'trio juncto in uno' must be the order of the day." The signal book should officially define "group." The word "column" should be omitted.

Campbell asked for smokeless coal for fleets (not a British product). Another of his recommendations—made by others later—but imprac-

ticable, was to supply each ironclad with two torpedo-boats, of not less than 12 knots speed, "great turning power," and of such size that they could be lowered at 10 knots in ordinary weather.

It is evident that in 1874, group tactics were favored in the British fleet.

Commander Noel's prize essay, a short time after its publication, was the subject of discussion in the Naval Institute.

Commodore Parker said that the signal book permitted groups of any number of ships and line, or column, of groups, or any other desired formation, and that

> A fleet should be so drilled, as to be enabled to assume any formation with readiness, and it should be a *unit* of force, acting under one head. . . . Commander Noel's plan of battle would simply afford one's adversary, in my opinion, a chance of surrounding his detached groups, one after the other, with a superior foe and thus whipping the whole fleet in detail.

Parker did not object to groups, but to *detached* groups, acting independently of each other. He asked for a greater differentiation between ships. A ram should be purely a ram. Artillery vessels should not be rams, but should rely entirely upon their guns. Torpedo craft should be restricted to the use of torpedoes. It is not clear whether the Commodore was thinking of spar or fish torpedoes—possibly spar. "In my judgment," he wrote,

> the rams should begin the action by charging the enemy and throwing him into confusion, or bringing him to a stand; then the artillery vessels would open with some effect, and the torpedo vessels, under cover of their fire, proceed stealthily and swiftly to complete the work of devastation inaugurated by the charge.
>
> After charging through the enemy, the rams should re-form and charge back; or if unable to do this, pass around the fleet, attacking everything on the way. . . .

Parker had been recently Chief of Staff under Admiral Case, who commanded a fleet of 11 frigates and sloops-of-war and 5 monitors, based on Key West. As already related, he had compiled the Tactical Signal Book of 1873 and had been attached to the Navy Department as Chief Signal Officer of the Navy.

For tactical purposes, the fleet off Key West was composed of three divisions: van, or right; center; rear, or left, with a reserve division of monitors.

This far from homogeneous fleet was drilled in the evolutions contained in the tactical Signal Book, but without satisfactory results, due principally to the very low speed and poor steering capabilities of the monitors and to the wide variation in tonnage of the frigates and sloops. Both Farragut and DuPont had commanded larger fleets but their

operations were conducted in narrow waters, and largely against forts. It is not of record that they devoted time to fleet evolutions.

The fleet drills, conducted under the direction of Admiral Case, recall those of Bainbridge with a heterogeneous sailing fleet in 1815 (p. 523).

In 1875, Lieutenant Graham Bower, R.N., proposed a system of attack and defense against rams, based on pairs (Chef et Matelot). Bower, like some of his French contemporaries, opposed groups of three, or of any larger number and strove to prove that two ships, fighting as a unit, made the best possible combination.

He prefaced his essay with three statements:

(1). That the *ram* is the principal weapon of naval warfare.

(2). That of two ships, equal in every respect and equally well handled, and each desirous of ramming his adversary, neither can count on success, but if two ships are brought against one, the single ship must be rammed.

(Bower's premise does not agree with Boutakov's records, nor does his second statement take into account other ships than the pair and the single ship he imagines.)

(3). The object I propose to myself in this system of tactics, is, in all cases, to bring two ships against one of the enemy.

It was not until nine years after the battle of Lissa that any Austrian tactical studies seem to have attracted attention in France. The author was Commander Attlmayr of the Austrian navy. He supported Tegethoff's double échelon, both as a good sailing order and a good order of attack. He did not disapprove of groups, nor did he especially advocate them, but excluded the column, as having no advantage. He supported indented column, single line, double, or indented line, single and double échelon, as attacking formations. His largest units were squadrons. Divisions of a squadron were not to exceed four ships each. He gave the commander-in-chief no fixed station.

It was not until 1881 that note was taken of Italian writers on naval tactics. In that year, the Italian Minister of Marine offered a prize for information on the best orders of sailing and of combat for modern ships, with the existing means of attack and defense.

The three officers who received awards, in the order named were: Commander Grillo, Lieutenant Algranate, and Lieutenant Cottori.

Commander Grillo held that a good battle order must fulfill four conditions:

(1). Give the greatest possible freedom for each ship to employ all its means of attack.

(2). Permit ships to support each other, offensively and defensively.

(3). Provide for meeting any battle order in which the enemy may be found.
(4). Be simple, flexible, easy to form and maintain in the excitement of battle.

Commander Grillo preferred column as an attack formation for the same reasons as Colomb, against an enemy approaching in line. His own course would be at right angles to the enemy's course.

The six years between the examples given of Austrian and Italian tactical beliefs (1875-1881) produced many tactical discussions which must be at least summarized. France and England continued their squadrons of evolutions, endeavoring to solve the problem of ironclads versus ironclads, but no solution could be final.

In 1876, the French admiral, Bourgois, was an advocate of a single battle formation only—line. Distance between ships was to be one cable. The best station for the commander-in-chief was in the center of his line. After a charge through, all formation should vanish and each ship endeavor to ram an enemy and avoid friends. There should be no reserve. Every ship should take part in the initial attack.

He believed that neither towing, nor fish torpedoes had modified ramming tactics.

Bourgois considered the "carrée navale" to be a good cruising formation, but not for battle. Other special formations, such as indented line, column, échelon, chasse, retreat, and line of groups, he discarded, as "useless for navigation and improper for action."

The United States Navy Department issued a new General Signal Book in 1876, carefully arranged for convenient use, but containing no new tactical principles. Its compilers tried to make provision for every known method of attack, with every known weapon.

While Admiral Bourgois was advocating that all attack formations, except line, be discarded, Lieutenant Mason of the United States Navy was endeavoring to show that the Naval Square was the only attack formation that should be retained.

With such a formation, he felt able to attack and defeat Commander Noel's line of groups in open order. He considered that the flexibility of the square which permitted any course to be taken by a simple simultaneous turn of all ships, helped to make it effective for a battle formation, but in the discussion before the Naval Institute, it was pointed out that two-thirds of the ships in a square could not use their batteries, however much they might mutually support each other from ramming attack. Rear Admiral (then Commander) W. T. Sampson said that he believed the proper formation to be that in which all the ships could be brought into action at once—a sound belief.

Mason predicted that in thirty years there would be but three classes of men-of-war—ships of the line, cruisers, and rams. Ships of the line were to displace about 6,000 tons; speed sixteen knots; to mount a 15-inch gun en barbette at bow and stern and sixteen 12-inch in broadside. They were to have ram bows, backed with armor, and armor over vitals. The standard tactical diameter for ships of the line was to be about 300 yards. This was to be normal "distance" between ships when cruising. Armored towers ("domes") for ship control, gun control, and signaling, projected above the upper deck. All guns were to be fired electrically.

Mason's cruisers were to be unarmored, "carry respectable batteries, and have great speed." This was not a definite description.

His rams were to be heavily armored, have great speed, and carry three submarine guns, one in the bow and one on each quarter.

In lieu of torpedo boats, his fleet tenders (fast tugs) were to be fitted to fire torpedoes. He evidently had fish torpedoes in mind.

Neither his battle nor his fleet plans met with approval.

The same year, 1876, the R.U.S.I. awarded Commander Noel the prize for the best essay on "the best types of war vessels for the British Navy," and again, in 1878, made a similar award to Colomb on "Great Britain's Maritime Power. How best developed?"

Colomb in his essay specified the classes of ships he thought the navy should include and gave their characteristics. The similarities and divergencies in ships and classes of ships, advocated by Mason, Noel, and Colomb in 1876-78, are still of some value. Noel said:

> We require for combined action, moderately heavy ships of the line. *All* to hold the sea in any weather and for any length of time. Possessing batteries of at least sixteen guns, ram bows, a speed of fourteen knots, the most efficient turning gear and water-line thoroughly protected with armor, especially from the boilers to the stern . . . in addition, I would suggest that all these ships be built on the cellular system, with double bottoms.

He saw the advantage of twin screws, but preferred single. He thought all ironclads of the line should be full-rigged for sail.

Mason advocated telescopic masts for his ironclads.

Noel's ships were to displace about 7,500 tons and mount ten 10-inch and seven 8-inch guns, as compared with Mason's two 15-inch and twelve 12-inch, on 6,000 tons displacement. This probably could not have been done, even with the short-calibered guns of that time. Noel might have achieved it on his ships.

In addition to his 7,500 ton ships of the line, Noel proposed to build

5,000 ton coast defense ironclads, to mount ten 9-inch and seven 8-inch guns. He called his coast defense vessels, "improved *Popoffka's*" though there was little resemblance between his design and Admiral Popoff's heavily armored, circular ships, propelled in any direction by six screws, and carrying, at the exact center of the hull, a heavy barbette in which were mounted two heavy guns.

Noel advised against protecting guns with armor:

> I maintain that by armouring a battery, you not only limit it in size, but you give the ship too much top weight, and after all, it is not possible to render it proof against any of the heavier system of guns. I would, therefore, in our sea-going ships, give up the idea of protecting anything but the water line (and perhaps, in the larger ships, a conning tower) with armour.

The prize essay was vigorously discussed in the R.U.S.I. His ships were violently criticised, and it was even proposed that the three senior officers who awarded the prize to him should be censured. The criticism was chiefly aimed at his unprotected battery and his "improved *Popoffka.*"

Although Noel's design won the prize, no British ship was subsequently built without having her heavy guns behind armor. His water-line belt, with unarmored battery, was the exact opposite of the Italian "Monsters," *Lepanto* and *Italia,* with unarmored water-lines and 18-inch guns behind heavy armor.

Noel's cruisers composed five classes, from 5,000 to 1,000 tons; lightly armored at the water line and mounting numerous light guns, unprotected. All cruisers carried full sail rig.

Colomb, in his prize essay, recommended, "Fleet ships, Frigates, Corvettes, and Gun-boats." He said:

> I suppose there will still be Despatch vessels, Torpedo Boats, Rams, etc., but these in my view are *temporary* and *insignificant,* and I leave them out of my scheme. . . .

He favored classification of ships, because in his opinion, "One of the results of the present . . . want of classification is, that there is an idea that any ship should be ready to attack any other."

He proposed "Fleet ships" of 6,000 to 8,000 tons, armored and stiffened forward, to be able to ram; to mount a main battery of 12-inch guns and a secondary battery of smaller guns.

His ships were to be compartmented, with unpierced bulkheads, as a protection against torpedoes; to have twin screws and two boiler rooms. He was not specific as to maximum speed, but provided for a coal en-

durance of 4,000 miles at most economical speed, and for auxiliary sail power.

His essay is chiefly notable for its opposition to ships for harbor or coast defense only. He said, in part:

> The building of powerful ships which are not fully sea-going (defensive ships) which are more or less incapable of maintaining the ocean communications of the Empire, can only be justified on the assumption that the chief danger lies at the mouth of the Thames, the Mersey or the Clyde. . . . But if our enemies are to career at will across our lines of communication, what will be left for us to guard?

He then outlined the correct British naval policy:

> It appears to me that our Navy has two, and only two, great defensive functions to fulfil, namely, (1) to keep the enemy in his own ports and to stop his supplies thither, and (2) to keep open sea routes to and from the heart of the Empire.

Even with auxiliary sail power Colomb's coal endurance did not meet his employment requirements.

The major error of building special types of ironclads persisted for many years in France, Russia, and also in England, despite Colomb's clear exposition of the true function of the British Navy:—to blockade enemy ports, as the best defense of their own. In later years, our Congress, in more than one instance, directed that coast defense ships should be built.

At the time Noel and Colomb were asking for ironclads of 6,000 and 7,500 tons, respectively, England and other countries had already in commission ships of 10,000 and 11,000 tons. The recommendations of the prize essayists went unheeded, both at home and on the continent.

France, which had adhered to wood for the hulls of her ironclads until 1872, changed to iron. Her *Charles Martel, Hoche,* and *Neptune,* in 1873, were as large as the earlier British *Minotaur* and *Northumberland* of about 11,000 tons.

Germany had built one broadside ironclad, the *König Wilhelm,* of about 10,000 tons; Russia, the turret ship *Peter the Great* of 8,700 tons; and Spain the *Numancia* of 7,300 tons.

In the United States, naval building had been practically at a standstill, since the end of the Civil War. The torpedo ram, *Alarm* of 720 tons was launched, and the *Intrepid,* a larger ram, partially completed, but never commissioned. The wooden frigate *Trenton* of 3,200 tons was built and a number of ships of war were re-built, prior to 1875. No ships were laid down between 1875 and 1883.

In 1881, two officers, Lieutenants S. W. Very and Seaton Schroeder, competing for the Naval Institute prize, gave their opinions on the best

types of ships for the United States Navy. Both were familiar with Commander Noel's prize essay of 1876. Lieutenant Very, to whom the prize was awarded, considered armored ships for coast defense only. The largest was to be of only 3,500 tons; the smallest, 2,000. All were evidently to be of the monitor type, of which a number were in reserve. He called the armored fleet, "the passive one," and said it represented the defensive strength of the country, while the unarmored cruiser fleet represented its offensive strength.

The armored ships were assigned stations; 16 on the Atlantic coast; 5 on the Gulf coast; 3 on the Pacific coast.

The armament was of 12-inch B.L.R.s for the larger and 10-inch B.L.R.s for the smaller ships. Monitors, then built, were armed with 15-inch and 11-inch smooth-bores.

Very's cruisers—in four classes from 4,000 to 900 tons—were to be heavily armed. The heaviest battery was two 8-inch and ten 7-inch B.L.R.s, the lightest, two 7-inch and four 60-pounder B.L.R.s.

Lieutenant Schroeder was more specific in his ship characteristics. His ironclads were to be double-turreted, ram-bowed ships, designed for 13 knots, with twin screws. They had great beam, compared with their length, to give a mean draft of 17 feet. The hull was to be sub-divided by both longitudinal and transverse water-tight bulkheads. They were to carry a battery of four 10-inch—or larger—B.L.R.s and were fitted to fire the most approved torpedoes.

Schroeder's cruisers were to be of one class only—2,500 tons, composite built, ram-bowed, speed fourteen knots, with twin screws, many water-tight compartments and ship-rigged; batteries to be three 8-inch and eight 6-inch B.L.R.s, mounted on a covered deck; two of the 8-inch as bow-chasers and one a stern-chaser.

The battery was decidedly heavier than that proposed by Very for the same tonnage. (The composite cruisers, actually built 23 years later, were 3,100 tons, 16 knots, with batteries of ten 5-inch B.L.R.s.)

If the opinions of the two essayists represented naval, or American opinion in general, there was then no intention and no desire in the United States to match ironclad fleets of England, France, or any other European power.

The discussion of battle tactics abroad was more realistic, as naval officers had in sight, and might some time serve on the ships they planned on paper.

In 1879, the French Vice Admiral Penhoat and the British Vice Admiral Randolph published their views on battle tactics.

Penhoat reiterated his opinion of 1860 that the advent of the armored ram made the "section" of two ships, a chief and a support (matelot de combat), the only proper tactical unit.

Two sections made a division; two divisions, a squadron; two squadrons, a fleet of 16 ships.

Ships with rams and torpedoes should approach in double line, or line of sections. Distance between chief and mate, in column, four cables. Interval between sections, six cables.

Many tacticians advocated a closer order in battle than in cruising formations. Noel increased the interval between groups to eight cables. Penhoat doubled the standard distance between ships in sections. He explained this by saying that rear ships of sections (second line) would have maneuvering room to profit by the disorder created in the enemy's line by the "charge through" of chiefs of sections; but he forgot that these would be widely separated, and each exposed to the fire of at least four ships from a fleet approaching in line at distance.

Penhoat considered that it would be impossible for the Admiral, after the mêlée was established, not to permit captains of ships the largest initiative. In other words, signals would be useless. He set maximum battle speed at ten knots.

Admiral Randolph had a plan for attack by a squadron of eight ships against an enemy squadron of eight, approaching in line. With his own squadron, in line, on the opposite course, Admiral Randolph would signal his right division of four ships to form line of bearing, one and a half points on the right ship of the division. His flag would be on the left ship of the division. He would then have his left division form line of bearing, one and a half points on the left ship of the division.

He recommended a battle speed of about eight knots and would make his signal to his left division so that it would reach the point of attack a little later than the right division. On signal, the ships of the right division would steer to ram the four left ships of the enemy, and on signal from the second-in-command, his left division would endeavor to ram the four right ships of the enemy. Ships that failed to ram would complete the turn and follow the enemy.

The Admiral and his second in command would be on the rear ships of their respective divisions, where Randolph considered they could best see and govern their distances. His theory was that the enemy ships would be taken out (rammed) in succession.

If the enemy approached in double column, his flagships would attack heads of columns; other ships, those in rear.

His plan was not approved.

To incorporate trial tactics which had stood tests made by successive squadrons of evolution, the French, in 1879, revised the tactical signal book of 1861. Paraphrasing a French author: "The new book, faithful to the spirit of the old, did not impose on the Admiral of a fleet any particular maneuvers, nor detailed means of effecting those described."

The tactical unit was a division of three ships. Two divisions formed a squadron. The Admiral was not permitted to choose his station. His flagship was to be the leading ship of the first division. Group formation was specified, not greatly different from the old equilateral triangle. The new group of three was to form a right-angled isosceles triangle.

All former steaming formations were recognized and the Admiral was left free to choose any one of them as a battle formation. Groups were thus officially established (1879) as battle units in the two largest navies.

Admiral Randolph did not stress groups, but he felt that experience justified the conclusion "that at least one of two rams, resolutely engaged, must go to the bottom . . ." and he wished to emphasize the "transcendent importance of superior dexterity in handling a ship. . . ."

The next year, 1880, the subject for its prize essay proposed by the R.U.S.I., was "Naval Tactics in the Open Sea with Existing Type of Vessels and Weapons."

The award was to Admiral (then Captain) Edmund R. Fremantle. Lieutenant Charles Campbell, who had received second favorable mention in the Junior Professional competition of 1874, again received honorable mention.

The British navy had been developing salvo firing from a director gun, connected by electric firing circuits with all guns of a broadside. Guns were elevated and trained to concentrate their fire at short ranges, up to 800 yards. Captain Fremantle held that concentrated broadsides at over 800 yards were impractical, but that a broadside laid for 800 yards would do good shooting at 1,200.

Director firing had some advocates and many opponents. It was concisely described by an advocate, Captain Wilson, R.N., during the discussion of Admiral Fremantle's essay. Captain Wilson said:

> Electric firing cannot be used on any account unless the ship is rolling. You trust to your helm to bring your sights on horizontally. You trust to the rolling of the ship to bring them on vertically. Of course it can be done just as well, if the enemy does it in passing, as if you did it with your helm.

Captain Wilson, advocating salvos, also said:

If you will take any war game that has been played and look how long your guns have been in bearing, you will find it very often, a matter of a few seconds. So short is the time that before the smoke of a single gun cleared, your guns will be out of bearing again, or you will have to re-train.

[Firing time, with fixed train, on a 300 foot ship passing at 20 knots, is nine seconds. Continuous train was not considered].

It was generally agreed that but one broadside could be fired during the "charge through." A proposed rule was to concentrate for 400 yards, 15° forward of the beam, and to put the helm hard over at the instant of firing. Thus, friends would not be hit, and the quick turn, unless the enemy did the same, would put him at a disadvantage by exposing him to a ram attack when he attempted to turn.

Admiral Randolph, who opposed director firing, thought it might be of use for the "first broadside." Captain Fremantle did not condemn it, but agreed with Admiral Randolph that to continue it during a general action would be too great a tax on a captain's powers.

Captain Wilson pointed out that with the passing and re-passing contemplated, nearly all firing would be "first broadsides."

Battery officers were, of course, to take charge, if director firing failed.

So much for the guns.

At this time, the issue of the Harvey towing torpedo had been discontinued. Whiteheads were being supplied to ships not having the Harvey. Fremantle listed the service speed of the Whitehead at 12.5 knots for 300 yards and 9 knots for 1,200 yards. The newest pattern could make 20 knots for 200 yards and 16.5 knots for 800 yards. Wilson found Whiteheads poor in action.

Torpedo boats, to fire the Whitehead, were being built and a large torpedo ram, the *Polyphemus,* was expected to play a decisive role in battle. Attempts were being made to build a 28-knot torpedo for her.

Of the ram, Fremantle said,

There is one all important matter which makes the ram so favorite a weapon. With the gun, it is only by rare good luck that penetration can be affected below the water-line, and the most that can be expected, is to sink a ship by a few fortunate hits between wind and water. The ram, on the contrary, if it hits at all, hits in a vital spot.

After referring to the sinking of the *Cumberland* by the *Merrimac,* and to the battle of Lissa, he continued:

From Lissa, dates the all but universal agreement of naval officers of all nations, as to the ram being the weapon par excellence. Boutakov, Bouet-Willaumez, Jurien de la Gravière, Bourgois, Lewal . . . and indeed all foreign officers who have written on the subject, have assumed the ram to be the weapon of the day. . . .

In our own Navy, the views have been almost equally decided in favour of the ram . . . it is to be remarked, nevertheless, that the English opinion is scarcely as decided or enthusiastic on the subject as that of foreign authorities. Captain Colomb, for instance, in his War Game . . . takes the part of a ship which has no intention of ramming and proposes to gain a victory by his broadside guns. . . . It (the ram) is a most formidable weapon, although not quite so fatal, as is popularly supposed . . . it may still be held, however, that while using ramming tactics, and being ready to ram, from mutual failure to strike a successful blow, the action may, after all, be decided by the gun. . . .

Our ships are now armed in every different way conceivable. The ram, the gun, the torpedo, are all available for us in the open sea. Which shall we use? Can we use all three in the same ship? and what is more, at the same time?

Of the torpedo, Fremantle remarked that with the slightest ripple in the water, its course could not be depended upon. In two imaginary actions which he described to illustrate his battle tactics, he made no mention of torpedoes, launched by himself, or by the enemy.

He advocated "ramming tactics, good broadside and moderate end-on fire; great speed as absolutely necessary for a ram, and the Whitehead torpedo, strictly as an auxiliary."

Rams and torpedo boats attached to a fleet "must act independently, according to a pre-arranged plan."

"Torpedo boats will be of use, chiefly at night."

He was not dogmatic with regard to groups and saw no special virtue in the number "three," nor the scalene triangle formation. He said:

We work our fleet in groups for better sub-division and command, but we do not adopt the scalene triangle formation as suitable for fighting purposes.

He offered, as tactical principles:

We prefer in all cases, concentration to dispersion.

We believe long lines, whether lines ahead, or lines abreast, to be dangerously weak formations.

We consider lines abreast, or very open échelons, the best for ramming tactics.

We hold high speed essential for tactical efficiency.

Fremantle illustrated his tactics by a series of game-board battles. He followed Admiral Randolph in his method of squadron attack against a squadron in column. He attacked a fleet of twelve in line, with twelve ships in double (indented) line and triple line, and won.

From these trials he concluded that both column and line were weak formations.

In a fourth battle, a line of scalene triangle groups of three, he attacked an enemy of the same number of ships in "very open échelon" and was defeated. He believed this discredited "groups," except that group leaders would make good rallying points after the initial attack.

Commander Noel, in his discussion of Fremantle's essay, introduced the idea, though not actually expressing it, that with increase of bearing of his fighting mates, abaft the beam of No. 1, a group of three was no more than a division of three ships in open order. This being true, and the principle of "follow the group leader" established, groups have a present day value.

Fremantle favored evolutions based on rectangular (constant speed) movements, as prescribed by the British signal book, as compared with oblique movements, favored by the French, which required changes of speed.

Lieutenant Campbell's essay, which received honorable mention, was more discursive, and, perhaps because he was younger, more positive in its statements than Captain Fremantle's. Campbell speaks as an experienced signal officer who had served in the squadrons of evolution.

A group system was made official in the signal book of 1879, and it was ordered that the leader, or commander of a group, must be the senior officer in it, and that No. 1 must always lead.

Campbell said:

> It is all very well for an essayist, or advocate for the system, to say "I am going to fight an action in the open sea. I will form my ships in groups"; but unless he has the details at his fingers' ends, and his captains are well posted in their A.B.C.s., he will find that it is possible to get into as big a mess in groups, as in any known formation; and on the contrary, when minute attention is paid to the interior working of each group, it is astonishing what a result may be obtained. . . . We do not, for one moment, wish to lay it down as an unchangeable law that these ships must be fought in a group; but we do think that in the opinion of our most experienced officers, that is the formation that will give them the best chance. . . . We would lay down three axioms with reference to fighting ships in groups:
>
> First. The three ships should have been thoroughly trained and exercised as a group.
>
> Secondly. That a well trained group, formed as such, would have a tactical advantage over three ships formed in any other formation.
>
> Thirdly. That a well trained group would have an enormous advantage over a group of ships that had lately come together.

A British cruising organization for a fleet of twelve ships under Vice Admiral Hay, in 1879, was three divisions of four ships each, with sub-divisions into pairs or sections. For an exercise organization, the fleet was in two divisions of six ships each, and each division composed of two groups of three ships each.

As an argument against the gun, and in favor of the ram, Campbell quoted part of an Admiralty Committee report on the probability of making hits with projectiles from ships' guns:

The probability of hitting in a naval engagement, must not be estimated by the precision of modern rifled guns. There are several sources of error, so large, that in comparison with them, the error of the gun is insignificant.

. . . Amongst the chief sources of error in action are:

The motion of the attacking vessels [speed].

The motion of the attacked vessels [speed].

The smoke from both vessels [steam and guns].

The rolling and pitching of the vessel forming the gun platform.

The imperfect knowledge of distance of the object aimed at.

The action of the wind in deflecting the shot.

The action of being fired at during pointing, or at the moment of firing.

Rifle projectiles are very devious after ricochet, so that if they fall short, they have little chance of producing effect, while if they go over, they are actually thrown away.

The means of ascertaining the range are very rude.

The gun is generally fired at the middle of the roll. At such a time the speed of the roll is the highest and the disturbing effect the greatest, rendering it a matter requiring great skill and practice to make anything like accurate firing, even at short ranges.

From this Campbell concluded that the ram was the primary; the gun the secondary weapon.

He believed in independent successive firing, if the wind were ahead, beginning with the after guns; if otherwise, in director firing, laying guns to converge at short range.

If a torpedo was to be launched, it should be done just before the broadside was fired; the latter beginning when the enemy was 15° forward of the beam, if range did not exceed 4,000 yards.

As in 1874, he believed in portable torpedo-boats carried at davits.

Maneuvers in the presence of the enemy should never be at less than two cables (standard) distance between ships.

As a matter of tactics in action, we must say we would like to observe that our adversary was a cable, or a little over a cable, apart . . . we fancy it would not be impracticable to put him through a few alterations of course which would somewhat mar the symmetry of his formation, and lead to just a little confusion. . . .

We would advocate, whether in single ships or group formation, that a moderately large front, arranged obliquely, is the best formation for attack . . . we must bear in mind the formation the enemy is in when sighted, and changes into on approach, which will probably decide the formation on our side. . . .

I would like to lay it down, as a tactical axiom, that the exclusive adoption of any one form of attack, either by groups, pairs, or single ships, is not of so much importance as the tactical knowledge of the Commander-in-chief and the officers under him, in all forms of attack and their power of changing from one formation to another with rapidity and precision.

On the station of the Commander-in-Chief, Campbell quoted Admiral Codrington, who had spoken in opposition to Colomb on that point.

. . . wherever he may be, he should be in a position not only to make signals to

his squadron, but also to show a good example to his whole fleet. We hold that an ounce of example is worth a pound of precept . . . cruising around in a swift, quick-turning vessel means a separation from the main body whichever way you put it . . . the best position for an Admiral is at the head of his line.

Campbell felt that study of the sail era was valuable for moral lessons, but useless for teaching tactics. Said he,

I consider that the value of Admiral Hornby's pamphlet, or Commander Noel's essay, is ten thousand times greater than that of any historical action, tactically speaking, from the Middle Ages up to the introduction of steam propulsion . . . the description of the action between the Athenians and the Corinthians in the Peloponnesian War is far more valuable to the tactical student than what took place in the intermediate period. . . .

Considering the stage at which steam tactics had arrived in 1880, what Campbell said was at least partially true.

He stated "Theories are started and practice establishes them and they become what is the most difficult thing to break through; namely, the customs of the service."

During the period covered by this chapter no major battles involving ironclads took place, but the Russo-Turkish War (1877-78) and the Chilean-Peruvian contests at sea (1877-81) include some engagements worthy of note involving torpedoes as well as ironclads.

Russia, having no Black Sea navy, relied principally on small spar torpedo boats for attack and made extensive use of mines; but in all single and multiple attacks by torpedo boats, only one success was achieved.

A Turkish river monitor on the Danube was destroyed by hits with two spar torpedoes in May 1877. The attack was made by four torpedo boats at early daylight in a rain storm, with the monitor at anchor.

Mr. H. W. Wilson records an unsuccessful attack on four Turkish ironclads by six Russian torpedo boats commanded by two lieutenants later to become world famous—Makaroff and Rojestvensky.

On one occasion a towing torpedo was employed, which made contact and exploded without doing any damage.

Whether the attacks were well or badly managed, eluded or resisted, the results were unfavorable to the spar torpedo.

In South America, Peru had three heavily armed and armored ironclads, the slow *Atahulapa* and *Manco Capae,* ex-*Catawba* and *Oneonta* bought from the United States in 1868, and the relatively fast *Huascar* —also a single turret ship mounting 10-inch guns as compared with the 15-inch of the other monitors.

Although a year older, dating from 1865, the *Huascar* was at least

five knots faster than the other monitors, and the principal events of the war revolve around her. This is true notwithstanding the fact that Chile had two small battleships recently completed of two knots greater speed and with guns capable of piercing the *Huascar's* armor. These were the 3,500 ton *Almirante Cochrane* and *Blanco Encalada.* The *Huascar* displaced less than 1,200 tons—little more than the original *Monitor.*

In May, 1877, the crew of the *Huascar* revolted against the Government and put to sea. Peru requested the Chilean government to seize her if she came into a Chilean port. The *Huascar* having interfered with several British ships, Rear Admiral de Horsey sent a large and a small cruiser, *Shah* and *Amethyst,* in search with orders to force her surrender. The *Shah* mounted guns which could pierce the *Huascar's* armor. When overhauled the *Huascar* refused to surrender. A battle began near the town of Ylo, north of Arica, which lasted nearly three hours. At the end the *Huascar* steamed off, with the loss of a marine killed and an officer and two men wounded as the result of perforation of her armor by a 9″ shell from the *Shah.* The *Huascar* had been hit 60 times without other injury of importance. Neither British ship was hit. During the action the *Huascar* attempted to ram the *Shah.* The *Shah* fired a Whitehead torpedo which missed. Wilson says this was the first Whitehead ever used in action. The *Huascar* was chased and further attempts made to torpedo her with Whitehead and spar torpedoes, without success. She reached port and surrendered to Peruvian authorities the next day (May 30). Nearly two years later, April 5, 1879, Peru followed Bolivia in declaring war on Chile—a war for the valuable nitrate deposits lying inland from the port of Iquique in the Peruvian province of Tarapaca.

The first sea engagement was on May 21 at Iquique between the *Huascar* and *Independencia* (an old Peruvian armor-clad) and two smaller Chilean cruisers, *Esmeralda* and *Covadonga,* close inshore on blockade duty. Captains of ships were: Peruvian, M. Grau and J. S. Moore, Chilean, A. Prat and C. Condell. To avoid endangering people on shore, Captain Grau determined to sink the *Esmeralda* with his ram, and after the third attempt succeeded. The first blow was a glancing one. As the ships swung alongside, Captain Prat and one man jumped on board the *Huascar.* Refusing to surrender, they were shot. A larger number of Chileans boarded on the second attempt to ram—all were shot down. It was not until the battle had lasted four hours that the third and last blow sank the *Esmeralda.* Of her crew 137 sank with her and 63 were saved. In the meantime the *Independencia* attempting

to ram the *Covadonga* struck a reef and was wrecked by the *Covadonga's* fire. The *Huascar* drove the *Covadonga* off but failed to capture her.

After repairing her injuries, the *Huascar* appeared off Iquique July 9. She attempted to ram a Chilean gunboat, but without success. She continued her cruising with varying results, accompanied by a small cruiser, the *Union,* whose speed equalled hers. At the end of July she captured a Chilean transport. At the end of August, at night off Iquique, she attempted to torpedo a Chilean gunboat with a Lay torpedo—a fish torpedo operated and steered by electricity, the steering gear controlled from the firing ship through an electric cable which unreeled as the torpedo progressed. On this occasion the gear jammed with the rudder over. The torpedo turned towards the *Huascar* and was only prevented from striking by an officer who went overboard and guided it away.

The *Almirante Cochrane* and *Blanco Encalada* were out in search of the *Huascar* and Captain Grau had orders to avoid action, but he and his consort were sighted on the morning of October 8 entering the Bay of Antofagasta. Grau attempted to escape to sea, but caught between the two Chilean ships, he opened fire on the *Cochrane* at 9:25 at an estimated range of 3,000 yards and closing. After twenty minutes, during which a Chilean shell pierced her armor, the *Huascar's* conning tower was destroyed by a heavy shell. Captain Grau and the conning crew were killed and the steering gear was disabled. The battle continued another hour during which the *Cochrane* made three unsuccessful attempts to ram. At 10:50, not being able to steer, having four feet of water in the hold, her armor pierced in at least seven places, and forty percent of her crew killed or wounded—the seventh in command, Lieut. Garezon—his seniors having been killed or wounded—gave orders to sink the ship, but before they could be carried out the Chileans boarded and saved her. Her machinery and turret were still operable. In this battle of 90 minutes the *Huascar* fired 20 rounds—40 shells from her 10″ turret guns. The *Cochrane* fired 45, and the *Blanco Encalada,* 31. The *Huascar* made but 4 hits, all on the *Cochrane.*

The *Huascar* was repaired, given a new battery of two 8-inch breech loaders, and sent to sea under the Chilean flag. Off Arica on February 27 the following year (1880), commanded by Captain M. Thompson, she fought a point blank action against the *Manco Capae* (*Onconta*). Her hull was pierced once and her captain was killed. She forced the *Manco Capae* to withdraw from action but could not sink or seriously

injure her. Wilson says that the presence of a Peruvian torpedo boat prevented the *Huascar* from attempting to ram. However that may be, the *Manco Capae* survived until Arica was captured, June 7, when she was sunk by her own crew. In the meantime the *Huascar* with other ships had been employed in bombarding Callao and Peruvian ships in the port and making attempts against them with spar torpedoes.

The *Huascar* received one dangerous hit from the forts at Callao, but she was intact at the end of the war. Her record is unique. By or against her was employed every new weapon—the fish, the spar, and the controlled torpedo, and the ram—with armor a passive and the gun an active participant. Of these, armor, the gun, and the fish torpedo survive. All honor to the brave crew of the *Huascar* and her opponents.

CHAPTER XLIV

INCREASE OF THE U. S. NAVY. ESSAYS ON TACTICS

In 1881, Secretary of the Navy W. L. Hunt appointed an advisory Board of naval officers and civilians to investigate and report on the numbers and types of ships required for our Navy and the material and methods of construction to be employed. The Advisory Board's recommendations resulted in an appropriation by Congress and the laying down, about two years later, of three protected cruisers, *Chicago, Boston,* and *Atlanta,* and a despatch boat, the *Dolphin.* The material used in their construction was mild steel.

The *Chicago,* largest of the four, was designed for a speed of 16 knots, on a displacement of 4,500 tons. She was propelled by twin screws and was bark-rigged. She mounted four 8-inch guns singly, in sponsons, bow and quarter, on her spar-deck, and eight 6-inch in broadside on her gun-deck. These guns were built-up breech-loading rifles, 30 caliber, the first of their kind in service afloat in the United States.

The *Boston* and *Atlanta* were 15-knot ships, displacing 3,000 tons, single screw and brig-rigged; each mounting an 8-inch B.L.R. on her port bow and one on her starboard quarter and six 6-inch B.L.R.s in a covered superstructure on the same deck level as the 8-inch guns.

The despatch boat *Dolphin* was single screw and schooner-rigged. She displaced 1,500 tons, mounted one 6-inch gun, and was designed for a speed of 14 knots.

In 1882, Naval Secretary William E. Chandler established the Office of Naval Intelligence, to collect, collate, and issue to the naval service, information from abroad. This office published annually a series of General Information books and pamphlets which were supplied for a number of years to each ship in commission and to each officer. The work of this office has enlarged. It still compiles and publishes information from abroad, but not all of its activities are public and the form of the information supplied has been varied.

In 1884, General Information series No. 3, compiled and arranged by Commander Bainbridge Hoff, was issued to the naval service. This volume contains some tactical views which have already been summarized. Commander Hoff's own comments and conclusions were:

(1). All authorities agree that ships will fight at great speed; they will come close to one another on a charge, and then separate, turn, and charge again.

(2). A vessel built for a ram *"pur et simple"* to be unarmed in regard to battery, once so favorably looked upon by naval economists, seems to be losing its prestige as a fighting factor.

(3). So much progress has been made in foreign navies with the automobile torpedo, that it is considered a perfectly reliable weapon within 400 yards. . .

(4). Due to this, it is believed that ramming will only be attempted against a defenseless ship; one without torpedoes.

(5). The typical sea torpedo-boat is a sea going cruiser . . . of 200 to 400 tons displacement. . . . There should be two to each ship of the line of battle and they should cruise close to them.

(6). The Italians have lately brought to notice a vessel of war about 150 feet, displacing 600 tons and capable of making 25 knots.

This vessel was ram-bowed, had twin screws, carried about 45 machine guns on two decks, and was called a *torpedo-boat destroyer*. She carried two tubes for discharging automobile torpedoes. This class of vessel, much modified, finally supplanted the small torpedo-boats, then being built in numbers. The last and most significant part of the name—"torpedo-boat *destroyer*"—has been retained.

By 1886, 283 torpedo-boats over 100 feet in length had been, or were being built by England and by the Continental Powers, France Germany, Italy, Austria, Russia, and Turkey (four by Turkey). An almost equal number, of less than 100 feet in length, were built, or building.

(7). Every ship should have machine guns for the destruction of torpedo-boats alongside. It may be set down as a maxim that machine guns will play a prominent part in future naval combats.

(8). The question of ammunition supply is a very burning one and has become a prominent problem in naval strategy and bears strongly on naval tactics. [This had a special bearing on the subject of actions at long range.]

(9). The latest authorities combine in the opinion that there should be no regular *reserve* squadron, believing that all vessels of any size and strength should be in the line of battle.

(10). A great diversity of opinion exists as to the post the Admiral should occupy in an engagement. . . . Personal example, however, will weigh more in the scale of victory than signals, and therefore, we find that since all actions are based on the ram, the Admiral's post is in the place of danger: he must lead into battle.

(11). If the commanding officers of ships are not thoroughly imbued with the spirit of the Commander-in-chief, and are not conversant with his tactical plan of action, there can not only be no success, but only disaster and defeat to be looked for.

(12). The victory will probably lie with that fleet whose formation will permit it to keep its integrity the longest.

There were no definite statements and perhaps no definite opinions on maximum battle ranges. Guns were ranged about 5,000 yds., but essayists still contemplated close action with rams.

Commander Hoff's compilation included 24 plates, illustrating all types of formations and movements. No immediate tests could be made of the maxims formulated, but by means of this volume, current opinions on battle tactics were placed in the hands of all officers.

Secretary Chandler also established the Naval War College (at Newport, R.I.), October 6, 1884. This college—the first of its kind—was designated officially as "A college . . . for an advanced course of professional study for naval officers, to be known as the Naval War College."

Secretary Chandler, in his report to Congress, said, in part:

. . . The reasons which have controlled the action of the Department, are to be found in the recognized necessity for an *advanced* course of military and naval education in the United States.

There are now existing three schools for the purpose in the army, and one in the navy. The latter is at the Torpedo Station at Newport where a class of officers is assembled for a few months in each year for instruction in the art of manufacturing and using torpedoes and torpedo explosives.

The constant changes in the methods of conducting naval warfare imposed by the introduction of armored ships, swift cruisers, rams, sea-going torpedo boats and high-powered guns, together with the more rigid methods of treating the various subjects belonging to naval science, render imperative the establishment of a school where our officers may be enabled to keep abreast of the improvements going on in every navy of the world.

The Torpedo School only partially fulfils the imperative requirements. The College is intended to complete the curriculum, by adding to an extent, never heretofore undertaken, the study of naval warfare and international law and their cognate branches.

. . . Steam tactics and naval warfare under steam are comparatively new studies and readily admit of modern and scientific methods of treatment. The formation of the line-of-battle, composed of large iron-clads, carrying heavy guns and automobile torpedoes, the use of the ram as an independent arm, and the sea-going torpedo-boat and its place in the order of battle, are subjects which require the most careful consideration, and may well excite on the part of the naval officer, indeed *should* excite, an intelligent curiosity or inquisitiveness. Indeed, we may go further, and say that the naval officer who does not seek to inform himself on these points is indifferent to the most important branch of his profession. That the whole subject is new and fresh and worthy of our most careful study, is to be learned from the fact that the great naval powers of Europe still regard steam tactics as an unsolved problem.

Lieutenant Commander Horace Elmer, in an article on Naval Tactics contributed to the Naval Institute in 1884, criticised our signal book for lack of definite battle formations. He said:

. . . there are only four signals having any reference to an order of battle, and there are virtually only two formations; order of battle in two lines and two columns. . . .

It is hardly to be conceived, however, at the present day, that any admiral commanding a fleet of modern vessels would receive an attack in this formation, ex-

posing the broadsides of his fleet to the rams of the enemy, and trusting to his guns to stop them.

He also criticised some of Parker's military evolutions, such as feinting on one wing and attacking on the other, as impracticable with ships.

Elmer condemned "groups" and followed Lieutenant Bower, Captain Courbet, and Admiral Penhoat in advocating pairs as the best tactical units. Elmer recommended that formations and evolutions by pairs be added to the signal book, and that tactical units of four ships be discontinued.

Discussion of Elmer's paper showed "great diversity of opinion on the subject of fleet and squadron maneuvers."

While the protected cruisers laid down in 1883 were building, the question of ironclads, other than monitors, for the United States Navy was brought before the Institute by Ensign W. I. Chambers. He proposed two classes of ironclads, coast defense ships and ships of the line or "ocean monarchs."

Chambers believed that if coast defense ships were given only moderate speed and moderate coal capacity they could be provided with great offensive power in guns and great defensive power in heavy armor and compartmentation.

> If we confine the machinery, heavy guns, and ammunition to a moderate space, thoroughly protected by heavy armor above, and light armor below the water-line, and surround the citadel, thus formed, by a raft body, composed of numerous compartments, we can produce a vessel that will be unsinkable by several blows of the ram and torpedo. . . . The whole auxiliary structure could be composed of very light plates, with the exception of a fore and aft bulk-head which would give the raft structure strength enough to ram.

Here is foreshadowed the modern inner skin, or exterior (blister) methods of torpedo proofing.

Chambers called such a ship a coast defense ram, and armed it with two 15-inch guns, two 6-inch, six 6-pounders, and four torpedo tubes. His battleships were to be at least as powerful as those of England, although he felt that the ships she was then building, the *Anson, Benbow, Camperdown,* and *Collingwood,* could never match the 14,000 ton, 18-knot *Italia* and *Lepanto,* which, however, he did not consider perfect.

Chambers thought that ships as strong as any building for England could be designed on a displacement of 11,000 tons, but he had no objection to going up to 15,000 tons, or more, "unless we decide, as our English cousins are inclined to do, that future engagements on the high seas will invariably result in victory for the ship that possesses the best qualities for ramming."

He believed that on the high seas, ramming would be a last resort:

> My reasons for thinking so, are: (1). The development of the torpedo will render the destruction of sea-going ships almost certain at short range. Moving torpedoes may be regarded as a species of projectile, the range and efficiency of which, will, in the natural course of improvement, be continually increasing. (2). The possession of powerful guns by one of the two antagonists, will enable that ship to multiply the chances of delivering blows almost equal in power to the ram of the small ship, at a safe distance outside the zone of effective torpedo offense.

He proposed for battleship armament, at least two 15-inch guns, six 6-inch (or 5-inch), ten 6-pounders, ten revolving cannon, and six torpedo tubes. The 15-inch and 6-inch guns were to be ranged up to 5,000 yards, but he gave no intimation of what he considered to be the best battle range.

His battleships were to have armor protection equal to those of Italy. Italy protected her guns, but not her water line. Some Englishmen (Noel for example) advocated water-line protection and mounting guns in the open, but generally both water-line and guns were protected; the latter, at least by a barbette, which strove for favor with the turret.

Another live subject was protection of vitals with heavy armor, leaving unarmored ends, or lighter *belt armor.*

Chambers' recommendations were, "No ship to be built that is not superior, or fully equal to those of any other nation of the same type contemporary with it," and "no ship should be built which does not designedly occupy her place in the great scheme of preparation of war for national defense."

This was sound advice. He believed that a "war navy could perform the offices of a peace navy in the best interests of efficiency."

He recommended that an annual fund be obtained for experiment, under the direction of the Secretary of the Navy's Advisory Board, and the building of a model tank in the Washington Navy Yard, or other suitable place for the benefit of the navy and shipping interests.

As subjects for experimental research, he suggested, (1) Determination of the best construction to diminish the effect of shell explosion and the entrance of water through shot-holes. (2) The best types of engines and boilers. (3) The best fuel, including naphtha. (The earliest steamers burned wood. For men-of-war, wood was displaced by anthracite coal, and then by soft coal.) (4) The best form of propelling power (screw design).

Chambers also suggested the use of *smoke* to blind the enemy in action. He had an inventive mind which he employed for the benefit of his country.

At this time, six other countries had squadrons of evolution, and engaged in maneuvers to solve the problems of attack and defense. These were England, France, Italy, Germany, Austria, Norway, and Brazil.

The course of the maneuvers, and—as far as they were made public—the results, were assembled in the "Information Series" and supplied to officers, many of whom followed them with deep interest, awaiting the time when we should have enough new ships to do likewise.

The compactness of the "Naval Square" and the ease with which its course could be changed, continued to attract a few officers, but when it was discussed at a meeting of the Institute, it found no supporters.

The fact has been noted that Commander Noel published without change, in 1884, his prize essay of 1874, thus signifying that his views on the essentials of battle tactics had not changed in a decade.

In 1886, the R.U.S.I. prize essayist of 1880, Captain Fremantle, who had reached the rank of rear admiral, traced in another essay the trend of naval tactics during the elapsed six years. He said:

> Our iron-clads have not changed materially. . . . Considerable changes and modifications in armament have taken place and are being daily developed from the advance of the torpedo attack.

He described the types of rapid-fire guns developed to repel torpedo boats and the need for smokeless powder. He said nothing of torpedo tubes for ironclads, but clung to the idea that every big ship should be, as far as possible, self-supporting and should carry at least two torpedo-boats, "capable of being dropped *easily* from the ship, when under way." (This is a problem that has never been solved.)

As a mechanical defense at anchor, torpedo nets were being developed for the British navy.

The rapid building of torpedo boats by the principal European powers was partly in consequence of a belief, especially in France, that the torpedo boat would be the master of the sea. Taking notice of this, Fremantle said:

> I do not see how the size of battleships is to be limited, if ships are required at all, and, at all events, I am on the side of the big ship. . . .
>
> France, Germany and Austria have not laid down any ironclads recently. The great tactical question of the day, is clearly that of whether big ships and fleets are to continue to exist, or whether they are to give place to torpedo flotillas, at least as far as combats on the open sea are concerned . . . whether they are to be a mixed medley or mêlée of small craft, like Actium or Lepanto.
>
> Admiral Aube [French Minister of Marine] believes implicitly in torpedoes and fast cruisers. . . . [The French advocated 5½-inch guns ranged to 7200 meters.]

Fremantle did not subscribe to the French belief, which was, at least in part, the product of a desire to avoid the growing cost of ironclads, but he did believe that, "These naval vessels [torpedo-boats and destroyers] will, in my opinion, act a very important part in future naval actions and operations"; and a modern fleet "certainly cannot depend solely on ironclads."

He considered the ram *Polyphemus* as an "overgrown torpedo ship, of special value under exceptional circumstances . . . too large and too expensive to be often repeated." Besides, his belief in the ram as a weapon was less settled:

> I must, I am afraid, put the ram a little in the background—at least in the commencement of the hostilities between fleets . . . [but] I consider it a most important weapon and the ram bow of our ships should be at least as strong as that of the ships of any foreign power.
>
> I am told that I ought to make some allusion to Mr. Nordenfeldt's diving boat, and to the effect such inventions will have on tactics . . . I looked upon his diving boat as merely a development of the torpedo attack.

Fremantle said that, in 1880, England had a few torpedo boats which were "rather experimental craft . . . the outrigger torpedo was in more general use than the Whitehead."

The Whitehead, in the meantime, had increased, and was increasing, so much in power, range, and reliability (though complicated, and frequently failing) that it was "the Whitehead which threatens to revolutionize maritime warfare."

Fremantle's estimate of the importance of the torpedo is shown in his proposed fleet organization: 12 ironclads, 4 frigates, 12 scouts, 24 torpedo-catchers (destroyers), 50 first class torpedo-boats with 2 mother-ships.

If the ironclads carried—as he recommended—two small torpedo-boats, these would add 24 to the 74 craft carrying torpedoes.

He said that a torpedo had been built which could make 24 knots for 600 yards, with 70 pounds of gun cotton in its war-head, and that assurance had been given that a later pattern could be supplied, fully adjusted and *ready for use*.

Promise, here, outran performance. The "ready torpedo" was long the dream of manufacturers and torpedo officers.

Even if the Admiral kept his smaller boats at the davits, the efficient organization of his one hundred ships—large and small—would be difficult, except in smooth water. A first-class torpedo-boat was rated as sea-going, but had fatal limitations in endurance and of control in bad weather.

The Admiral advocated destroyer divisions of six, and torpedo-boat divisions of twelve. Since the British "division" was sometimes the equivalent of our "squadron," it is possible that he may have had in mind subdivisions of his destroyers and torpedo-boats.

He did not lay down any initial attack formation, contenting himself with the statement that

> both foreign and English writers have generally assumed "line abreast" or some modification of it, such as indented lines abreast, or lines abreast by divisions, as suitable for ramming tactics, while those who have advocated reliance on the gun, have gone back to line ahead, or some modification of it.

"Ramming or torpedo attack should *follow* the gun action," which he thought would begin by skillful maneuvering to avoid torpedo fire, the gun being the principal weapon, and the ram to be used and torpedoes fired as opportunity offered.

> The enemy might try a torpedo attack with all his small vessels at night, as a surprise. In this case, the look-out ships and torpedo-catchers would at once attack them. . . . The fleet attacked, would probably do best by not firing a shot [he is referring to the heavy ships] but by changing position rapidly.

This is the first definite opinion that silence, darkness, and change of course are the best precautions against night torpedo attack.

The electric arc light had been developed during the preceding decade and incandescent lamps were commercially developed towards its end (1879). One of the early naval uses of the arc search-light, was the illumination of mine fields, to prevent counter-mining. It soon became an important aid to navigation and was relied upon to detect the approach of enemy torpedo-boats.

The incandescent light for ships was a convenience; the search-light was felt to have become a necessity. The United States installed incandescent lights on the *Albatross* in 1883, and on the *Omaha* in 1885.

Fremantle thought that all ships should have electric lights. Some useful comparisons can be made between his opinions and those of Admiral (then Lieutenant) Frederick C. D. Sturdee, R.N., later the victor at the battle of the Falkland Islands. Sturdee was the R.U.S.I. prize essayist of that year (1886) on "The Changes in the conditions of Naval Warfare, owing to the introduction of the Ram, the Torpedo and the Submarine Mine, having regard chiefly to the following points in our own and foreign navies, viz: Training of Personnel, Construction and protection of matériel, and Defense of Ships and Harbors."

On account of the torpedo, which Sturdee said made over 70 per cent of hits on a 200 ft. target, at 300 yards, he thought that the ram was,

by no means, the first weapon of offense. Battles should begin by torpedo attacks before guns opened fire or attempts were made to ram. For defense against torpedoes, he recommended that "all ships down to the smallest gun-boat" should be equipped with nets.

Like Fremantle, he clung to portable torpedo-boats, to be hoisted out at sea from cruisers. He did not specify them for his battleships. Battleships were to have six torpedo-tubes with wide train; cruisers, two, for firing abeam. He followed through for the torpedo, as a weapon, by advocating one or two torpedo rams for each fleet.

Noting that no coast defense ironclads had been laid down since 1872, Sturdee advocated a return to that class of ship.

Guerre de Côte and Guerre de Pleine Mer, as the French called coast and deep sea warfare, both had their advocates, then, and for many years, although the best minds agreed on a powerful sea-going fleet, as the best defense—including coast defense—for any country.

Sturdee's coast defense ironclad was to be a small, light-draft ship with fair speed and coal capacity, able to steam from port to port with safety in bad weather. She was to mount one large gun, one or two 5-inch, and some machine-guns.

He also had in mind an intermediate ironclad of limited draft, for going through the Suez Canal. (The canal had been opened in 1869, with a minimum depth of 26 feet. It has since been deepened.)

Sturdee's battle line ships mounted their heavy guns in barbettes, with a two-inch deck over the barbette. Instead of a central, armored citadel, his ships carried a water-line belt, with an armored deck over the vitals. Two well armored conning-towers were provided: one for the captain, the other for signals.

For torpedo defense, he mounted a 6-inch battery on a covered deck, supplemented by machine guns. His torpedo tubes and torpedo nets have been mentioned.

His ships were to have speeds of 15½ to 16 knots, twin screws for maneuvering, steam steering-gear, and coal endurance for six days at full speed. He did not estimate the tonnage and draft which would be necessary to meet his other requirements.

He advocated large twin-screw, 18-knot cruisers, with long range guns, great coal capacity and auxiliary sail power. He thought a length of 350 feet would be sufficient. His portable torpedo-boats and beam tubes for battleships have been mentioned.

In the United States, in 1886, two additional cruisers and two gunboats were authorized. The Advisory Board reported that "ironclads

are absolutely needed for the defense of the country in time of war," but made no specific recommendations as to number, size, or armament.

A naval officer, Admiral Edward Simpson, taking into account the depth of harbors in the United States, the capacity of its drydocks, and the ironclads built, or building, for other nations, recommended a ship to displace about 7,300 tons, on a draft of 23 feet, beam of 58 feet, and length of about 300 feet, with a speed of 16 knots.

He proposed that his main battery should be mounted in barbettes, saying,

> . . . the only question that could arise . . . would be between the barbette and the turret system, but for sea-going purposes the increased height . . . of the battery given by the barbette . . . must be recognized as an advantage, hardly to be equaled by any that the friends of the turret could advance. . . .
>
> In recommending, as I do, the barbette type of ships for our sea-going armored vessels, I think I have the experience of the world behind me.

He seems to have associated turrets with low free-board vessels only. At that time, the British, French, and Italians were building barbette ironclads of about 10,000 tons displacement. In England these were the Admiral class: *Collingwood, Howe, Rodney, Benbow,* and *Anson;* also an armored cruiser of 7,500 tons, the *Impericuse.*

Simpson did not specify caliber of guns, nor thickness of armor, but what might be achieved on his proposed displacement is shown by the 6,000 ton *Riachuelo,* then being completed in England for Brazil. She was a double-turreted ship, mounting 9-inch guns in turrets protected by 10 inches of armor, with a secondary battery of six 6-inch mounted on her upper deck. Her hull was protected by an 11-inch armor belt and 2-inch deck protection.

The Naval Advisory Board had recommended the building of five 2,000 ton steel rams. Simpson claimed that a ram of less than 3,000 tons would not draw water enough to get below the armor belt of an ironclad. He also stated that since the appearance of the torpedo-boat, vessels designed solely as rams were considered less suitable as fleet components. He felt that the torpedo had lost some of its early prestige, because of the defense against it which had been developed.

Two prominent officers, Commander—later Rear Admiral—W. T. Sampson, and Rear Admiral S. B. Luce, appreciated the importance and value of the Naval War College and the Naval Institute as forums for the study of naval warfare and naval tactics.

Admiral Luce, after reviewing all that had been written on steam

tactics, concluded that all nations were still "groping in the dark," but he believed that "steam tactics and naval warfare under steam . . . readily admit of modern and scientific methods of treatment."

This was an optimistic remark, because at that time, multiplicity of types—in fact, confusion of types—was at its height in foreign navies.

A year later, Lieutenant J. F. Meigs contributed some pertinent statements. He said that before "appropriate tactics" could be developed,

> it is necessary that the types of warships which have not yet taken the form they are destined to keep, shall stand out a little more.
>
> We have, shading down by almost imperceptible gradations, battleships, armored cruisers, protected, unprotected, and partially protected cruisers, rams and torpedo-cruisers. And then, with no clearly drawn line to separate them from the foregoing, come the gunboats and gun vessels, protected, unprotected, and protected in part; torpedo-boats, torpedo-boat-catchers and hunters, sea-going and coast defense torpedo-boats, etc., in apparently inextricable confusion.
>
> Have any of these types tactical features which are permanently grafted on ships?

Meigs posed this question to both the War College and the Institute.

He undertook to determine fighting ranges, considering the gun only. After comparing guns and armor of battleships, then building, he concluded that the *heavy guns* could penetrate the water-line belt of their own ships, at about 4,000 yards, when impact was normal (at right angles) and muzzle velocity about 1,800 f.s. Oblique impact would materially shorten the penetrating range.

From this data, he concluded that with varying angles of presentment, "no material damage will usually be incurred outside of 2,000 yards."

> Will 2,000 yards, then be the fighting range? . . . if the combatant ships are commanded by skillful officers, one will seek close range, and one will try to avoid it. The ship with skillful officers, will hold off at a range where her guns will penetrate, and yet where it will require some skill to hit.

Two thousand yards was then well outside of torpedo range.

Meigs made another important estimate; viz., that for targets twelve feet high, the range whose whole length was danger space, was 1,100 yards for 1,800 f.s.m.v. heavy projectiles. This was also outside of torpedo range.

Lieut.-Commander W. W. Reisinger in a comprehensive article on "Torpedoes," submitted to the Naval Institute in 1887 said that "The effective range of the Whitehead is small yet, but it is much more certain of effect at closer quarters; 400 yards may perhaps be stated as the range at which it may be counted on with some degree of certainty." Comparing this with gunnery, he estimated that modern guns could make 25 per cent of hits at 1,000 yards.

Reisinger quoted from a British admiral, Boys, what is still true,

> We are told that it [the Whitehead] is a very simple weapon, and wants but little attention. My experience was that it was a very complicated weapon . . . that to make a Whitehead torpedo, a success, and keep it in complete order, you must love it, you must be always with it, inspecting it and cleaning it; it must not have the least detail or particle out of order.

While recognizing the torpedo's defects, Commander Reisinger believed that it had taken first place from the gun and the ram. He quoted Colomb as saying, "I think the effect of the torpedo is to push the ram back, almost, if not entirely, for I cannot conceive anybody attacking with the ram, if he can attack with the torpedo instead."

Reisinger thought "its greatest power lies in its immense moral influence." His ideal torpedo would have "long range, certainty of starting and exploding, heavy charges, great speed to the end of the run, *directive power,* ease of manipulation, run noiselessly, and be capable of frequent firing for trial, without derangement."

He said that experience in France and England "proved the inexpediency of sending the torpedo-boats to cruise with the fleet."

Speaking as an officer of the United States Navy, which at that time had no torpedo boats, Reisinger remarked, "It is rather a difficult task to suppose a system of tactics, applicable to vessels which we know only by reputation."

This was a period of confusion of types and weapons, but it appeared to stimulate invention.

In the discussion of Commander Reisinger's essay, Commander G. W. Sumner made a wise statement,

> Everyone is expecting some new discovery which will revolutionize all accepted tactics and render war easy. I rather think that on the contrary, . . . the new discoveries, whatever may be their effect upon all accepted tactics, will continually render war more difficult in all its phases. Certainly, such has been the effect of the introduction of great speed, of the ram, the torpedo, of the high power gun and of the rapid-fire gun.

Another officer, Lieutenant Seaton Schroeder, said that the great moral influence of the torpedo was lessening, intimating that earlier expectations of its effectiveness had not been realized except on proving grounds.

Another widely informed officer, Lieutenant F. M. Barber, said that predictions that the torpedo had doomed the ironclad would not be realized, although it had affected ship construction. Armor to protect ships' vitals had grown thicker; and the Italians had built some ships with triple bottoms. "Probably the next step will be to use cellulose, or

something else in the bottoms to stop holes automatically." This would bring on larger torpedoes, but armor would not be abandoned, since the *gun* always had to reckoned with.

Reisinger said the submarine might be a possibility; but in France it was felt by influential officials that sea-keeping torpedo-boats would keep France in the first-rank of naval powers, until the ideal vessel, "the submarine boat, the true weapon of the future, shall have been realized."

Cost was always a large, and sometimes a deciding factor in the French building program, but at this time (1888)—probably to keep abreast of England—France was building seven barbette ironclads of 7,000 to 10,000 tons each. An opponent of large ships claimed that for the cost of the ironclads twenty 3,000 ton ships could be built to supplement the sea-going torpedo-boats and provide a more powerful navy until the advent of the submarine.

The 1888 session of the Naval War College was devoted to a study of the "Tactics of the Ram and Fleet Battle Tactics," but the decisions were not made public. The President of the College, Captain A. T. Mahan, in his annual address, discussed English and French naval tactics during our Revolutionary War. Mahan had made a special study of the naval battles of that war and his conclusions were of great interest.

In his address he first cautioned officers "in the eager curiosity to know how your weapons are manufactured," not to neglect "to prepare yourselves for their use in war."

Then taking up the subject of his address, he said,

> There remains in my own mind no doubt, after reading the naval history on both sides, that the English brought to this struggle much superior seamanship, learned by the constant practice on shipboard; while the French officers, most of whom had been debarred from similar experience by the decadence of their navy in the middle of the century, had devoted themselves to the careful study of their profession. In short, what are commonly called the practical and theoretical man were pitted against each other, and the result showed how mischievous is any plan which neglects either theory or practice or which ignores the fact that correct theoretical ideas are essential to successful practical work. The practical seamanship and experience of the English were continually foiled by the want of correct tactical conceptions on the part of their own chiefs and the superior science, acquired mainly by study, of the French. It is true that the latter were guided by a false policy on the part of their government and a false professional tradition. The navy, by its mobility, is pre-eminently fitted for offensive war, and the French deliberately and constantly subordinated it to defensive action. But though the system was faulty, they had a system; they had ideas; they had plans familiar to their officers, while the English usually had none—and a poor system is better than none at all.

It must be said, however, that although frequently foiled, the bulldogs, in the end, won, and their tactics, if not always followed, were systematized in their signal books and fighting instructions.

In his great work, *The Influence of Sea Power upon History,* in which the preface is dated December, 1889, Mahan in the Introductory chapter says of tactics:

. . . while it is wise to observe things that are alike, it is also wise to look for things that differ; for when the imagination is carried away by the detection of points of resemblance—one of the most pleasing of mental pursuits—it is apt to be impatient of any divergence in its new found parallels, and so may overlook or refuse to recognize such. Thus the galley and the steamship have in common, though unequally developed, the important characteristic mentioned [ability to move in any direction, independent of the wind], but in at least two points they differ; and in an appeal to the history of the galley for lessons as to fighting steamships, the differences, as well as the likeness must be kept steadily in view, or false deductions may be made. The motive power of the galley when in use necessarily and rapidly declined, because human strength could not long maintain such exhausting efforts, and consequently tactical movements could continue but for a limited time; and again, during the galley period offensive weapons were not only of short range, but were almost wholly confined to hand-to-hand encounter. These two conditions led almost necessarily to a rush upon each other, not, however, without some dexterous attempts to turn or double on the enemy, followed by a hand-to-hand mêlée. In such a rush and such a mêlée, a great consensus of respectable, even eminent, naval opinion of the present day finds the necessary outcome of modern naval weapons—a kind of Donnybrook Fair, in which, as the history of mêlées shows, it will be hard to know friend from foe. Whatever may prove to be the worth of this opinion, it cannot claim an historical basis in the sole fact that the galley and steamship can move at any moment directly upon the enemy, and carry a beak upon their prow, regardless of the points in which galley and steamship differ. As yet this opinion is only a presumption, upon which final judgment may well be deferred until the trial of battle has given further light. Until that time there is room for the opposite view—that a mêlée between numerically equal fleets, in which skill is reduced to a minimum, is not the best that can be done with the elaborate and mighty weapons of this age. The surer of himself an admiral is, the finer the tactical development of his fleet, the better his captains, the more reluctant must he necessarily be to enter into a mêlée, with equal forces, in which all these advantages will be thrown away, chance reign supreme, and his fleet be placed on terms of equality with an assemblage of ships which have never before acted together. History has lessons as to when mêlées are, or are not, in order.

Thus, Mahan warned against a mêlèe, which the favored (theoretically) "charge through" would surely bring about. Continuing with Mahan:

. . . The distinguishing feature of the weather-gage was that it conferred the power of giving or refusing battle at will, which in turn carries the usual advantage of an offensive attitude in the choice of the method of attack. The advantage was accompanied by certain drawbacks, such as irregularity introduced

into the order, exposure to raking or enfilading cannonade, and the sacrifice of part or all of the artillery fire of the assailant—all which were incurred in approaching the enemy. The ship, or fleet with the lee-gage could not attack; if it did not wish to retreat, its action was confined to the defensive, and to receiving battle on the enemy's terms. This disadvantage was compensated by the comparative ease of maintaining the order of battle undisturbed, and by a sustained artillery fire to which for a time the enemy was unable to reply.

. . . Henceforth the ships which have the greatest speed will have the weather-gage.

. . . the seaman . . . will observe also that changes of tactics have not only taken place *after* changes in weapons, which necessarily is the case, but that the interval between such changes has been unduly long. This doubtless arises from the fact that an improvement of weapons is due to the energy of one or two men, while changes of tactics have to overcome the inertia of a conservative class; but it is a great evil. It can be remedied only by a candid recognition of each change, by careful study of the powers and limitations of the new ship or weapon, and by a consequent adaptation of the method of using it, to the qualities it possesses, which will constitute its tactics. History shows that it is vain to hope that military men generally will be at the pains to do this, but that the one who does will go into battle with a great advantage—a lesson in itself of no mean value.

We may therefore accept now the words of a French tactician, Morogues, who wrote a century and a quarter ago:

Naval tactics are based upon conditions the chief causes of which, namely the arms, may change; which in turn causes necessarily a change in the construction of ships, in the manner of handling them, and so finally in the disposition and handling of fleets.

CHAPTER XLV

CONTINUED INCREASE OF THE U. S. NAVY. JAPAN-CHINA WAR. ESSAYS ON TACTICS

FLEET tactics continued to be a live subject in the navy, though the United States had no other ironclads than some old monitors, and but few modern cruisers. However, the four steel ships, already named, were followed on the ways, between 1885 and 1890, by twelve protected cruisers of from 2,000 to 7,500 tons and from 17 to 23 knots speed; three armored cruisers of 6,500 to 8,500 tons (two of these, the *Maine* and *Texas,* were later called third-class battleships); one double-turreted monitor, the *Monterey,* 4,000 tons; one torpedo-boat, the *Cushing,* 115 tons; one experimental dynamite-gun ship, the *Vesuvius,* 930 tons; and four 1,200 ton gunboats—in all 26 craft, varying widely in tonnage, speed, and purpose.

In 1889, what was commonly known as the "White Squadron," commanded by Rear Admiral John G. Walker, was designated as a "squadron of evolution." When first formed, it consisted of the *Chicago* (flag), *Atlanta,* and *Boston* (cruisers), and the gunboat *Yorktown.*

To these were later added, soon after their first commissioning, the cruiser *Newark,* gunboats *Bennington* and *Concord,* dynamite cruiser *Vesuvius,* and torpedo-boat *Cushing.*

The evolutions prescribed in the Tactical Signal Book, then in force, were practiced to the point where the squadron could maneuver as a body, as skilfully as the widely varying tonnage of the ships would permit. Many officers had their first useful experience in controlling ships at moderate speeds and in changing formations in close order. The ships of this squadron were assigned to other duties about the end of 1891. Thus began, and ended, our first and last steam squadron of evolution, especially designated as such.

In all discussion of over-sea actions, the question of fuel endurance arises, not only on account of knots to be traversed, but of water-line protection at lightest permissible draft.

At this time, there was a strong feeling in both England and the United States that ships—especially cruisers—should, as advocated by Admiral Luce, have lines which would enable them to "do well under canvas," and should have full sail power to allow them to reach any

point where belligerent operations might ensue with full bunkers.

Colomb had undertaken to prove, on the score of economy, that the cost of spars and sails and their upkeep was greater than the cost of coal saved. This, however, did not satisfy Luce's strategic requirement of arriving at the scene of hostilities with full bunkers. Also the greater the coal capacity, the less tons of guns, or protection, a ship could carry.

Coaling stations partly solved the question of coal endurance for the British. Fuel ships to accompany a fleet, and later the advent of oil burning and the achievement of oiling at sea, solved Luce's problem in a large degree.

Admiral Luce was a "Sailor of the Sail," but also he was alive to the need of establishing a better system of steam battle tactics. He recommended that the U. S. North Atlantic Squadron be designated to operate annually in collaboration with the staff of the Naval War College, to work out war problems practically. The finish of each problem was to be followed by a critique. He said:

> By this intelligent method of conducting exercises, officers and men are brought to a realizing sense of what hostile operations might lead to, and next to war, itself, learn from them more of their business than they possibly can from any other method.

Among the suggestions he made was one citing as the proper station of an Admiral in battle, one similar to that being provided by the French for commanding and torpedo officers of battleships, aloft on the military mast,

> from whence, overlooking the field of battle, they can direct the movements of their ships, distinguish in the mêlée, friend from foe, and send out their torpedoes intelligently. Farragut first suggested, and practiced this plan. . . .

In 1890 the Naval Policy Board advised the building of three classes of battleships, differing widely in tonnage. It recommended great sea endurance for the first class; thus recognizing that our best protection might be to carry the war "to the very doors of the enemy . . . for an enemy knowing it was possible for such a fleet to appear on its own coast, would be obliged to assign a superior force for its protection, thus greatly diminishing that to be sent against us." Their specifications for the second and third classes are not of value.

This board also recommended the immediate building of torpedo-boats, and that the building of cruisers be continued. The board discussed the qualities of rams but did not recommend that any be

built. It favored experiments with the submarine boat and dynamite guns.

In 1890, Lieutenant Richard Wainwright attempted to evolve a battle plan for our non-existent ironclad fleet. His essay compares well with that of any European author of the period.

Wainwright announced himself as a believer in the gun, as the principal naval weapon.

> Certainly a commander who is confident of his own skill, and of his power to wield his fleet as a single machine, would prefer that weapon upon which he can base his calculations, and throw out the element of chance as far as possible. He would first use the gun, until his calculations proving correct, he had disabled a portion of his enemy's fleet; then the great value of the ram would be seen. . . . At this time, its value far exceeds that of the gun, and a good commander would push his advantage home with the ram.
>
> Much has been claimed for the torpedo, but when it has been practically tested, its performance has fallen far below the expectations of its advocates. As at present developed, it has little, or no, practical value in fleet action. . . .

In what formation should the attack be made to use the gun most effectively? He concluded that a battle formation in bow and quarter line, in close order, was preferable to either line or column. "If your vessels are nearer together than the enemy's you have a greater force than his on some part of the line, and you move your vessels in less space.

This reasoning is not very clear, but he said later in the essay:

> . . . the fire of the heavy guns of the fleet will be concentrated upon one or two vessels of the enemy, according to the distance, state of the sea, and weight of fire of the fleet, taking into account the probable number of hits and the disposition of the armor of the opposing vessels, the idea being, to insure, as nearly possible, the disabling of at least one of the enemy's vessels, rather than distributing the damage over several vessels. . . .

To inflict serious damage, "2,000 yards should be the *opening* range under ordinary circumstances, as then the probable target would catch one fourth of the shots fired," and the ordinary range should be about 1,000 yards unless the enemy had less armor or lighter guns, in which case advantage should be taken of this superiority to engage at longer ranges. In no case should the range be less than 600 yards, on account of the danger of being forced to turn bows-on to meet a ramming attack.

Wainwright was considering a battle line of not more than ten ships. If more than ten, two fleets (squadrons) should be formed and maneuvered separately.

He would endeavor to bring his fleet of ten (closely formed in bow and quarter line, "probably something between line and column, never

reaching either limit") to the attack on such a course as would "tend to draw his fleet along one flank of the enemy" with his own line of bearing "at an angle of 45° with that of the enemy, rarely being parallel to his, and never at right angles." If the enemy came within ramming distance, ram must be presented to ram, and a charge through must result.

He announced as an axiom, "The fundamental principle of naval, as of military tactics, is to combine our force against a portion of the enemy. . . ." This is only true when the other portion of the enemy is *out of range*. Wainwright believed in a *reserve*.

W. Laird Clowes, author of the *History of the British Navy*, frequently referred to and quoted in this volume, was a member of the Naval Institute, and its prize essayist in 1892. His subject was, "Torpedo boats, their Organization and Conduct."

After some preliminary remarks devoted to the exaggerated claims for the torpedo and torpedo-boat, as the instruments of naval warfare which made all others obsolete, and the subsequent reaction when these claims were not substantiated, he said:

> It may . . . be assumed that the modern automobile torpedo will do all the work that is expected of it, provided that it be properly prepared and properly discharged, that is be used at a reasonable range, and that there be no obstruction between the weapon and the target.
>
> . . . The more interesting question is: How best shall we bring the torpedo into a position whence we may despatch it, under all possible advantages, to do its work in war-time?
>
> For several years I have enjoyed exceptional opportunities of seeing torpedoes and torpedo-boats at work. . . . I have witnessed the discharge of hundreds of unloaded torpedoes of all marks. . . . I have watched experiments with all kinds of tubes . . . been afloat in torpedo vessels . . . of all types, in all weathers.
>
> . . . I have been present at numerous . . . , torpedo attacks . . . day and night . . . have observed the behavior of torpedo-boats under all conditions. . . . have conversed or corresponded with the most distinguished specialists in Europe . . . and . . . my experience has not been limited to the torpedoes and torpedo flotillas of any one nation. . . .
>
> What may be called the new view of the proper functions of the torpedo-boat, regards that little craft, as merely a quick and decisive raider from a base.
>
> . . . in 1885, the *Polyphemus*, during the Bantry Bay operations, easily escaped several Whiteheads which were aimed at her, she being able to see them, and having sufficient speed and turning power to out-maneuver them. Indeed, I can think of no case in which, either in peace or war, a torpedo attack, unless made in darkness, or as a complete surprise, has attained its objects. Secrecy and suddenness, then, are the desiderata of prime importance for the success of a torpedo attack. Equally important are organization and training.
>
> What the unit in torpedo warfare should be, is still a matter of discussion . . . in torpedo-boat tactics, it must be the division.

. . . the German division consists of six first-class boats and a "division boat"—a vessel of three or four hundred tons displacement, of great speed. . . .

In England . . . in France also, the constitution of the division varies, or has varied. . . .

So numerous are the advantages attendant upon the presence of a division boat . . . a division should as seldom as possible be employed without such a leader. . . .

A vessel with a mast of some kind and a proportionally wider horizon, can keep a far better look-out than any torpedo-boat . . . can take observations and conduct navigation with much greater facility than the smaller one. . . .

It was Clowes' opinion that attacks at sea could reach to 150 miles from a base.

A torpedo-boat should cross, at high speed, what he called the "helpless zone"—the zone in which, while she may be discovered and fired upon, she cannot effectively attack in return. He considered the width of this zone as 1,850 yards. Attacking from ahead, at a speed of 18 knots, a ship steaming at ten knots, the torpedo-boat would cross the zone in approximately two minutes. Attacking from astern at the same speeds, it would cross the zone in seven minutes. He recommended approach from ahead, attack (fire) when broad on the bow from broadside tubes, complete an 8 point turn, escape if possible, and again alter course, when clear of the "helpless zone."

He thought that ships at anchor, could—and would—be protected by nets,

. . . only by devotion, steadfastness, carefulness, coolness and bravery, can he [an officer] hope to gain the slightest success in it [torpedo warfare].

He did not prophesy for the future of either the torpedo, the torpedo-boat, or the division boat. But he brought out two important facts: (1) that a well handled ship with good look-outs could avoid torpedoes; (2) that a leader (cruiser or division boat) is an important factor in an efficient attack.

Two years later (1894), he contributed two other valuable articles to the Institute: "The Ram in Action and in Accident," and "Consideration of the Battleship in Action."

He tabulated the names of all ships sunk by the ram, with the circumstances in each case, and showed that the ram had been, in reality, more dangerous to friends than to enemies. Nevertheless, he believed that its advocates were still in the majority in England. And further,

. . . there is now rising in the British navy, a school which would ram at full speed, although two or three years ago, if in this theater, the question of ramming at full speed had been put forward, nobody would have spoken in favor of it.

He prefaced his article on the "Battleship in Action" by a general statement whose truth has been amply demonstrated since he wrote.

> . . . nations have not yet begun to lay aside their inherited rivalries; the increase of armaments goes on everywhere, unchecked, and it is still the part of prudence, no matter how costly and distasteful the business may be, to prepare, as far as possible, for whatever may betide. . . .

Referring to the multiplication of machinery and appliances in ships, he thought naval officers did not prepare themselves thoroughly to get the best possible use from each in battle.

He propounded twenty-five questions, most of which are as pertinent to-day as in 1894, and not all of which have yet been satisfactorily answered. The questions were for captains, and pertained principally to ship and fire control. Their character is shown by the twelve quoted here:

> 2. What should be done with a ship's boats upon clearing for action? Would it be prudent to hoist them all out, and to leave them in tow of the steamboats a few miles astern; or would it be prudent to expose them to the enemy's gun-fire in their positions on the booms and elsewhere? Preservation of the boats and reduction to the lowest possible quantity of the splinters flying about the deck must be considered on the one hand; on the other hand, the possible escape of one or more boats from the effects of projectiles, and the importance, if it can be secured, of having something ready for immediate lowering deserve attention.
>
> 3. What is likely to be the effect upon a ship's anchors, of a successful attempt to use the ram? What the effect upon them of the ship's heavy forward guns, if fired nearly ahead and with some depression? Is it, or is it not important that you shall be in a condition to anchor at the close of an engagement?
>
> 4. Have you a thoroughly workable scheme whereby you can at once provide the proper substitute for any officer who may be killed or wounded, no matter in what part of the ship he may be stationed? Can you instantly make good the chain of authority throughout the vessel, no matter in what link it may be broken? Can you do this repeatedly? Can you do it if two or three links should break at once? Does your method of making good these breaks, leave your chain dangerously weak in places, or only shorter as a whole?
>
> 5. To what extent do you propose to rely upon voice-tubes, electric wires for lighting, firing, and signalling, helm indicators, engine room telegraphs, etc., in action, and what provision have you for finding substitutes at an instant's notice for any or all of them?
>
> 7. What provision have you for making or answering signals in action? Have you any protected station for your signalmen?
>
> 9. How would a suspicion that your bow tube might at the moment contain a live torpedo influence your decision, should an opportunity for ramming present itself?
>
> 10. Is there from your battery-deck, an updraught which would quickly free the battery from the gases of any explosion that might occur there? What consequences are to be apprehended there or elsewhere from the gaseous products of certain modern high explosives?

13. What will be the effect upon the occupants of a conning-tower, even if it withstand the blow of a heavy projectile, (a) from the concussion, (b) from the displacement of the fittings? Should a commanding officer attempt to fight his ships from the conning-tower? If not, how should one be steered, and from what position can the captain enjoy the necessary view, while still maintaining communication of some sort with his officers?

14. . . . Is it advantageous or otherwise to have a brightly lighted battery on the occasion of a night action?

21. To what extent does the principle of closed water-tight compartments conflict with the communication of orders to various parts of the ship, supposing voice-tubes, wires, etc., to be dislocated or unserviceable? How is the difficulty to be provided against?

24. Are you prepared with any scheme whereby, even at risk to your ship, you can take on board, while under weigh, at least some coal, if such a proceeding be desirable? Do you habitually complete with coal in the shortest possible time, and is it desirable that when coaling you should always do this?

25. What are the advantages and the dangers attendant upon the use of the electric searchlight against an enemy? Where should a searchlight, if used, be projected from? What is its effect upon the sight of your own people? What its effect upon the sight of the enemy? To what extent can the projected ray be used as a screen? Are you prepared with any better method whereby an enemy's ships or works may at night be rendered visible to your gunners?

A British view of future naval tactics is found in the R.U.S.I. prize essay for 1894.

The subject was, "The tactics best adapted for developing the power of existing ships and weapons (guns, ram, and torpedo) which should regulate fleets, groups, and single ships in action."

The *permanence* of groups in tactical formations seems to have been taken for granted.

The prize essayist, again F. C. Sturdee, now a commander, said that in 1886, he had preferred group formations. Now he pronounced for "column" as having more advantages and fewer disadvantages than any other attack formation.

Of groups, he said, "It may be pointed out, that what at one time was considered the best by a majority of the officers has . . . become discredited by many, and will probably never again be adopted in our navy."

About this time, an able officer of our own navy, the late Rear Admiral B. H. McCalla, was rounding out his system of group tactics (groups of three) which he continued to advocate for some eight years, until an opportunity to try them in squadron evolutions failed to secure their adoption.

Commander Sturdee said that an admiral should lead his first squadron, and commanders their squadrons. Cruisers and torpedo-boat de-

stroyers, when not attacking, should be formed 15 cables off the admiral's beam, on the side away from the enemy. Action speed should be the highest possible, allowing the slowest ship a reserve of one knot.

Fire should not be opened at over 3,000 yards. If range was changing rapidly, he recommended reserving fire until 2,000 yards and emphasized the necessity for a good range finder.

In the case of night torpedo attacks, search-lights should not be used until an attacking boat was sighted, and then the top (high) lights should be used.

The sequence of an engagement should be: cripple with guns; then close; give final blow with torpedo, and, if necessary, ram.

To make attempts to ram more dangerous, he said, British and foreign navies were installing stern and quarter torpedo tubes; because "ships failing to ram, will, in the majority of cases, have to pass under the stern of their opponent, and the nearer they are to being successful, the closer they will have to pass under his stern . . ." and the easier it will be to torpedo him from a stern or quarter tube.

Sturdee stated that torpedoes had increased in effective range to 600 yards, and in speed, for that range, to 30 knots. (This was an optimistic statement.)

War-head charges had gone up from 60 to 190 pounds, and submerged tubes which rapid-firing guns could not injure, were in successful use.

Sturdee wrote very soon after the tragic sinking of the *Victoria* by the *Camperdown* during maneuvers, and in quoting from Clowes, said that the table of failures and successes in ramming "appears . . . dispiriting to anyone who intends to devote all his attention to ramming at the first opportunity."

The motto with which he began and ended his essay was, "In war, it is not permitted to err twice."

Owing to lack of experience in action with the weapons of the day, Sturdee felt the difficulty of arriving at sound tactical conclusions, and moreover, as he said, ". . . the tactics of the day may not be the tactics of to-morrow, as owing to a fundamental change in existing weapons, or the introduction of a new one, everything might be altered."

The issue of the R.U.S.I. *Journal* which carried Sturdee's essay, contained the translation of an article by an Italian naval officer, Lieutenant Cipriani, who considered column an impossible battle formation. His theme was the best tactics for a fleet with torpedo-boats, against an enemy also with torpedo-boats.

His plan was to bring the enemy under gun-fire and await the attack from the enemy's boats, which should be kept under fire during their approach. When the enemy's boats neared torpedo range, his own torpedo boats would be sent to attack them. The enemy's battleships would have to stop firing in order not to injure their own boats. Your fire, until it endangers your own torpedo-boats, should have been progressively effective as the range of the enemy's boats shortened. Your boats should then attack, and presumably win, or disperse the enemy boats, and then your main body should charge and your undamaged torpedo-boats find victims during the mêlée.

An alternate plan was to turn away, keep every boat under fire until disabled, then with your own boats intact turn for the mêlée.

Lieutenant Cipriani considered the second plan (turning away) as the surer.

As these essays were being published, a naval battle which threw a little light on the perplexing question of the best tactics for steam fleets, took place in Asiatic waters.

After the opening treaty of 1854, negotiated by Commodore Perry for the United States, Japan advanced rapidly in treaty relations with European countries, and in adopting new methods of government, more nearly affiliated with those of the Anglo-Saxon and Latin peoples than with her own previous customs.

Profiting from the example set by Perry, but obtaining the end in view by a show of force rather than peaceful persuasion, she exacted a treaty from Korea—"The Hermit Kingdom," in 1876, opening three Korean ports to foreign trade.

Nearly three centuries earlier, during the ascendency of Hideyoshi, Japan had invaded Korea, as a first step to the subjugation of China.

A short and successful campaign, with overwhelming forces, was halted by two naval defeats. The first was inflicted by Korean war junks, off Fusan, June 1592, less than a month after the first landing of Japanese troops; and the second and more important was by a Chinese war fleet, off the coast of Korea, about 150 miles north of the capital, Seoul.

The invaders had reached this point in less than two months, driving the Korean army before them, but in the fleet engagement with the Chinese they lost all the supplies and troops sent to support their armies.

This loss was so severe as to halt the advance across the Yalu River into China proper, although the Japanese had no difficulty in driving out the Koreans, and throwing back the first contingent of Chinese. The latter, however, returned in force during the winter, and the Japanese

were further embarrassed by a general uprising of the Koreans, caused by their harshness as victors.

After a drawn battle, in mid-winter, 1593, the Japanese withdrew to Seoul, and then, in May, evacuated that city for strong positions along the coast, which they held until late in 1598, defeating all attempts of the Chinese to dislodge them.

The Chinese refused to make peace, until after a severe defeat in October of that year, although negotiations, with a view of enabling the invaders to withdraw without loss of prestige, had been going on from the time of evacuating Seoul.

Korea continued as the nominal vassal of China, but both countries held, through the centuries, their suspicion and dislike of Japan. This, down to modern times, was shown in many acts which irritated the Japanese people.

The treaty of 1876 with Japan described Korea as an independent state. Treaties were subsequently made with the United States and other countries, which gave no indications of her dependence on China, although the revenues from her ports open to foreign trade were collected by Commissioners of the Chinese Customs, and it was claimed that Korea paid annual tribute to China, in acknowledgment of her vassalage.

In 1885, China and Japan agreed, at the latter's instance, that in the event of serious internal disturbances—which had become frequent in Korea—neither country would send troops without notifying the other, although previously Chinese troops had been despatched on several occasions to quell uprisings, some of which had been directed against the Japanese.

In the spring of 1894, a Korean insurrection broke out, and the reigning family asked for Chinese aid. China notified Japan, and sent 2,000 troops. Japan sent 12,000. China then despatched additional troops by land, and sent a transport by sea carrying 1,200 men, convoyed by three men-of-war. The Japanese construed this as an act of hostility and attacked the men-of-war. One was captured, one had to be beached, and one escaped. The transport *Kow Shing,* which refused to surrender, was sunk. This act of war took place south of the entrance to the harbor of Chemulpo, the port of Seoul, on July 25, 1894. Both countries declared war a few days later.

The war soon resolved itself into a series of victories for Japan, both on land and sea.

The broad outlines of the related events which preceded it are of

interest, because this war was but the prelude to another, ten years later, and to a third, undeclared, but in progress at the time of writing, with Japan still pursuing what she believes to be her manifest destiny, the hegemony of Eastern Asia, and the subjugation of China.

The principal naval engagement of the war of 1894-95, known as the battle of the Yalu, took place September 17, 1894, almost in the same waters which witnessed the Japanese defeat in 1592.

It was fought in sight of land, about 25 miles west of the mouth of the Yalu River, which for part of its length is the boundary between Korea and Manchuria.

The description of the battle which follows is condensed from the account written by Ensign Frank Marble, and printed in the Naval Institute *Proceedings* for the third quarter of 1895. It received honorable mention in the prize essay competition for that year.

The two fleets were nearly equal in number—about 12 ships each—but both were of such heterogeneous composition in tonnage, guns, armor, and speeds, that comparison is difficult. It can only be said that the disparity between the fighting qualities of the best and poorest ship of Admiral Ting's fleet, was, if possible, greater than that which existed in Admiral Ito's fleet.

Speaking generally, the Chinese were superior in armor and heavy guns, and the Japanese in speed.

Admiral Ting had two second-class battleships, the *Ting Yuen* (flag) and the *Chen Yuen,* built in Germany in 1883. Each was of about 7,500 tons displacement and approximately 15 knots speed, mounting a main battery of four 12-inch guns in barbettes, and each carrying two 65-foot torpedo-boats.

All the other Chinese ships were of less than 3,000 tons displacement, including four of less than 2,000 tons. Admiral Ting's slowest ship was the armored coast defense vessel *Ping Yuen,* maximum speed 10½ knots.

Admiral Ito's flagship *Matsushima,* and her two sister ships the *Itsukushima* and *Hashidate,* displaced about 4,300 tons, each mounted one 12-inch gun in an armored barbette turret, and could steam at sixteen knots. Five other Japanese ships exceeded 3,000 tons and were classed as armored, or protected, cruisers, carrying main batteries of which the largest gun on any ship was 10-inch. Two others displaced about 2,500 each, and the smallest, 600 tons. The slowest vessel could make 13 knots, while the fastest, the *Yoshino,* was rated at 23 knots.

An armed merchantman may be classed as the twelfth Japanese ship, although she was not in the line.

Total tonnage and horse-power was in favor of the Japanese, but such disparities existed between the ships of both fleets that *material* evaluation is impossible. All Chinese ships and nine Japanese mounted above water torpedo tubes; three or four each.

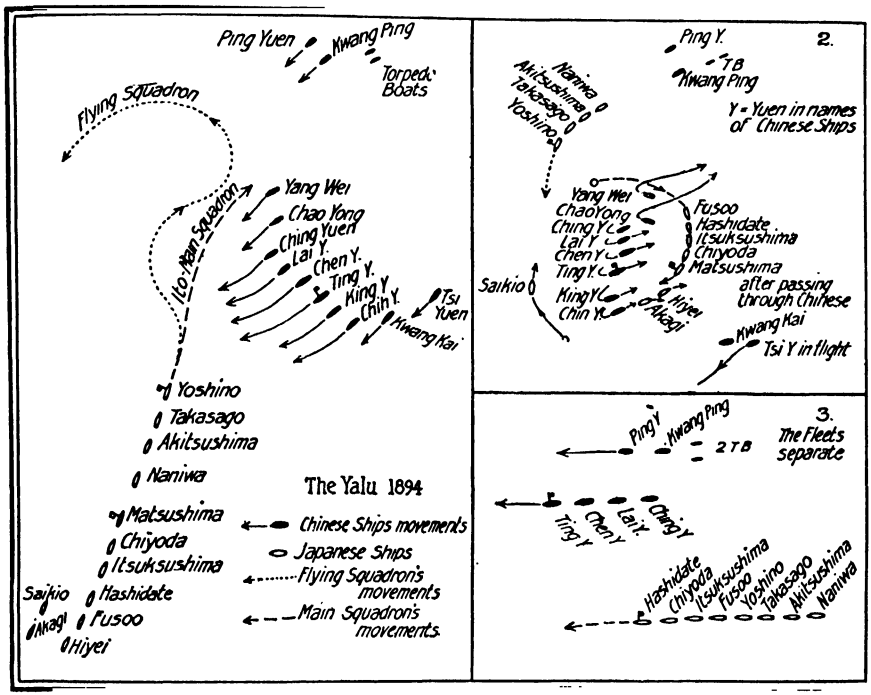


FIG. 116.—The Battle of the Yalu. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Shortly after noon, Admiral Ting advanced to the attack in what was nearly double échelon (Tegethoff's formation), with his flagship at the apex.

Admiral Ito approached in column, steering for the Chinese *flag*. His four fastest, but least protected ships were in the van, the admiral commanding and leading the second division in the *Matsushima*.

The Chinese opened fire at about 5,000 meters. The Japanese held their fire until within about 3,000 meters, then changed course to port and steamed in column along the Chinese right wing, and then, changing

to starboard, along its rear. The battle was fought, in general, at ranges of from 2,000 to 3,000 meters.

Admiral Ito maintained an interval between his van and center, so that while the center was engaging the Chinese ahead, the van was doubling on their rear.

Admiral Ting changed course to starboard to keep his flagship bows-on to the enemy, thereby throwing his right wing into a huddle, and stringing out his left.

The Japanese rear engaged—due to the Chinese advance—at closer quarters than the van and center, and the rear ship of the column, the *Hiyei,* a small armored cruiser, being unable to clear the Chinese line, passed between the enemy ships and rejoined the rear of the Japanese fleet. The 600-ton *Akagi* also broke through the Chinese left wing.

Both the *Hiyei* and *Akagi* were in distress and under heavy fire, when the Japanese van division, again changing course to starboard, came to their assistance. (Wilson says the van division went about to port.)

Admiral Ting was injured by the blast from his flagship's barbette guns, twenty minutes after the battle began. His double échelon was broken and his fleet in wild disorder, his two battleships completing it by attempting to charge and ram the rapidly moving Japanese.

It is impossible to describe what followed. Admiral Ito, with his center division intact, is reported to have circled the Chinese group, still in action, three times. Some of the Chinese ships tried to escape to sea. Three ran ashore and two were sunk.

The *Matsushima,* at the end of about two and a half hours, was so much injured on deck by the explosion of a 12-inch shell in her turret, and by the explosion of another against one of her rapid-fire guns, that Admiral Ito transferred his flag to the sister ship, the Japanese-built *Hashidate.*

This caused a lull, but the action began again about an hour later (4:30 P.M.) and lasted between Ito's division and the *Chen Yuen* and *Ting Yuen* until darkness fell at 6 P.M., when Admiral Ting, with his remaining ships, steered southwest for Port Arthur. Ito followed, but did not molest the Chinese during the night.

But few torpedoes were used by either side. The small torpedo-boats of the Chinese battleships seem not to have been hoisted out, though indefinite mention is made of other Chinese torpedo-boats. The Chinese flagship showed marks of 200 hits and her sister ship, of 120, but their belt armor was not pierced.

The main battery of the *Chen Yuen* was put out of action early in

the battle. It was poorly protected, but the cause of its failure, whether internal or external, was not ascertained.

Marble remarked that the results of the battle justified the prediction of Professor Alger:

> A ship which, either improperly armed or manned with men insufficiently trained in gun practice, trusts to her torpedoes and ram, and endeavors by them to gain the victory, will fall an easy prey to an antagonist in whose construction and tactics, the gun is recognized as the paramount weapon.

The Japanese won praise throughout for their conduct of the battle. Admiral Ting was cool, but inefficient. Two Chinese captains were subsequently beheaded for cowardice, but there was one who went down with his ship, colors flying, and fighting to the end.

Of this engagement, Colomb wrote, in 1897:

> . . . the question of differentiation of naval force . . . has a certain light thrown upon it, in its modern aspects by this battle. . . .
>
> . . . the battle of the Yalu was like the early battles between the Dutch and English, where all classes of ships fought indiscriminately. The result of that method of fighting was, as I have shown, to force a selection of ships "fit to lie in a line" and to discard from participation in a general action, all ships below a certain standard of size and force. . . . The question therefore arises whether . . . the distinction between the ship "fit to lie in a line" and the ship which is unfit, is about to pass away, or whether . . . this mingling of various classes in battle, which has scarcely shown itself for two centuries [is] due to the smallness of the contending navies and the special conditions of the moment. . . . The latter conclusion is the more reasonable.

Some writers have doubted whether Admiral Ting's double échelon formation was real, or apparent only, intended or accidental. We have no details of the signal books or fighting instructions of either fleet.

Grant, in *School of the Ship* (1907), says that Admiral Ting "concluded that he could not control his squadron during action by signals," and quotes Ting's general instructions:

> In action, sister ships or sub-divisions of pairs of ships shall, as far as possible, remain together and support one another in attack and defense. A ruling principle should be to keep bows-on to the enemy. All ships must, as a general rule, follow the motions of the Admiral.

With such instructions, the most elementary reasoning should have caused Ting to form column with himself at the head, as the only formation in which his ships could "follow the motions of the Admiral" without signal, but this he did not do. It would have conflicted with his other order to keep bows-on.

A British officer (Admiral Long) had been employed as a naval

adviser by China for some years prior to the war, but his engagement had expired. A few, at least, of the Chinese naval officers were graduates of American and European colleges, and Admiral Ting had with him in the *Ting Yuen* an officer, Captain McGiffen, who had been a United States midshipman and who for fully six years had been an instructor in navigation to Chinese officers.

When Japan decided to adopt western methods of government and internal organization, she employed nationals of the countries whose



FIG. 116a.—Captain Philo Norton McGiffin, as a cadet and as he appeared after the battle of the Yalu. (*From Brady's "Under Tops'ls and Tents," Charles Scribner's Sons, New York*)

methods she wished to follow, as aids and instructors in the particular branch of government or organization in which, according to Japanese opinion, their country excelled. Thus for education, postal service, and agriculture, Americans were employed; for medical science, business codes, and local government, Germans; for painting and sculpture, Italians; for laws and the army, Frenchmen; for railways, telegraph systems, maritime aids, and the navy, Englishmen.

Navies such as were familiar to the western world were unknown to the Japanese. Having no equivalent for western naval terms, they adopted those used in the British navy, and with them, British naval

customs. The Yalu, and later history, show them to have been apt pupils.

The Chinese at Yalu suffered a loss of five ships and from 1,000 to 1,500 men killed and wounded, as compared with no loss of ships, only three seriously damaged, and but 290 men killed and wounded on the Japanese side.

With the crippled remainder of his fleet, Ting reached Port Arthur, and later, Wei-hai-wei, without molestation. It appears that Ito was without spare ammunition and his magazines ran short. It also appears that the Chinese battleships had practically exhausted their ammunition.

Wei-hai-wei is a fortified island-protected harbor on the south side of the Strait of Chi-li, about 100 miles from Port Arthur. The Japanese fleet could easily watch both places, and from the early part of October, they were blockaded. Japan had complete command of the sea and landed her armies at will. Whatever Chinese ships remained in the south took no part in the war.

Port Arthur surrendered November 21 to Marshal Oyama. In December, troops were landed on the Shantung coast for the siege of Wei-hai-wei, and by the end of January, the Chinese fleet and garrison were besieged by land and sea. Night torpedo attacks were made and close night watch of the harbor maintained, in such severe weather that some of the Japanese sailors were frozen at their stations.

On the night of February 4, 1895, the first success was obtained by the torpedoing and sinking of the *Ting Yuen,* with the loss of four Japanese torpedo-boats, one sunk by gun fire and three wrecked.

A later torpedo attack damaged three Chinese ships. Other torpedo attacks were made, but without result. On February 9, however, the *Chen Yuen* was sunk by gun fire.

On the 12th, Admiral Ting offered to surrender if quarter were granted, to which Ito agreed. This assurance given, Ting and the Chinese general commanding the garrison surrendered to Admiral Ito's envoys, and immediately after, destroyed themselves. The remaining Chinese ships (seventeen) were taken by the Japanese into their navy.

With the north and south sides of the entrance to the Gulf of Pechili in Japanese possession, the way to Peking was open and China sued for peace.

Li Hung Chang, the world famous viceroy of China, and Li Ching Fong, Chinese Secretary of State, sailed for Nagasaki on the steamer

Hsin Chi to meet the Japanese Prime Minister, Marquis Ito, and the Minister of Foreign Affairs, Count Mutsu, for peace negotiations.

The Chinese envoys, for reasons of safety, made their headquarters on the *Hsin Chi,* which, though flying the Chinese flag, was captained by an American, Martin Patterson. Another American, the Hon. John W. Foster, diplomat and statesman, was employed by the Chinese as an adviser.

A treaty, subsequently ratified, was signed April 17. The terms were severe, but Japan soon had the principal fruit of victory, a commanding position in Manchuria, snatched from her by other powers. This, however, in the end did not benefit China.

By the treaty, China acknowledged the absolute independence of Korea, ceded the Liao Tung Peninsula, Formosa, and the Pescadores to Japan, and in addition, agreed to pay an indemnity of 300,000,000 taels. Japan was to occupy Wei-hai-wei until payment was made. France, Germany, and Russia combined to compel Japan to give up the Liao Tung Peninsula, including the two important ports of Nieu Chwang and Port Arthur, on the ground that her occupation of it would be a menace to the integrity of both China and Korea. Japan yielded the peninsula, receiving, instead, an additional indemnity of 30,000,000 taels from China.

About three years later, much to the perturbation of England, as well as Japan, Russia, ostensibly as a consideration for guaranteeing a loan to China to finance the Japanese indemnity, secured a lease of Port Arthur and part of the Liao Tung Peninsula, with the right to build a railroad from the first named, through Manchuria to join her Siberian line.

To counter-balance Russian influence, England secured a lease of Wei-hai-wei, and occupied it in 1898. Previous to this, and not long after Japan's agreement to give up her conquests on the main land, France had successfully carried through an agreement for some changes in China's southern boundary line. England then claimed, and secured, changes in her favor on the boundary line between China and Burma, while Germany seized the port of Kiao-chau (Tsing-tau) and surrounding territory in the province of Shantung. China was despoiled, in some degree, by each of her professed friends.

Had Admiral Ting and his officers and men at the Yalu been able to handle their material as well as did the Japanese, or even had Ting's tactics been equal to Ito's, Yalu would have been at least a drawn battle. China would not have lost command of the sea and Japan would have

found it impracticable to transport troops and supplies by water. The course of history might well have been altered by a change in the results of the conflict between these two small fleets.

Lieutenant Wainwright was a prize essayist, for the second time, in 1895. Although his subject was "Tactical Problems in Naval Warfare," he did not discuss the Battle of the Yalu.

He was still an advocate of the gun as the primary naval weapon and quoted Colomb as preferring the ram in 1871, and the gun in 1884; Fremantle, the ram in 1880, and the gun in 1886; Sturdee, the torpedo in 1886, and the gun in 1894. Wainwright considered the weight of opinion to be strongly in favor of the gun.

Torpedoes carried by battleships had made them too dangerous to approach for ramming. Rapid-fire guns and search-lights increased the hazards of the torpedo-boat. This decreased the value of the torpedo except when fired from heavy ships at short ranges. Guns could keep well outside of torpedo range and still do effective work.

Wainwright still held to line of bearing as the best attack formation. He described an approach which began with two fleets nearing each other on opposite courses, at 15 knots, one in line, and the other in line of bearing. He listed the moves and counter-moves that each might make to reach a position of advantage—to be able to "concentrate a superior portion of your force on an inferior portion of the enemy's force."

He concluded that the fleet in line of bearing—well handled—on the whole would have an advantage. But if both fleets were well handled, the battle would tend to become one between two fleets on parallel courses.

This was a significant conclusion.

He reached a like conclusion on single ship combats. That is, two ships intending to ram would be drawn to parallel courses. This was contrary to the usual belief that single ship action would be a matter of "chasing tails."

He quoted the safe rule that two ships passing should turn across each other's wakes, but believed that before coming to such close quarters, one would turn away, unless—which he considered unlikely and inadvisable—attempting a head-on collision. If one turned away, the other would turn to follow, which would tend to bring them to parallel courses.

In a fleet action, he thought "The fastest vessels should be held in a *reserve,* so that they can be pushed around either flank, if possible,

to double on a portion of the enemy's line." (He forgot that his battle speed of 15 knots would make such movements impracticable, without slowing the main body.)

Wainwright did not mention groups. He gave cruisers no place in an action with ironclads and considered that torpedo-boats were not sufficiently seaworthy to accompany the fleet, except near home ports where they could take refuge in bad weather. If with the fleet, they should steam in the lee of the battleships until a favorable opportunity arose for a surprise attack.

His essay was the most comprehensive attempt to visualize a naval battle between ironclads carrying torpedoes which had yet been published by an American naval officer.

It aroused great interest. Lieutenant Seaton Schroeder suggested that the approach in échelon should not be on a course opposite to that of the enemy, but rather one which initially had the enemy bearing at right angles to your own line of bearing. Schroeder was a midshipman at the Naval Academy when Ward's *Naval Tactics* was a textbook, and consciously or unconsciously he drew the expression "keeping the enemy bearing at right angles to your own line of bearing" from Ward.

The subject of the Institute's prize essay for 1896 differed little from that of the previous year. Its title was "The Tactics of Ships in the Line of Battle." The essayist, Lieutenant A. P. Niblack, did not favor line of bearing as an initial battle formation. He believed in a "charge through" in line.

After a preliminary discussion of the advantages of rectangular over oblique or direct movements, he advanced 31 tactical propositions, covering a wide range; from ship equipment—for signaling, communication, protection, finding the range, etc.—to the position of the admiral in battle. Some of these are quoted:

(7). Tactical distance, here defined as *standard distance,* should be the radius of the standard turning circle of the particular fleet or squadron, and not an arbitrary number of yards for all squadrons.

(8). Speed in battle should be standard fast speed. Standard full speed and individual full speed, should be reserved for emergencies. . .

(9). In a fleet action, the tactics of the torpedo and the ram are incidental to the tactics of the gun, which is the weapon of prime importance.

(16) A lengthy condemnation of group formations, except a "section" of two ships, ". . . where [quoting Hoff] in line, the gun and ram of one, support the gun and ram of the other, and when formed in column of sections, the guns of the leader support the rear vessel, and where the rear vessel supports the leader with its ram." [This is a definition of "mutual support," so often used, but so seldom defined.]

(17). . . . tactics should be judicious formations aimed . . . to reduce the tactical efficiency of the enemy by concentrating the attack on one or more units of his fleet, particularly on the flank, or on a manifestly weak part of his formation.

(19). . . . concentration is by gun fire or by rams. Neither has much application in the early stages of an action. . . .

(20). Échelon is a strong defensive formation, but may be dangerous to the fleet using it, unless superior in speed . . . as a formation for attack it is too oblique to the line of bearing of the enemy . . . échelon is really the compromise between line and column with the disadvantages of both. . . . In torpedo boat tactics abroad, the groups steam in overlapping column, each bearing about 17 degrees on the quarter of the other. . . .

(21). The *reserve* made up of special ships, has its special tactics. . . .

(22). The flagship in a small fleet should be a battleship of the heaviest order, to be able to lead when necessary, and bear the brunt of the approach in a maneuver.

(23). The flagship in a large fleet should be an armored cruiser of considerable speed. Her position need not be in the line of battle, except when it is to her advantage. [He adds to this, a second armored, or protected cruiser as mate, and possibly two, or more, torpedo cruisers or despatch vessels; all to be maneuvered separately from the rest of the fleet.]

(25). Line should be limited to a front of eight vessels. . . . [Interval between double lines, six cables.]

(26). Column is historically and logically, the strongest formation, but should never be used for the approach . . . unless . . . [you have] the advantage in speed. Once in the zone of fire, and the charge through, not expedient or practicable, column is the safest, best and most effective formation to go into from line.

(27). Column should always be taken to mean indented column. [He then gives eight reasons why indented column is better than any other formation].

(29). Changes of direction . . . should be four points or multiples of that number. . . .

When we ask ourselves in what formation we should approach to the attack, the answer is that in which the maximum number of heavy guns can be brought to bear at long range, viz.; some compound form of line, preferably double line, each line being indented, the heavier ships in the first indented line, and the lighter ships in the second indented line, six cables in the rear. . . .

The *attack*. It will be a surprise to many to meet with the statement that a charge through, line to line with the enemy, should be eagerly fought for, and tactically striven for. If in the approach, the enemy is not in line, there is no use remaining long in line . . . to remain in line, the enemy being in any other formation, is to invite a concentrated attack on either flank.

He then describes a charge through in double or triple line [no torpedoes to be fired, as being as dangerous to friend as foe]. He does not mention rams.

. . . The fleet which can reform quickest, after a charge through, by a turn through sixteen points, presenting a renewed, compact formation in chase, has an overwhelming advantage.

To those who think a "charge through" is chimerical, and that no admiral, in his right mind, would attempt it, it may be answered, that if two fleets approach in line, there comes a time at about 1500 yards, when it will take more nerve to go

into column and present broadsides to a line of rams, than to continue on. . . . [The answer to this is, that unless *both admirals* determine to ram, two fleets would never reach a range of 1500 yards in line, on opposite courses].

He concludes his essay by advancing ten "tactical rules."

(1). When the enemy is sighted, form indented line at right angles to his bearing, [Ward] with heavy ships in the first line, and advance at fast speed.

(2). If he is in line, seek a charge through in column of sections in line abreast [double line]. Torpedoes shall not be used. Gun fire of rear ships should be reserved for volley firing, under control of the captain, so as not to injure friends, until an enemy's ship becomes a target close-to, when general action may be had.

(3). [Tells how to reform after passing through—an intricate proceeding].

(4). If the enemy is in single échelon, stand across the line of bearing of enemy's formation, at right angles, in column; then change course to come by successive changes of direction of head of column, in rear of his formation, and give chase. If in double échelon [Tegethoff at Lissa, and the Chinese at Yalu], proceed in same manner around either flank.

(7). The leading ship of a column should never attempt to ram, unless it is unavoidable, or to prevent being rammed.

(8). If the enemy's column attempts to cut through your column at nearly right angles . . . [not a very probable occurrence].

(9). Gun fire being of prime importance, frequent changes of direction should be avoided. . . .

(10). Always use rectangular, in preference to direct movement unless to serve a special purpose.

Lieutenant J. H. Glennon pointed out the weakness of an approach in échelon, in the greater average range which could be imposed on it by a turn of the enemy towards its head, forcing it to turn also, or be capped, and in any case, for a short time, having its rear out of action (withdrawn), unless, while approaching, it keeps the enemy at right angles to the line of bearing.

Clowes' comments were, in part,

He has, I venture to think, admirably distinguished the limitations of the past. These are, I fear, too often lost sight of. I have myself noticed, in recent controversies in which I have been engaged, a tendency, on the part of my opponents, to hurl Nelson and Hawke at me, on much too slight provocation. It ought, surely, to be our endeavour rather to try to imagine what the great commanders of old times would now do, were they in our position with our material, than to seek slavishly to adapt our material to their tactical principles. . . .

The essayist, while giving full value to the gun as a tactical weapon, allows, I think, too much value to the ram, and far too little to the torpedo. I regard the career of the ram as ended. The fear of the torpedo,and the terrible effect of heavy gunfire at short ranges, are factors which cannot but tell for many years to come, and which must inevitably render close action, in the old sense of the word, between large modern vessels, very infrequent, even when one party has a superiority of speed, sufficient to enable him to select his distance.

But effective action cannot be maintained at greater ranges than 4,000 yards. . . .

In his discussion of Lieutenant Niblack's essay, Commander Caspar Goodrich challenged the author's proposals to take the Admiral out of the line of battle and to attack in line.

Of the latter, he said, "A formation for opening battle that employs less than half of one's guns, must, in order to be adopted, hold out great and tangible advantages, over a formation that brings in more than half."

In 1896, Colomb, the most prolific writer of his time on naval tactics and the conduct of naval war, published a volume of *Essays on Naval Defence* which he said represented his studies from 1871 to 1889.

In December, 1897, he delivered a lecture on "The Future of the Torpedo." His study of the torpedo's possibilities caused him to overrate its actual effectiveness. He said:

> . . . when I supported guns and armor in the battleship, as against the torpedo in the unarmored torpedo vessel, I did not think I should live to support the torpedo against the battleship.

He felt that the type of battleship then building had reached its limit and "that perfection is the sign of disappearance." He predicted that some new type would appear but did not profess to know what it should be.

Assuming war with France, he foresaw a stalemate in battleships.

> France will not send her battleships to sea because of our destroyers off their ports. We shall not send our battleships to sea, because their work was being done by another force, the destroyer . . . already we are preparing for a 33-knot speed to match the increased speed of the latest battleship. Already an armored torpedo-boat destroyer has been sent to sea. Must we not reasonably expect directly, the perfectly armored torpedo vessel, sea-going, sea-keeping, comfortable to live in, and with seven or eight knots more speed than any possible armoured gun ship of the present type?

He thought future battleships should be smaller, have a larger protected area of lighter armor, and mount more and lighter guns.

> We cannot go on indefinitely developing the battleship at one extreme, and her greatest enemy, the torpedo vessel, at the other. Either one or the other will disappear, if a mean cannot be found between them.

Colomb's prediction has not come true. At that time, battleships carried heavy guns and torpedoes to be used against battleships and light guns to be used against destroyers. Destroyers carried torpedoes to be used against battleships and small guns to be used against each own type and against torpedo-boats. Torpedo-boats carried torpedoes to be used against battleships and light guns to be used against their

other. They were being steadily displaced by destroyers. Battleships and destroyers still persist.

In the discussion of Colomb's lecture, Captain Eardley Wilmot, R.N., said,

> On hearing this remarkable paper, I do not know whether my feelings were more of admiration at the able way in which the arguments were marshaled before us, or wonder at the conclusions at which the author arrived. . . .

About this time, the Naval Institute published a valuable historical account of the development of torpedo-boats and their congeners, from 1871 to that date (1897). The author was Lieutenant R. C. Smith, U.S.N., and the subject "Torpedo Boat Policy." It received the Institute's prize for that year.

Smith quoted a British naval officer as saying, after the maneuvers of 1895:

> The impression left on my mind . . . was that all types of torpedo-boats are obsolete and that probably no more will ever be built. But I believe that boats of the size of destroyers will take their place in every navy. . . .

Smith thought that both torpedo-boats and destroyers were desirable. At this time the United States had 16 torpedo-boats built, or building, ranging in tonnage and speed from the *Stiletto,* 31 tons, 18 knots, to the *Porter,* 185 tons, 28 knots.

For torpedo-boats, he considered the *Ericsson* class fulfilled all requirements: tonnage about 120; length 150 feet, speed 24 knots, armament two 18-inch center-line torpedo tubes; four torpedoes; four 3-pounder guns; endurance 24 hours at full speed.

He recommended destroyers of 250 to 300 tons, with speed and endurance as great as displacement and armament would permit, and to carry liquid fuel, if practicable. Destroyers were to mount eight 3-pounders, three torpedo tubes, and carry six torpedoes.

He did not recommend division boats or special tactics. Boats should attack singly, but simultaneously, from different points of the compass.

His opinions seem to be consonant with those of the officers who discussed his essay.

The following year (1898) a translation from the Russian by Lieutenant John Bernadou, U.S.N., of the opinions of Vice Admiral S. J. Makaroff on naval tactics, was published for the information of our naval service.

Of torpedoes, Makaroff said that the Russian practice was to fire

at ranges under 660 yards, at which distance the torpedo's speed was 25 knots. For single combat, torpedoes should be regarded "as guns, to be fired slowly and deliberately, at long ranges and with increased rapidity as we approach our antagonist." He felt that more torpedoes should be carried, estimating their cost, as compared with that of a shot from a 12-inch gun, as 3 to 1.

Two fleets in column, passing on opposite courses, could effectively fire torpedoes at much longer ranges than in single combat.

To avoid a torpedo, he advised the use of the *helm only,* and normally *turning towards* it. Jellicoe turned away, in low visibility, and lost contact with a fleeing enemy.

If unexpectedly attacked by torpedo-boats in a fleet action, he advised backing full speed, and dropping nets, as the best defense. Or, if time permitted, turning stern to the attacking craft, if the fleet had fair speed.

In firing at torpedo-boats, shell which burst on water impact should be used, to strike a little short.

For training, torpedo divisions should consist of eight boats. They should steam in very close order. Against the enemy, they should operate in pairs, and at night, should attack from different directions "throwing overboard, during the approach, water-floats with lights on them for the purpose of drawing off the enemy's fire."

Makaroff advanced the idea of giving each torpedo-boat the name of its captain. He said that an objection would lie against naming large ships after their captains, but he felt that a "torpedo-boat possesses the character which its captain imparts to it and when occasion for special duty arises, first of all, suitable captains and not suitable torpedo-boats are sought."

The battle line should include both ironclads and cruisers. He saw no need for a *reserve,* but said that cruisers should be separately commanded and have some freedom of action. They should be stationed astern of the battleships at the commencement of an engagement. Torpedo craft, when not in action, should be well clear, on the side away from the enemy.

He advocated column as the best battle order and felt that a "general mêlée" should be avoided.

It is impossible to give exact directions how to fight a squadron. Much depends on the tactics of your adversary . . . in general . . . we should endeavor to concentrate a superior force upon some part of his squadron. . . .

Ships that leave their station to avoid ramming or torpedoes should re-form as quickly as possible, although exact column should not be required in action.

He preferred guns to armor and small ships to large.

A fleet should consist of vessels of about 3,000 tons displacement, with armored decks. Guns should be placed on upper decks exclusively.

Judging from the experience of the *Chen Yuen* in the battle of the Yalu, men in the open stood a better chance than men behind thin armor. The Admiral should not be in an armored tower "from which he can see nothing." He seemed to think that water-tight sub-divisions would take the place of armor and listed uninjured pumps, capstan, chains, hawse-pipes, steering wheel, two 6-inch guns, and six smaller ones, as being outside of armor and uninjured, although the *Chen Yuen* was struck 464 times.

She was still afloat, however, and could maneuver, which fact rather speaks well for heavy armor instead of indicating it was unnecessary.

Rams, he felt, were important, and they should be strong (heavy). He did not believe that impact, bows-on, would be fatal in all cases and counseled captains not to fear such encounters. But he neither advised, nor disapproved, plans for ramming.

Makaroff's professional reputation at this time was high, both at home and abroad. He gave credit to Admiral Boutakov for his contribution to battle tactics. Unlike some authors, he did not fail to recognize that his own movements in battle would depend much on the tactics of his adversary.

As an old custom which had a good effect on morale, he recommended that an admiral before going to sea, or before battle, should bring his commanding officers together, not only for consultation, "but to personally impart to them the necessary energy and confidence in success."

He gave a good definition of the phrase, much used by the British, "mutual support," saying "mutual support in a navy consists principally in the strong belief of every one that all strive together in every part of the field to destroy the enemy." This does not conflict with Niblack's definition.

Makaroff suggested that broadside (salvo) firing, instead of firing at will, was also an aid to morale:

The ship firing broadsides, produces a deep impression. . . . As long as broadsides are heard, one may remain convinced that matters are proceeding in a regular manner. . . . When we see losses on our own vessel, and hear the broadside of an antagonist, it seems to us that his losses are nothing, and this must have an effect on the spirits of the men.

CHAPTER XLVI

THE SPANISH-AMERICAN WAR

WE COME now to the first war between the United States and another naval power, since 1812.

During the thirteen years between 1885 and 1898, the United States had completed and commissioned four first-class battleships, *Oregon, Indiana, Massachusetts,* and *Iowa,* all heavily armed and armored; two second-class battleships, *Maine* and *Texas;* two armored cruisers, *New York* and *Brooklyn;* five monitors, *Puritan, Miantonomoh, Terror, Monadnock,* and *Monterey;* one ram, *Katahdin;* 18 protected cruisers, of widely varying tonnage (2,000 to 9,000); 15 gunboats and 20 torpedo-boats. All of these were in active service in 1898, together with 15 armed revenue cutters and numerous auxiliaries commissioned for the war.

The immediate cause of the Spanish-American War was the destruction of the United States second-class battleship *Maine,* in the harbor of Havana on the evening of February 15, 1898, with the loss of 260 men and officers. A Court of Inquiry reported, on March 21, that an external explosion of a submarine mine had caused the detonation of powder in the ship's forward magazine and her resultant destruction.

Strained relations between the United States and Spain already existed, brought about by strong expressions in the United States against Spain's harsh methods in suppressing revolt in the "Pearl of the Antilles," one of her most important colonial possessions.

The *"Virginius"* affair in 1873 had not been forgotten. It grew out of the Ten Years War (1868-1878) of Cuban insurrection and revolt against the mother country and resulted in the shooting of about fifty Cubans, Americans, and Englishmen who comprised nearly a third of her crew. This caused the mobilization of our North Atlantic squadron at Key West, and war seemed imminent. It was avoided, however, by a small indemnity, a salute to our flag, and a promise to punish those responsible for the shooting of the filibusters, whose ship had been captured on the high seas. The mobilization was made the occasion of an attempt to test Parker's tactics, already described.

On the Spanish side, it was claimed, with some reason, that the United States failed to prevent the use of its territory as a base for fomenting

discontent and for launching filibustering efforts against Spanish rule.

Bad feeling had been accentuated by American outcry against General Weyler's "reconcentration" orders, compelling all inhabitants of provinces where revolt was at its height, to assemble at specific places, without making sufficient provision for either feeding or housing them. Funds to alleviate their sufferings were sent from the United States and Congress was the scene of condemnatory speeches and resolutions.

Although the reconcentration system of suppressing revolt was abandoned, enmity between the Spanish ruling class in Cuba and Cuban sympathizers in the United States was expressed in various ways.

The probability of attacks upon Americans in Havana caused the United States Consul General to arrange for the presence of a man-of-war in that port, to protect American citizens from possible mob violence. The *Maine,* commanded by Captain C. D. Sigsbee, U.S.N., was detailed for this duty and arrived in the harbor January 25, 1898.

After the findings of the Court of Inquiry on her loss had been considered by President McKinley and the Congress, events moved swiftly. On April 11, the President recommended intervention in Cuba. On April 20, with the approval of Congress, he called on Spain to "relinquish its authority and government in the island of Cuba and withdraw its land and naval forces from Cuba and Cuban waters." A "full and satisfactory answer" was demanded by April 23.

On April 21, Spain severed diplomatic relations with the United States. On April 25, Congress declared that war had existed between the two countries since April 21.

Mobilization and concentration of our ships in Asiatic waters, at Hong Kong, under the command of Commodore George Dewey, had been ordered immediately after the destruction of the *Maine.*

In anticipation of hostilities, the 8-inch gun cruiser *Baltimore* was despatched to the Asiatic station and our men-of-war in South Atlantic and European waters were assembled and directed to coal for the voyage home.

Purchase of two cruisers, completed in England for a foreign power, was arranged and negotiations for securing the dynamite cruiser *Nichtheroy* (*El Sud*) from Brazil were begun.

The first-class battleship *Oregon,* which had been in commission for about a year, sailed from San Francisco for the Atlantic coast, on March 19, under command of Captain Charles E. Clark, who had been selected for the arduous duty of bringing her to re-enforce our North

Atlantic squadron, at the highest sustained speed of which she was capable.

This voyage of about 14,000 miles, via the Straits of Magellan through the storms and calms of both the Atlantic and Pacific oceans, above and below the line, consumed but 66 days. The *Oregon* arrived off Jupiter Inlet, Florida, on the night of May 24, ready for any duty.

The length of the voyage, the anxiety of the public and the Government over a possible break-down en route, and consequent indefinite



FIG. 117.—Rear Admiral Clark. (*From Clark's "My Fifty Years in the Navy," Little, Brown & Co., Boston*)

internment in a foreign port, the probability of attack by Spanish torpedo craft, in the South Atlantic, or of encountering the Spanish squadron of four armored cruisers and three torpedo-boat destroyers which had sailed from Cape Verde, all served to impress the American people with the need of shortening the water route between our Atlantic and Pacific coasts.

Captain Clark was ready to meet all emergencies of weather or battle, including a probable encounter with Admiral Cervera's squadron, though the anxiety of the Navy Department was such that he was cabled to remain, if he saw fit, in a Brazilian port, on plea of repairs. He was neither avoiding nor seeking action, on his voyage through the

West Indies. He steered a course which would not delay his arrival, but kept him clear of islands where the time and direction of his passage might be reported to the enemy.

The public interest awakened by the *Oregon's* voyage persisted after the war, and was a deciding factor in bringing us the Panama Canal, opened 16 years later.

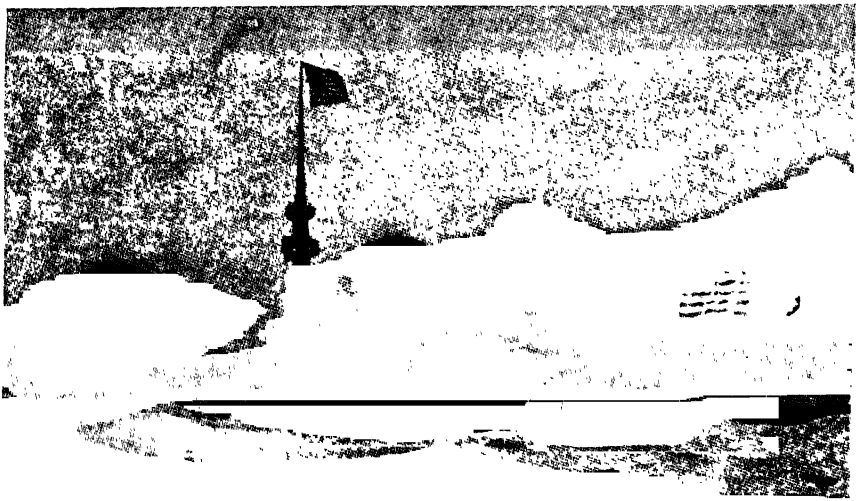


FIG. 117a.—U. S. S. *Oregon.* (*From Clark's "My Fifty Years in the Navy," Little, Brown & Co., Boston*)

On May 26 the *Oregon* joined Rear Admiral W. T. Sampson, Commander-in-Chief, at Key West. The armored ships under his command included the battleships *Oregon, Massachusetts, Indiana, Iowa,* and *Texas;* the armored cruisers *New York* (flag) and *Brooklyn,* and the modernized monitors *Puritan, Miantonomoh, Amphitrite,* and *Terror.* His second in command was Commodore W. S. Schley, in the *Brooklyn.* A coast patrol of cruisers and auxiliary craft was organized under command of Commodore John A. Howell, in the *San Francisco.*

Immediately on the declaration of war by Congress, Commodore Dewey, at Hong Kong, was notified by the local British authorities, on instructions from the home government, that he would be expected to leave port within 48 hours. This was his first intimation that war had begun.

He moved his squadron, within the time limit, to Mirs Bay, China, about 30 miles distant, leaving only the revenue cutter *Hugh McCullough,* which was detailed to carry mail between Hong Kong and the squadron. On April 26, she delivered a cablegram which read:

War has commenced between the United States and Spain. Proceed at once to Philippine Islands. Commence operations at once, particularly against the Spanish fleet. You must capture vessels or destroy them. Use utmost endeavors.

The following day Dewey got under way with his squadron, bound for the coast of Luzon in search of the Spanish Philippine squadron, commanded by Rear Admiral Patricio Montojo.

Dewey's force consisted of the cruisers *Olympia* (flag), *Baltimore, Raleigh,* and *Boston,* gunboats *Concord* and *Petrel,* auxiliaries *Nanshan* and *Zafiro,* and the revenue cutter *McCullough.*

The squadron steamed at moderate speed, to conserve coal. Gun division officers were directed to be careful in the expenditure of ammunition in action, because there was no supply other than in their ship's magazines.

Cape Bolinao, on the coast of Luzon, was sighted early on the morning of April 30, and the squadron stood south, the cruiser *Baltimore* steaming close in shore to reconnoiter. About 2 P.M. the *Boston* and *Concord* were detached to examine Subig Bay, while the other ships hove to, to await the result of their investigation. There was a naval station at Olongapo, at the head of the bay. Grande Island, which was believed to be fortified, commanded the entrance, and a squadron anchored there would be difficult to attack, except at a great disadvantage. The bay, however, was clear of ships, and no guns were fired from the apparently fresh earthworks on Grande Island. The reconnoitering ships rejoined.

All captains were called on board the flagship and informed of the Commodore's plans, which were to seek the enemy in Manila Bay, and to attack him if found there. The entrances to the bay were reported to be mined, but Dewey determined to accept the risk involved, and enter through the Boca Grande, keeping outside of probable night visibility from the Islands of Corregidor and Caballo which were known to be fortified,

Speed was regulated to arrive off Manila at daylight. The squadron was sighted while in the passage, and a few ineffectual shots were fired from Corregidor on the north, and El Fraile, a fortified rock on the south side of the Boca Grande.

Commodore Dewey's official report of the battle of May 1 is printed

in full in the *Proceedings* of the Naval Institute for the third quarter of 1899.

It reads, in part:

> Entered the Boca Grande or South Channel, at 11:30, steaming in column, at 8 knots . . . the squadron proceeded across the bay at slow speed and arrived off Manila at daybreak and was fired upon at 5:15 A.M. by three batteries at Manila and two near Cavite, and by the Spanish fleet anchored in an approximately east and west line across the mouth of Bakor Bay, with their left in shoal water in Canaçao Bay.
>
> The squadron then proceeded to the attack, the flagship *Olympia,* under my personal direction, leading, followed at distance by the *Baltimore, Raleigh, Petrel, Concord,* and *Boston,* in the order named, which formation was maintained throughout the action.
>
> The squadron opened fire at 5:41 A.M. While advancing to the attack, two mines were exploded ahead of the flagship, too far off to be effective.
>
> The squadron maintained a continuous and precise fire, at ranges varying from 5,000 to 2,000 yards, counter-marching in a line approximately parallel to that of the Spanish fleet. The enemy's fire was vigorous, but generally ineffective.
>
> . . . at 7:35, I ceased firing and withdrew the squadron for consultation and a redistribution of ammunition if necessary.
>
> The three batteries at Manila had kept up a continuous fire from the beginning of the engagement, which fire was not returned by this squadron.
>
> . . . at 11:16 A.M. . . . I returned with the squadron to the attack. By this time the flagship and almost the entire Spanish fleet were in flames, and at 12:30 P.M. the squadron ceased firing, the batteries [on Sangley Point] being silenced and the ships sunk, burned and deserted.
>
> [Dewey had carried out his orders to "capture or destroy the Spanish fleet"!]
>
> The Spanish lost the following vessels: sunk, *Reina Christina, Castilla, Don Antonio d'Ulloa*; burnt, *Don Juan de Austria, Isla de Luzon, Isla de Cuba,* and four smaller vessels and a large transport, partially loaded with ammunition.
>
> . . . The squadron is now in as good condition as before the battle. . . . [sgd]
>
> George Dewey, Commodore, U.S.N.
> Commanding Naval Force on Asiatic Station.

In addition to the ships and the transport *Mindanao* named in Dewey's report, the Spanish squadron included three gunboats, the *Velasco, Marques del Duero,* and *General Lezo.*

The personnel of the two squadrons was not greatly different, numbering on the American side slightly under 1,700 and on the Spanish side a little under 1,800 men. Spanish losses were severe—618 killed and wounded. Of the Americans, there were none killed and only eight wounded, none of these severely.

Unlike Brueys' column at Aboukir, that of Montojo at Cavite had its rear in shallow water, protected by a shore battery, and its head anchored in water also too shallow for Dewey's ships to take up raking positions. Montojo's vessels had steam up and were ready to get under way. His flagship, the *Reina Christina,* was observed at one stage of



FIG. 118.—Admiral George Dewey, U. S. Navy. (*From Galt's "The Battle of Manila Bay," copyrighted Wm. W. Galt*) Commodore George Dewey, Commander-in-Chief of American fleet during the "Battle of Manila Bay," was promoted by cable to Rear Admiral immediately afterwards, and to Admiral of the Navy on March 2, 1899. (Vignette)—The Future Admiral as Civil War Lieutenant. (*Copyright, "Photographic History of Civil War"*) Admiral Montojo. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

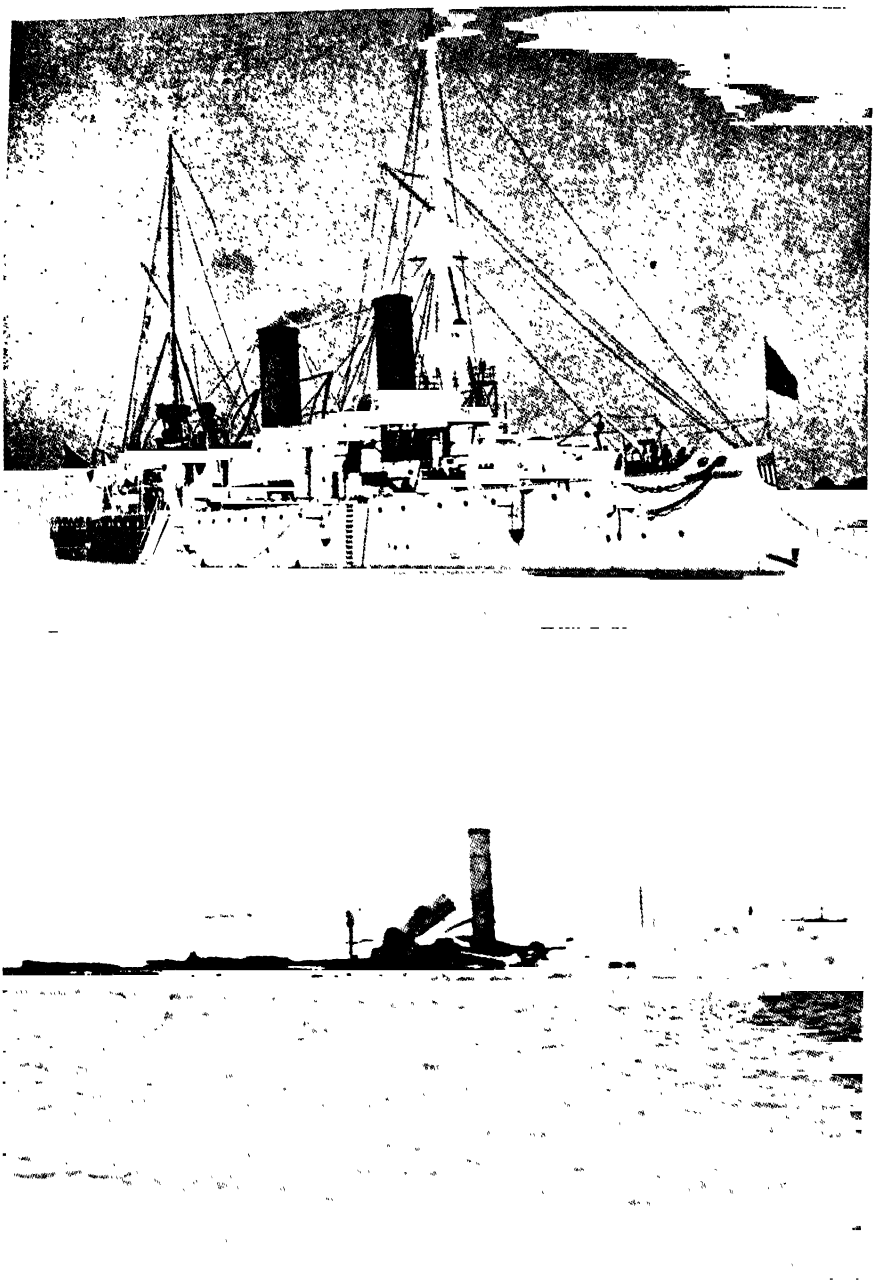


FIG. 119.—*Olympia.* (*From A. M. Dewey's "Life and Letters of Admiral Dewey," Woolfall Co., New York*) *Reina Christina.* (*Courtesy Office of Naval Records and Library*)

the action to be underway, heading towards the enemy. Maclay quotes from Montojo's report to this effect.

This movement of the Spanish flagship caused Dewey to alter his intention of anchoring his ships abreast the Spanish column, at a range of about 1,800 yards to increase the accuracy of their fire. It also caused a greater concentration of fire on the *Reina Christina* than would otherwise have occurred. She was raked on her approach, and also after her turn towards her first anchorage. Early in the action a shell had killed, or wounded, the crews of four of her guns. She had been on fire once, and had extinguished it. Later, however, she was observed to be in flames, beyond control. She grounded and settled.

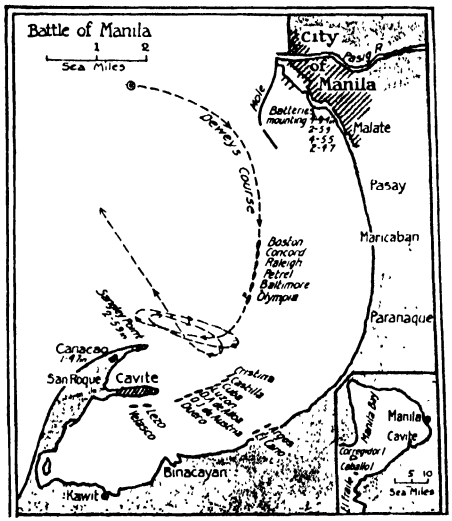


FIG. 120.—(*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Out of a crew of 352, this unfortunate ship lost a total of 150 killed and 90 wounded, 70 per cent of her complement.

Before the final stage of the battle, the *Austria, Cuba,* and *Luzon* left their anchorages, steamed under the protection of Cavite Arsenal and sank themselves. These three small cruisers were subsequently raised and taken into the American navy and assigned to general service.

Dewey's squadron had no torpedoes. Jane's *Fighting Ships* does not credit any of the Spanish vessels engaged as having torpedoes, but that some were on board is shown by the fact that one was recovered from the wreck of the *Castilla,* and its flask was used as a boiler for an improvised steam engine in a launch of the collier *Brutus.*

A few iron dump-scows were anchored close aboard the Spanish column, on the side next the enemy, but were of little, if any, protective value.

Montojo had occupied for only 24 hours the anchorage where he accepted battle. His first intention had been to defend Subig Bay and he had anchored there with five ships on April 26, but finding that the Grande Island fortifications could not be completed in time, he sailed

for Manila on the 29th, and formed his line of battle, at anchor off Sangley Point, on the morning of the 30th.

In his report, he said,

> At 7:00 P.M., April 30th, I received a telegram from Subig, announcing that the enemy's squadron had entered that port at 3:00 P.M., reconnoitering, doubtless seeking our ships, and from there they sailed with course for Manila. . . . At midnight, gun fire was heard off Corregidor and at two o'clock, on the morning of May 1st, I received telegraphic advice that the American vessels were throwing their searchlights at the batteries of the entrance with which they exchanged several shots. . . . The squadron being disposed for action, fires spread, and everything in proper place, we waited for the enemy's arrival.

Among other guns, the batteries defending the Manila water front included four 9.4-inch modern Hontoria rifles, whose extreme range reached the battle area off Cavite. These guns opened fire at 5:15 A.M. as the American squadron passed Manila. They continued to fire throughout the forenoon, without doing any damage other than once drenching the little *Petrel* with the spray from a shell. The officer in command is said by Maclay to have committed suicide from chagrin at the complete failure of his heavy guns.

Copies of Spanish Navy Regulations for 1793, giving detailed instructions for preparing ships for battle, were found in the Commandant's office in Cavite, but all Spanish signal books were—as far as we have learned—destroyed by the different ships before the end of the action.

In Spanish nomenclature, since 1793, the squadron was a major subdivision of a fleet, and a division was part of a squadron. This practice was in accord with that of the French, but as already shown, exactly contrary to the custom of the English. Our practice was at first like the French, then we followed the English, and finally, in the 1897 Signal Book, a squadron was defined as

> a naval force, consisting of more than one, and not more than eight ships for line of battle, or of similar type under one command. It is the unit of a fleet, which is a naval force composed of two, or more, squadrons under one command.
>
> A division is the half of a squadron that consists of more than five ships.

Dewey, however, did not divide his squadron of six men-of-war into two divisions. He maneuvered them as a single division, with himself in the van. The second division was composed of the three auxiliaries.

Distance was prescribed by the signal book as 400 yards. Half distance was 200 yards; double distance, 800 yards. Both oblique and rectangular movements were prescribed.



FIG. 120a.—Captains at Manila.

Left to right (*top*): Wildes, Gridley, Dyer, Lamberton. Left to right (*bottom*): Coghlan, Wood, Walker, Hodgsdon. (*Wildes, Gridley, Dyer, Lamberton, Coghlan, Wood, Walker*) *Courtesy "Life and Letters of Admiral Dewey," by A. M. Dewey, Woolfall Co., New York;* (*Hodgsdon*) *Courtesy "Harper's Weekly," Vol. 43, 1899.*

The first part of the action of May 1 was a follow-the-leader movement.

The second attack was led by the *Baltimore,* whose magazines were less exhausted than those of other ships of the squadron. The *Baltimore* directed her principal fire at the Sangley Point battery. Other ships concentrated on the *Reina Christina, Castilla,* and *Don Antonio d'Ulloa* at short ranges, all ships using engines only to keep their guns bearing.

Lieutenant C. G. Calkins, navigating officer of the flagship, contributed to the Institute *Proceedings* in 1899, some of the results of his observations during the action of Manila Bay, in the shape of "Historical and Professional Notes," from which extracts are given below.

. . . The American tactics of approach had been freely discussed before the fleet left Hong Kong. It had been proposed to attack in line abreast and to rely upon bow fire. The structure of many armored vessels and the disposition of their batteries might seem to favor this formation, but the modern view prefers a flexible column moving briskly along the line of fire and enveloping the enemy by superior speed and extended order, so that his huddled groups might be shattered by concentrated fire.

The enemy's defensive attitude and his misplaced reliance upon covering batteries on his flanks, promised to localize his squadron and he was found in the exact position which had been most carefully studied and diagrammed on the chart.

The *Olympia,* with her heaviest guns in her turrets, disposed for fore and aft fire and for the protection of the intermediate batteries in end-on attack, was the only ship fit for a line abreast. Even with her, the broadside fire was much heavier than that on the bows, and, as three years of target practice had shown, her five-inch battery was as much superior to her turret guns in accuracy and endurance, as it was in rapidity of fire.

High authority had attempted to convince the division officers that eight-inch guns in similar turrets had been fired with good results at intervals of one minute. Investigation showed that loading and sponging required nearly two minutes and that pointing might impose many seconds of delay, especially at stationary practice.

Better breech-blocks, more rigid shafting for sighting the guns, telescopes covering a four times larger field of vision, and improved dry batteries for firing, had greatly improved the operation of these turrets during the cruise, while division officers and engineers had been indefatigable in adjusting valves of the steam training-gear, and jolting had been nearly eliminated from the rotary motion of the turrets. Nor were the hydraulic cylinders scored by the pistons, nor the buffers jammed in ramming out, on this memorable occasion.

Of the familiar draw-backs of target practice, the smoking of telescope lenses was the most inveterate. The difficulty of finding the target, due to obscured and contracted outlook, may serve to explain the depressing fact that these guns, handled by well-trained crews, directed by attentive officers, fired less than half as many shells as the *Baltimore's* similar battery, mounted on old-fashioned carriages on bow and quarter. The *Boston's* pair, in barbettes, also beat the *Olympia's* four, in turrets, in spite of vexatious delays caused by crippled locks. But the five-inch rapid-fire battery redeemed the situation by firing as many shells per gun, during the hottest action, as the two turrets were able to expend in a much longer period.

There was a natural tendency to favor the heavier guns by maneuvering, and by

employing them at longer ranges. But the range-tables fail to justify this preference, and there was no obstacle to the full penetration of even a five-inch shell,

Having decided upon an advance in column, and the use of broadside fire, the line had to be lengthened to include the two purchased colliers and the unprotected revenue cutter *Hugh McCulloch*. At sea, these vessels had formed a second column, parallel to the six cruisers. . . .

Turning now to operations in the Atlantic Ocean, the Spanish armored cruiser *Vizcaya* was en route from Spain to the United States when the *Maine* was destroyed. Her captain, Eulate, first learned of the disaster on his arrival in New York, to return the *Maine's* visit to Havana. He proceeded to Havana, where the *Vizcaya* was joined by a sister ship, the *Almirante Oquendo,* on March 5.

These two ships visited San Juan, Porto Rico, and sailed thence, about April 13, for the Cape de Verdes, where they arrived a day or two before diplomatic relations between the United States and Spain were severed.

At the Cape de Verdes, they were joined by the *Maria Teresa,* another sister ship, and the new armored cruiser *Cristobal Colon,* accompanied by three destroyers, *Terror, Furor,* and *Pluton,* the whole forming a squadron under the command of Rear Admiral Pascual Cervera, intended for service in the Western Atlantic, in anticipation of hostilities.

Cervera sailed with his squadron on April 29. The United States Navy Department received the information the same day, and forwarded it by despatch to the Commander-in-Chief, Rear Admiral W. T. Sampson. At the same time, it ordered the fast auxiliaries *Harvard, Yale,* and *St. Louis* to stations east of the Lesser Antilles where it was most probable they would sight the Spanish ships.

A second Spanish squadron, consisting of three ships under Admiral Camara, was also at sea, with the West Indies as a possible destination. This squadron included the battleships *Carlos V* and *Pelayo*—Spain's most powerful men-of-war, and the protected cruiser *Alfonso XIII.* It was possible that the two squadrons might unite before reaching the Atlantic coast.

The uncertainty of where or when the Spanish squadrons would arrive or might strike, was the cause of keen anxiety to the United States Government. The desire to add the *Oregon* to Sampson's fleet was greatly increased, but her possible encounter with a force supposed to be overwhelmingly superior led to the alternative of authorizing her captain to remain in South American waters if he deemed it prudent.

Camara's squadron, however, was assigned elsewhere, and Cervera

passed the outer scouting line undetected and reached Santiago de Cuba May 19, with his four cruisers and two of his destroyers *Furor* and *Pluton*. The third destroyer *Terror* had been sent to San Juan.

Cervera had entered the Caribbean Sea through the passage between Martinique and St. Lucia, on May 11. He touched, in passing, at Fort de France, where he was seen on the night of the 11th by Lieutenant T. P. Kane, U.S.M.C., from the scout *Harvard* (Captain Cotton), lying at St. Pierre. This officer had been sent to Fort de France to investigate a report that a Spanish torpedo-boat had been seen in the vicinity. Cervera coaled at Curaçao, which he reached on the 14th.

The *Oregon* came into Barbados on May 18, the day before Cervera arrived at Santiago, and her captain was informed that he might expect to encounter the Spanish squadron immediately upon leaving, its numbers being swelled by rumor to 18 ships.

Cervera's presence at Santiago was not definitely ascertained by Commodore Schley until May 29. The Commodore, with a "flying squadron" of three battleships, the armored cruiser *Brooklyn* (flag), and some smaller vessels, had been awaiting the arrival of the Spaniards off Cienfuegos for a week, as it was believed that Cervera carried important stores for Havana.

On May 31, Schley, in the *Massachusetts* (Captain Higginson) with the *New Orleans* and *Iowa,* conducted a long range attack on the *Cristobal Colon,* which was visible in the outer harbor. The fire was returned, but shots on both sides were generally short and no hits were made.

The following morning, June 1, the *Colon* withdrew to the inner harbor. The Commander-in-Chief arrived with the *New York* (flag), the *Oregon,* which had joined at Key West, and the yacht *Mayflower.* He took over command and instituted a close blockade, employing twelve ships, disposed in the arc of a circle around the entrance to the port. The blockading ships were divided into two squadrons. Admiral Sampson took personal command of the eastern squadron. The western was assigned to Commodore Schley.

The blockading vessels kept at a distance of about six miles from the fortifications by day, closing in at night to a distance of three to four miles and keeping the harbor entrance continuously illuminated by search-lights during the dark hours.

Sampson had made preliminary plans for sinking the collier *Merrimac* in the narrow entrance to the harbor, with the hope of effectually sealing it. These plans were pushed to completion by Naval Constructor

Richmond P. Hobson, who was placed in charge, and the attempt was made before daylight, on the morning of June 3.

The ship was discovered by the shore batteries, which opened fire. The *Merrimac's* steering-gear was carried away and she was obliged to anchor while still moving ahead at about six knots. Her momentum carried away the anchor-chain, and sinking more slowly than was intended—due to the failure of some of the torpedoes carried for that purpose—she drifted for 22 minutes, part of the time with her quarter touching the bank, before she finally went to the bottom.

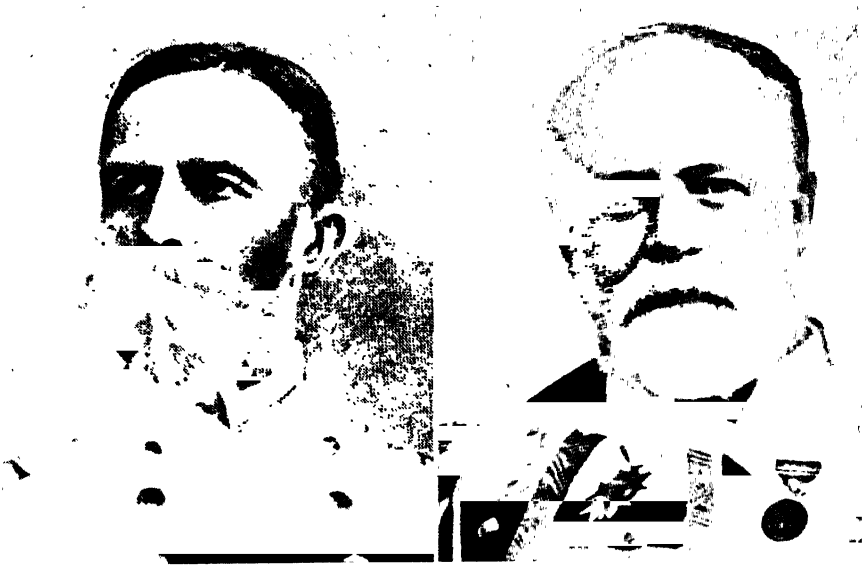


FIG. 121.—Admiral W. T. Sampson. Admiral Cervera. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Hobson and his crew, making use of a catamaran which had been provided for the purpose, were picked up after sunrise by Admiral Cervera, in person. They were imprisoned for a time, and later exchanged. The executive officer of the Spanish cruiser *Reina Mercedes,* stationed to guard the harbor entrance, claimed that he sank, or accelerated the sinking, of the *Merrimac* with two Whitehead torpedoes from his bow tubes.

Orders to the blockading fleet were, "If the enemy tries to escape, the ships must close and engage as soon as possible, and endeavor to sink his vessels or force them to run ashore."

A series of day bombardments of the harbor forts was begun on June 6, and before the end of the month Santiago was invested on the land side by an American army of 17,000 men under Major General Shafter. On July 3, a demand for the surrender of the city was made, with the threat of a bombardment on the 4th, if it was not complied with.

On the morning of the 3rd—Sunday—Cervera, seeing that his anchorage would soon be untenable, attempted to escape.

The account of the battle off Santiago which ensued, is taken from *My Fifty Years in the Navy* by Rear Admiral Charles E. Clark, then captain of the *Oregon.*

It was Sunday morning and a beautiful clear day. I was in my cabin and had just buckled on my sword and taken up my cap to go on deck . . . when the orderly burst through the cabin door, exclaiming, "The Spanish fleet, sir! It's coming out!"

I hastened on deck . . . man after man greeted me, with "You'll see her in a minute Captain! She's behind the Morro now!" . . . the leading ship came rushing out of the entrance with a speed that seemed to be inspired by the assurance of victory, firing her guns as she came.

The *Oregon* was thrilling with life. Men were hurrying to their stations at the guns, engines were throbbing, screws beginning to revolve. [The *Oregon* was exactly opposite the harbor entrance and her general quarters alarm gongs had been set off instantly on sighting a ship coming out.]

. . . I interested myself in the firing of a six-pounder near the bridge, with the idea of spreading the alarm.

. . . Before the leading Spanish ship, the *Maria Teresa* (flag) was obscured by the smoke of the cannonading which started immediately, I had seen that she was heading westward. . . . I too, turned west . . . suddenly the *Iowa* emerged, close on our starboard side. I gave the order "hard a-starboard!" for it was evident that we were drawing ahead of her slowly and ought to go clear. Just then, some one near me shouted, "Look out for the *Texas!*" and I turned to see her looming through the smoke on our port bow . . . the only thing to be done was to put our helm hard a-port . . . we did pass between them. . . . a little afterwards the smoke lifted, and somewhat ahead of us, and on our starboard bow, we saw all four Spanish ships and realized that at last, our meeting with the long looked for fleet was actually to take place. . . . I noticed that the *Oregon* was not only keeping pace with them, but was even gaining a little. Indeed, seeing nothing between them and us, for our less speedy companions were considerably in the rear, I said to the navigator, "Well, Nicholson (the late Rear Admiral R. A. Nicholson), it seems we have them on our hands after all."

At this point, the author says that he saw the *Brooklyn* (flag), Captain F. A. Cook, a little ahead on his port bow, and it was reported to him that she was flying a signal "Follow the flag!" which he at once repeated to the ships astern.

About this time, we noticed signs of distress on the sternmost Spaniard . . . Cervera's flagship. As she had come out of the harbor first, and then fallen back to the rear, I have always thought it must have been Cervera's chivalrous idea . . . to cover the retreat of his flying ships and to bear the brunt of the combat. Smoke was seen

presently rolling up from the doomed vessel . . . she headed for the beach. As her colors were still flying, we raked her as she went past . . . and pushed on for the next ahead, the *Oquendo*. We closed her to a distance of about eight hundred yards. . . . Fires broke out all over her, and she, too ran for shore. Nicholson said, "Captain, that vessel could be destroyed now," but I answered, "No . . . we'll push on for the next two."

It took us a little time to come abreast of the *Vizcaya* . . . but it was nearly eleven o'clock before she turned to the beach in flames. [The battle had opened at 9:27.]

The *Colon*, the only remaining ship, had drawn several miles ahead. . . . I thought

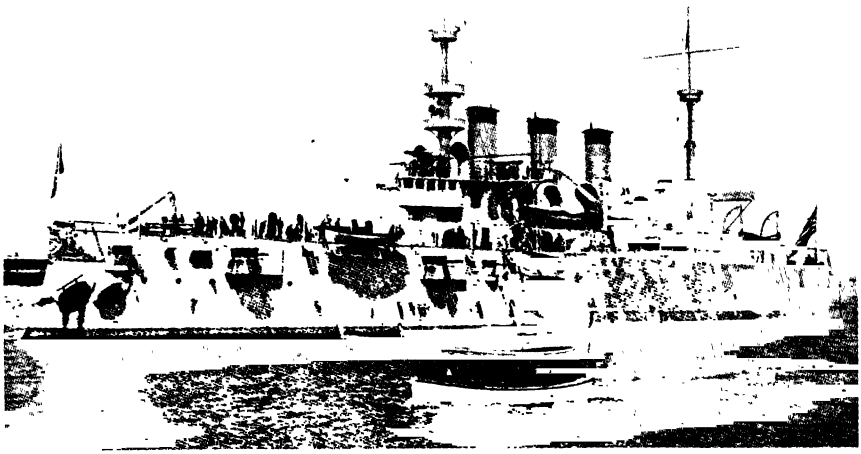


FIG. 122.—The Protected Cruiser *New York*. Admiral Sampson's flagship as she appeared in 1898. A protected cruiser of 8,150 tons, 380 feet 6 inches long by 64 feet 10 inches beam. Her trial speed was 21 knots, and she carried eighteen guns in her main battery. The naval battle off Santiago de Cuba was fought in accordance with Admiral Sampson's orders, although the flagship *New York* was absent at the beginning of the engagement and so came into the action late. (*Courtesy Office of Naval Records and Library*)

a shell or two falling near her might give her a hint that it would be well to surrender. So a little after twelve o'clock . . . we decided to fire with range set for 9,500 yards. The shot fell short . . . the Chief Engineer, R. W. Milligan, said, "Captain, I was thankful when I heard that gun. . . . Our men down below are nearly played out, but if they only hear the guns they will brace up again."

At 1:10 P.M. one of our shots fell close alongside the *Colon*, and she headed for the beach, her colors coming down, and with them, the last vestige of Spain's power in that New World which had once known her as its ruler.

After a victory so absolute, it is usual to begin to count the cost, but to our amazement, our ships, one after another, hoisted the signal, "No casualties." The *Brooklyn* was the only exception, and she suffered the loss of but one man.

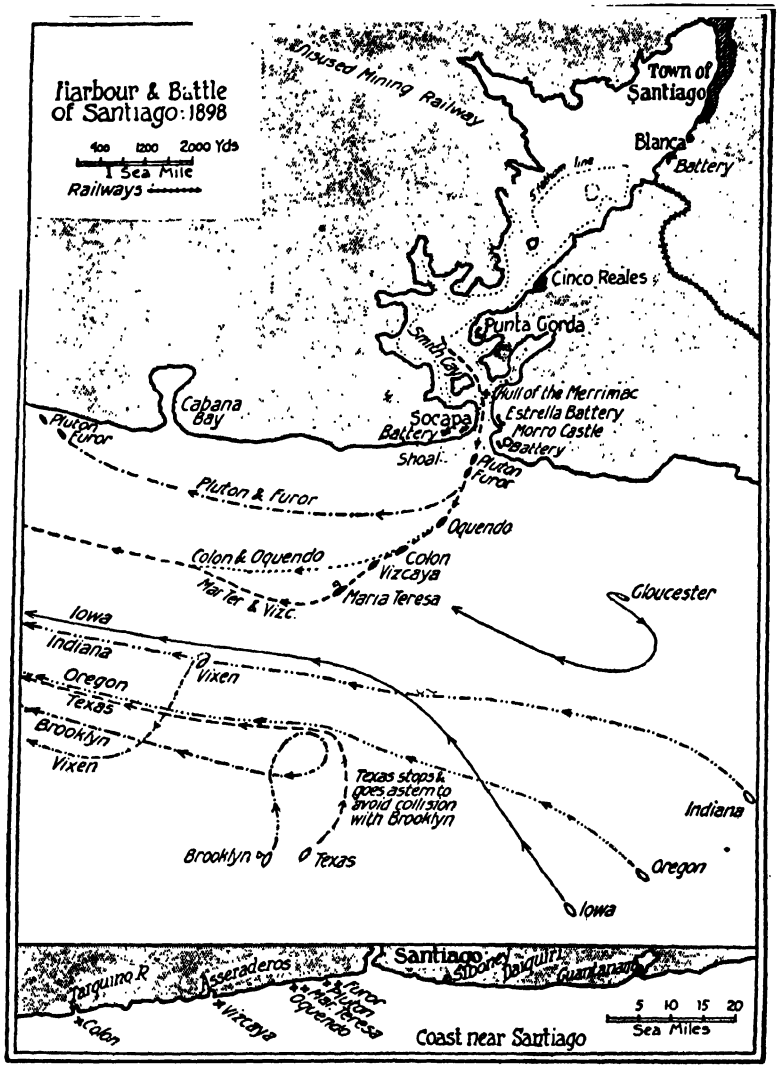


FIG. 122a.—(*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

No prisoners had been taken at Manila, Admiral Montojo having been allowed to take his men and the wounded to the city from Cavite, by water, under a flag of truce. The men and officers of Cervera's squadron, including the admiral himself, were taken prisoners and kept in the United States until the end of the war.

As at Manila, the Spanish losses in battle were heavy. The *Furor* and *Pluton,* which followed the armored cruisers, were speedily destroyed by the yacht *Gloucester,* Lieutenant-Commander Richard Wainwright, assisted by the secondary batteries of other ships within range. The *Terror,* the third of the destroyers, had previously been disabled off San Juan in June.

It appears that Captain Clark was correct in his estimate of Cervera's character. It was afterwards learned that the Spanish admiral's plan



FIG. 122b.—*Maria Teresa* ashore. (*Courtesy Office of Naval Records and Library*)

was to ram the *Brooklyn,* the fastest ship of the blockading fleet in the absence of the *New York,* hoping to disable her, and sacrifice his own ship, if necessary. In the mêlée likely to follow, the other vessels might escape. But the *Maria Teresa* was herself disabled before he could carry out his intention.

Camara's squadron, which was first believed to be destined for the Atlantic, sailed instead for the Philippines via the Suez Canal. His armored ships should make short shrift of Dewey's protected cruisers.

To be able to meet the new enemy on terms approaching equality, Dewey asked for, and the Navy Department sent, the monitors *Monterey* and *Monadnock* to augment his force. These low-freeboard ships made the voyage of some 6,000 miles, partly towed to conserve coal and



FIG. 122c.—Captains at Santiago.

Left to right (*top*): Schley, Clark, Philip, Taylor. Left to right (*bottom*): Evans, Cook, Wainwright, Chadwick. (*Schley—"Forty-five Years under the Flag," by W. S. Schley, D. Appleton-Century Co., Inc., New York; Clark, Philip, Taylor, Evans, Cook, Wainwright—"Century Magazine," Vol. 58, New Series Vol. 36, 1899; Chadwick—"Book of the U. S. Navy," A. B. Benesch Co., New York*)

partly under their own power, and did so without mishap. They reached Manila in time to assist in the joint attack on the city by the fleet and troops under the command of General Wesley Merritt. In the meantime Admiral Camara's orders had been canceled and he returned to Spain with his squadron.

Manila surrendered on August 13, one day after terms for the cessation of hostilities had been agreed upon between the United States and Spain. A treaty of peace, signed November 28 in Paris, ceded the Philippine Islands and Porto Rico to the United States for the sum of twenty million dollars and all Spanish claims to Cuba were relinquished. The island became "Cuba Libra" under a guarantee by the United States of a form of government satisfactory to the majority of its people.

Spain was on the defensive throughout this war. Her navy was outclassed. Admiral Montojo accepted battle at anchor without springs on his cables to enable him to use either battery. Dewey's decision to fight underway instead of at anchor was wise. Montojo could have made more hits on targets of constant range and bearing.

CHAPTER XLVII

TACTICAL ESSAYS. RUSSO-JAPANESE WAR

AT THE TURN of the century, the subject of the prize essay of the R.U.S.I. was practically the same as that of Noel's in 1878. The essayist, Major C. Field, R.M.L.I., referred to Noel's essay and to the sharp divergence of opinion over the judgment of the Board of Award. He quoted Captain Eardley-Wilmot as saying,

> We have in vessels like the *Royal Sovereign* and *Majestic,* both the turret ship and the broadside ironclad combined, and have put in them the best features of both classes.

Major Field added,

> . . . it seems almost as if we had, comparatively speaking, approached finality . . . the Russians, the Germans, the Italians, and our cousins across the Atlantic, all now build their battleships with their principal armament of four heavy guns, disposed in pairs, in turrets or barbettes, fore and aft, on the center line of the ship, with a central battery of heavy Q.F. guns between them. Even the French . . . seem now inclined to abandon their favorite types, to approach more nearly our own.

He remarked that this consensus of opinion on battleships applied, in a measure, to cruisers and torpedo craft, and agreed that the multiplication of types was far from desirable.

After reviewing the lessons of the wars of 1894 and 1898, he concluded that the classes of ships, lately built, and those building, were satisfactory, though he recommended some structural changes as desirable. He felt that the Chino-Japanese and Spanish-American wars had demonstrated the importance of: (1) Eliminating wood-work in interior construction. (2) Providing thorough protection for guns' crews. (3) Homogeneity in ships operating together.

Both wars had shown that: (1) Armor was more effective than had originally been supposed. (2) Light gun-shields were useless and dangerous. (3) Heavy guns were less effective than was expected. (4) Heavy Q.F. guns were more effective than had been expected. (5) Mounting torpedo tubes above water on battleships was unwise. (6) Rams, torpedoes, and the submarine were of less value than had been believed.

Of submarines he said,

> France, however, has several in hand at present, probably more with a view of

pleasing the fancy of the public, than from the real expectation that they will be of any value to the navy. . . . [They] are a confession of weakness, and by no means to be recommended for our own Navy, whatever foreigners may think about them.

The United States had recently completed its first submarine, the *Holland* (1899).

The Institute *Proceedings* for the second quarter of 1900 contained a translation by Professor Leroux of an article in the *Revue Maritime* by Lieutenant Commander Réné de Cartout of the French Navy, called "An Introduction to the Study of Naval Tactics."

Cartout recommended that ships' batteries be made up of "heavy, moderate, and light guns" with the role of the heavy gun "predominant."

He preferred four heavy guns in two turrets, one forward, the other aft; the secondary (moderate) battery to be between, on the same level, except those for firing right ahead, which should be higher.

The light battery (for fighting torpedo-boats) should be as little elevated as possible, to increase the danger space.

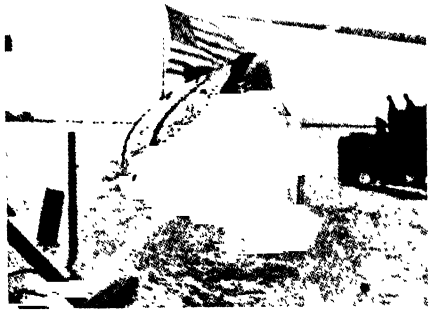


FIG. 123.—Launching of One of the Holland Boats, the *Holland*, at Elizabethport, N.J., 1897. From a photograph belonging to the John P. Holland Co. (*From Spears' "Our Navy," Charles Scribner's Sons, New York*)

The turret guns should begin to fire only at the range where their shot would pierce the enemy's armor.

The secondary battery should use slow fire only, until the danger space made the range immaterial.

There should be *three* calibers only.

Torpedo tubes should be mounted above water, to train ahead, astern, and abeam. If submerged tubes were to be installed, they should be fixed. He said,

> The gun is pre-eminently the arm of the battleship. Naval battles have always been, and are still, fought with the gun. The ram and the torpedo appear only as an episode. . . .

He believed that mastery of the sea, which is the object of naval warfare, can only be achieved by overcoming the enemy's fleet. "Tor-

pedo-boats . . . are powerless to realize the object we have in view."

Here Cartout was in advance of the prevailing French opinion, and in accord with that of England and America. But he also recommended a *coast* defense fleet, to be made up of "monitors, rams, and coast 'gardes' " . . . all intended to carry heavy batteries, capable of "ramming and combined [in action] with torpedo-boats acting from bases."

His fastest cruisers were to have speeds equal to the fastest cruisers of an enemy, and of the fastest ocean liners, and to be armed with the most powerful, protected batteries possible.

Of the torpedo-boat, he said:

> It must improve the weapon it carries and find the protection it lacks, by becoming a submarine . . or a submersible.

He excluded from the "corps de bataille," which he called the "front line squadrons," all light craft, torpedo-boats, destroyers, and despatch boats.

The *Reserve* should consist of the older vessels, to "line up" after the "first shock" of the "front line squadrons."

He offered no tactical rules for formation or attack, but apparently contemplated a "charge through."

In September, 1900, the Institute published a lecture delivered by Lieutenant L. H. Chandler at the Naval War College, on "Torpedo Operations in Naval Warfare."

Chandler dealt with the organization of a coast defense torpedo flotilla; the approach of a section; the firing tactics of a single torpedo vessel; and the evasion of picket or torpedo vessels of the enemy.

He said, in part:

> I consider our torpedo-boat destroyers, as little more than torpedo-boats of high sea-keeping capacity and offensive power . . . it would be very difficult to conceive of even the destroyers being ordered to accompany our fleet in an expedition against an enemy in his own waters . . . .
>
> This was the mistake the Spaniards made [1898] and the almost insurmountable difficulties encountered and the loss of mobility on the part of the big ships, showed the folly of the attempt.
>
> If it be the case that our destroyers cannot go abroad, so it may be safely assumed that the torpedo vessels of foreign powers need not be looked for on our own coast . . . . I believe this last statement will receive free, and perhaps unfavorable criticism . . . [Our earliest destroyers, displacing from 500 to 700 tons, were then being completed. They proved to be entirely seaworthy].
>
> It seems to me that the sphere of usefulness of the torpedo is largely limited by the possibility of keeping the gyroscope in adjustment . . . . Therefore we must admit that to get far from base with a torpedo vessel . . . and then to work successfully, would be a very difficult operation . . . .
>
> The nomenclature I prefer, is as follows: The "flotilla" includes all the torpedo vessels of the Navy.

A flotilla "section" is a squadron of seven boats, acting together as a unit. . . . It is very difficult to do more than theorize in regard to the actual composition and handling of the section . . . the only foreign power from which we have been able to learn of the existence of a definite method, is Germany, and the system in use in that country, as outlined and modified in this lecture, seems to me to be as good as anything that can be suggested . . . in regard to the actual composition of the section, it may be said that the Germans started with one large boat at the apex of their wedge, with six smaller boats forming the flanks; but they have now changed this arrangement, have given up the smaller boats, and all the units that form the wedge are of the same size, or nearly so. I believe the latter scheme to be the best.

Steaming in a very sharp wedge, the senior officer in the leading boat, the circumstances of darkness and weather being favorable, at a speed sufficiently low to prevent bursts of fire from the funnels, and the rolling up of masses of foam under the bows, the section will follow the leader in pursuit of its prey.

. . . The enemy's ship, or ships, being found, without their having detected the approach of the section, the leading boat will approach the target at low speed, the other boats opening out at higher speeds upon the signal for dispersion, until they attain positions on lines radiating from the target at angles of about two points, when they also turn and approach their quarry.

The approach would still be at comparatively low speed, until discovery, when full speed should be attained at once. . . .

Prior to starting I should have set my tubes and torpedoes, as follows:

Starboard, 30 degrees on the bow . . . torpedo set to run 35 degrees to the left of the line of fire, or crossing the bow at an angle of five degrees with the keel line of the boat at the instant of firing.

Port tube, 45 degrees on the bow, with the torpedo set to run 45 degrees to the right of the line of fire, or parallel to the keel of the boat at the instant of firing.

Stern tube, 45 degrees on the starboard bow, with the torpedo set to run 45 degrees to the left of the line of fire, or parallel to the keel of the boat at the instant of firing.

With the tubes and torpedoes thus adjusted, the commanding officer would then steer his boat in such a way, as to head for the point at which he wished his torpedo to arrive. The only allowance he has to make, is for the distance, course and speed of the enemy.

He recommended firing all three torpedoes together. A section of seven boats would thus have in the water, at one time, 21 torpedoes.

The two outer torpedoes would run about 90 yards apart. The one fired at the angle of five degrees with the keel line, would cross the middle line of the zone between the other two, at about 300 yards from the point of firing.

At the moment of firing, the torpedo-boat would turn to port, or if two tubes were trained to port, would turn to starboard, and retreat.

If discovered by picket or torpedo boats, an effort must be "made to reach the main enemy in spite of them."

For accompanying a fleet to operate elsewhere than in home waters, he recommended ships' torpedo-boats, or launches, and a torpedo depot ship. The boats were to be about 60 feet long, mount two 1-pounder

guns and a central pivot torpedo tube, and have a speed of about 10 knots.

A fleet of six battleships and armored cruisers should be able to put a dozen such boats into the water, and the torpedo supply ship should add six more.

He gave rules and diagrams for firing torpedoes from heavy ships, saying,

As the torpedo and the ram are both weapons which require that the ships shall close with each other before they can be used, it seems to me that the two go together and that a captain wou d hardly ever close for the use of one without expecting to try to use the other also.

. . . to get the best chance for using each . . . weapon . . . I believe torpedoes should be set to run ahead, parallel to the keel. . . . A vessel attempting to torpedo and ram an adversary, and failing, will find herself in great danger from torpedoes if she passes astern of her adversary . . . a vessel approaching bows on, is in excellent shape to use her torpedoes, while she presents the most difficult target possible to her adversary . . . in all torpedo vessels, the right ahead and right astern gun fire should be exalted at the expense of the beam fire. . . .

The extended discussion of Chandler's essay showed that while there was general praise of his careful working out of the details of a torpedo attack, some of his other recommendations, such as coast defense flotillas, stationed at points on our coast, and torpedo-boats to be carried on large ships, instead of destroyers accompanying the fleet, were generally criticised.

Of submarines, one brilliant writer remarked,

In referring to submarine boats, the lecturer very quietly gives them the thrust of Ahab, when he says, "It is no more possible to see under water than it used to be." Personally, I think attacks from balloons will find their place in serious warfare about as soon as attacks from submarine boats. . . .

Without intending it, Lieutenant Chandler was a true prophet. The submarine torpedo and the bomb took each its turn, in the minds of many, as the irresistible weapon, even as earlier the ram, and then the torpedo fired from surface ships, had done.

The very close formation of the wedge had some critics. After trials and some accidents it was abandoned.

Lieutenant Bradley Fiske noted "the fact that the torpedo has recently become effective at 1,500 yards and that the torpedo just developed is fully twice as efficient a weapon as that of only two years ago."

As related earlier, England was disturbed by the growing influence of Russia in China. In 1899, the two Powers agreed that Russia would not seek concessions in the Yangtsze Valley, nor in the provinces of

Honan or Che-Kiang. Great Britain, on her part, would seek for no concessions north of the Great Wall of China.

Neither China nor Japan looked upon this delimitation of "spheres of influence" with equanimity. Rumblings in China became audible, but nevertheless she was induced to open additional ports and interior waterways to foreign trade. Great Britain was promised that the post of Inspector-General of the Imperial Maritime Customs should always be held by an Englishman, as long as British trade with China was greater than that of any other nation.

The United States, also, was perturbed, and asked for "the open door" in trade. To this England, Russia, France, Italy, Austria, Germany, and Japan agreed, in principle, and also agreed to maintain the integrity of the Chinese Empire.

The Boxer uprising of 1899-1900 was in large measure caused by these agreements, to none of which was China really a party. The signatories of the "open door" agreement (or the treaty) of 1899 vied with each other in sending troops to relieve their besieged legations in Peking. The United States participated in the relief expedition. Japan and Russia furnished the largest contingents. Tientsin, and finally Peking, were captured by the allied forces in September, 1900, and Peking was partially looted by the captors.

Towards the end of September, a German general, Count von Waldersee, with 20,000 troops arrived and assumed supreme command, as the ranking foreign officer.

China agreed, perforce, to the terms imposed on her by the Ministers of the foreign governments. The terms included punishment of the murderers of Baron von Ketteler, the German Minister to China, and others, and an indemnity of 450,000,000 taels.

Russia took advantage of the confused state of affairs to grasp military control of Manchuria and to obtain privileges in adjoining Chinese provinces.

Japan and England were still further alarmed by these actions. The latter continued to feel the danger to her interests of Russia's efforts to secure an outlet on the Persian Gulf and to influence the native States in India.

Japan remembered Russia's actions after the Japan-China War. These considerations brought about an agreement (entente) between England and Japan, to protect their interests—real, or supposed—on the Eastern Asiatic mainland. Any aggressive intention in either China or Korea was disavowed, but it was agreed that each might take steps

to safeguard its interests, and that either might come to the assistance of the other, should any third power object to such action. Several years later (September, 1905), the Entente became an offensive and defensive alliance whose scope covered the whole of Eastern Asia and India.

In the meantime, Japan attempted to deal directly with Russia, in order to secure by treaty abatement of the latter's continually increasing authority in Manchuria and, to a lesser extent, in Korea.

However, negotiations were broken off on February 5, 1904. Just after midnight on the 8th, some of the torpedo-boats of Admiral Togo's fleet—already off the port—made a surprise attack on the major portion of the Russian fleet under Vice Admiral Stark lying outside of Port Arthur. Two battleships, *Czarevitch* and *Retvizan,* and the cruiser *Pallada* were seriously damaged, and grounded trying to get into the harbor. No torpedo-boats were injured.

Admiral Togo followed up the torpedo attack by an attack with his fleet on the Russian fleet in harbor. He approached with his six battleships and five armored cruisers in column, himself leading with his flag in the *Mikasa.* The *Mikasa* opened fire about noon, range above 9,000 yards decreasing. The action—or bombardment, as it might be called—lasted about 50 minutes. The heavy guns in the Russian shore batteries deterred Togo from pushing the attack to short ranges. The *Mikasa* was struck three times by heavy shell, and other ships in proportion. No ships in either fleet were seriously damaged. Russian casualties, 126 killed and wounded, were about double those of the Japanese.

On the same day, February 9, the Japanese armored cruiser *Asama,* in company with five other Japanese cruisers and some torpedo boats all under command of Rear Admiral Uriu, attacked the United States-built Russian cruiser *Variag* and the Russian gunboat *Korietz* outside the harbor of Chemulpo, Korea. Both ships reached the harbor and were sunk to prevent capture.

Russia and Japan declared war on February 10. On February 11 the *Yenesei,* a Russian mine-layer, after planting about 400 mines outside of Port Arthur, blew up, and the record of the limits of the mine field was destroyed with the *Yenesei.* On the next day a storm set many of the mines adrift. Two days later, February 14, the Russian cruiser *Boyarin* struck one of the floating mines and was sunk by the explosion.

Admiral Togo, after the bombardment of February 9, blockaded Port Arthur with his fleet. Admiral Makaroff, Russia's most capable and widely known officer, was sent to Port Arthur as Admiral Stark's relief. The Japanese ships, in daylight, lay well off the port. This enabled

Makaroff to exercise his ships outside, which he frequently did though without making any attempt to drive off the blockaders or bring Togo to action. His injured ships were being repaired.

He failed, however, in keeping an effective night harbor patrol. On the night of April 12 the Japanese mined the harbor entrance without being detected, and on the following day sent their cruisers close in to tempt the Russians to attack.

The ruse was successful. Makaroff came out, crossing the mine field safely, and chased, but without success. Returning, his flagship *Petropavlovsk* struck a mine, and sank with the loss of 600 men, including the Admiral. Another battleship, the *Pobieda,* had a hole 30 feet long torn in her side, but succeeded in reaching the anchorage.

Later Admiral Togo, emulating Sampson's attempt at Santiago, sank 17 merchant vessels in unsuccessful efforts to block the entrance to the port.

While endeavoring to sweep up the mines laid by the *Yenesei,* the Japanese in three successive days lost a torpedo-boat, a cruiser, and a battleship, the *Hatsuse.* A second battleship, the *Yashima,* was injured to such an extent that she was barely able to keep afloat and make port.

These great losses on both sides firmly impressed on the combatants, and on other naval powers as well, the perils of mines.

Russia's Far Eastern squadron included three large cruisers, the *Rossia, Gromboi,* and *Rurik,* which were based on the Russian port of Vladivostok, under the command of Rear Admiral Bezobrazoff. To watch these, Japan kept a cruiser squadron at sea under Vice Admiral Kamamura. Kamamura had some armored cruisers under his command, but did not attempt a close blockade.

In April, Bezobrazoff, during a short dash to sea, torpedoed a large Japanese transport. In June, Kamamura's squadron was reduced and the blockading fleet off Port Arthur was strengthened, owing to information that Russia's three injured battleships, the *Retvizan, Pobieda,* and *Czarevitch,* had been repaired.

In June, Bezobrazoff started on a commerce destroying cruise around the Japanese coasts. He made some captures, partially halted Japan's sea commerce, interfered with the transport of troops and supplies for the blockading fleet and the army besieging Port Arthur, but on the whole his raid had little appreciable effect on Japan's conduct of the war.

For more than two months, Kamamura endeavored to force an action, but it was not until August 14 that he found himself, with a

faster squadron of four armored cruisers, in sight of the Russians and between them and their home port.

Rear Admiral Yessin had succeeded to the Russian command. His three ships were unarmored and mounted lighter—though many more guns—than the Japanese cruisers opposed to them. The armor of the latter could have been pierced at short range by the Russian guns and Yessin's tactics should have been to engage closely where his guns would have been effective and to have overwhelmed his foe with volume of fire.

Instead he chose flight until the *Rurik,* his slowest ship (19 knots), was overtaken, when he turned back to her assistance with the *Rossia* (flag) and *Gromboi.* After checking Kamamura's pursuit and damaging his flagship *Idzumo,* Yessin resumed his course toward Vladivostok.

The *Rurik,* again overtaken, with her captain killed and her hull badly damaged, sank herself rather than surrender. The *Rossia* and *Gromboi* escaped, after a running fight of five hours, at a range of about 6,500 yards. Neither was badly injured. Kamamura gave up the pursuit, partially, it was reported, because of shortage of ammunition.

The Russian admiral Vithoft, who succeeded Makaroff, had felt that the addition of the three large cruisers to his command would enable him to meet the Japanese on nearly equal terms and offer him a fair chance to gain command of the sea. He had made one sortie from Port Arthur, but returned without risking an engagement.

The strength of the two fleets at this time was: Vithoft, six battleships, one armored cruiser, four protected cruisers, and ten torpedo-boat destroyers. Togo: four battleships, seven armored cruisers, ten protected cruisers, thirty destroyers and torpedo-boats.

On August 10, in the morning, Vithoft, with the same fleet as on June 23, except for the absence of two destroyers, left port with the intention of joining Yessin, making for Vladivostok and, with that port as a base, preparing to face the Japanese. Vladivostok's facilities for repair and maintenance were greater and it was entirely in Russian hands, whereas at Port Arthur, ships were in danger from Japanese siege batteries.

On August 10, Togo's fleet, with the exception of four armored cruisers absent with Kamamura, was the same as on June 23, but it was divided into two squadrons. Four battleships, three armored cruisers, and the torpedo craft were with the admiral, northeast of the port; the other cruisers were to the southwest.

Vithoft intended to avoid battle if possible, although—at least in heavy guns—he was not badly outnumbered by the Japanese. The

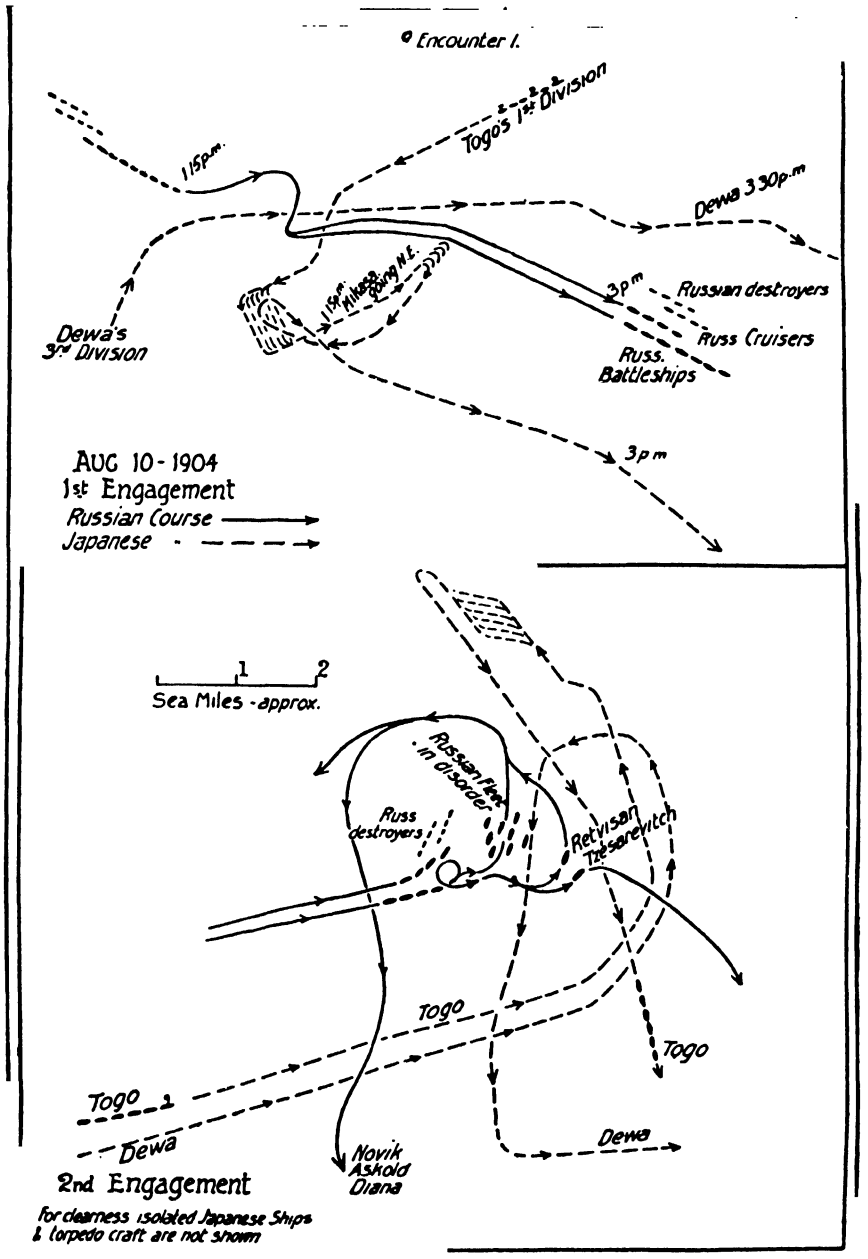


FIG. 124.—(*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

latter were hampered by one slow battleship, the former Chinese *Chen Yuen,* with a maximum of 14.5 knots and accounting for four of Japan's 12-inch guns. Including the *Chen Yuen,* Togo's fleet mounted twenty-two 12-inch and three 10-inch guns; Vithoft's, sixteen 12-inch and four 10-inch. Togo's principal superiority arose from twenty 8-inch long range weapons, mounted on his armored and protected cruisers. Three of his battleships were larger than those of the Russians, but not more heavily armed.

In the absence of the cruisers, Vithoft could well meet Togo on even terms, despite the latter's preponderance of torpedo craft, but he steered, instead, southeast for Shantung Promontory. He was led to change his course, first to south and then to the east, to avoid real, or simulated, floating mines.

Togo stood to cross his bows from port to starboard, and while capping Vithoft's column, opened fire at long range, He turned to starboard and passed the Russians on the opposite course—west—and continued firing, still at long range, and without doing any damage. He threw away ammunition from about 11:30 A.M. to 1 P.M.

After Togo passed to join his cruisers, Vithoft resumed course for Shantung Promontory. Togo counter-marched to pursue, his armored ships in column, led by the *Mikasa* (flag). His cruiser divisions were on his starboard quarter, in columns, with torpedo craft outboard of cruisers.

About 5 P.M., the *Mikasa* reached a range of about 8,000 yards, abaft the starboard beam of the Russian's armored column, and opened fire.

Vithoft in the *Czarevitch* led his armored column. His cruisers and destroyers were in column on his port beam.

About six o'clock, the *Czarevitch* was struck by a 12-inch shell which killed Vithoft and three of his staff. Within a few minutes other shells wrecked the conning-tower and wheel.

After the disorder produced in the column by the loss of control on the *Czarevitch,* the second in command, Prince Ukhtomsky, in the *Peresviet,* fourth in column, signaled the fleet to follow his movements and turned about for Port Arthur.

The *Retvizan* maintained the action for half an hour, at ranges under 4,000 yards, and then followed the other battleships.

The cruisers and destroyers dispersed.

The five battleships, the armored cruiser *Pallada,* and several destroyers reached Port Arthur during the night.

The *Czarevitch,* either before, or after dark, regained control and stood south at slow speed. Five attempts were made to torpedo her during the night, but all failed. She reached Tsingtau, 260 miles from Port Arthur, without further injury.

Of the remaining ships, the fast cruiser *Novik* and three destroyers reached Tsingtau. Another fast ship, the *Askold,* and one destroyer got in to Shanghai and the *Diana* reached Saigon. One destroyer was wrecked on the Promontory.

It appears that all ships that took refuge in neutral ports were interned. The *Novik,* which attempted to reach Vladivostok, was sunk in battle with a Japanese cruiser.

The sudden demoralization of the Russians after the injury to the flagship cannot be explained, and nothing can be said in favor of Togo's failure to pursue more effectively. His flagship was the only Japanese ship seriously injured.

Neither side seems to have made torpedo attacks during the day. At no time did the Russians make them.

If Vithoft intended to avoid battle why did he not sail at dusk, instead of two hours after daylight, and why, in the six weeks after the previous sortie, did he not choose a night with a head wind, which would have deprived Togo of most of his torpedo craft? He was not forced out by Japanese shore fire, because the ships which returned remained in Port Arthur until it fell and were included in the surrender.

The dispersal of the Russian Asiatic squadron left the Japanese in undisputed command of the sea and free to supply their armies in Manchuria. This condition continued until late in May of the following year.

Not long after the abortive attempt to unite the Port Arthur fleet with the cruiser division at Vladivostok, the "Second Pacific Squadron" sailed from Cronstadt to join in the war at sea. This was a fleet, rather than a squadron, and should have been able to meet any Japanese fleet on equal terms.

After about five weeks in Reval and Libau, this armada under the command of Rear Admiral Boyarin Rojestvensky in the battleship *Kniaz Suvaroff* sailed for the Japan Sea, via the Cape of Good Hope, on October 16, 1904.

In his diary, the Fleet Engineer, Politovsky, wrote:

> On the eve of our departure . . . there was prayer, with genuflexions for Boyarin Zenovie [the Admiral]. On the 18th, he was promoted to the rank of Vice Admiral and aide-de-camp to the Czar.

More than 200 days after, the fleet arrived intact south of the entrance at the Straits of Korea, having been reenforced in Kamranh Bay, Cochin China, by a squadron under the command of Rear Admiral Nebogatoff, who had sailed from the Baltic in March, 1905, via the Suez Canal.

When weather and swell permitted, the Russian fleet coaled at sea. The last stop for this purpose appears to have been May 23.

Politovsky's letters were almost uniformly gloomy. They afford some insight into the state of mind prevailing in Russian ships. Writing on April 22, 1905, he said,

> . . . there is an officer in the fleet, who was in the *Czarevitch* . . . on the day on which Withoft was killed and when our ships fled so disgracefully wherever they could. From what he says, it is evident that the morale in the ships was bad, and that they were all convinced they would return to Port Arthur; that the Japanese suffered heavily and if our ships had held out for half an hour more, the enemy's fleet would have run . . . the pity was, the spirit of despair reigned.

Politovsky was killed in the Battle of Tsushima. His last letter, dated May 23, was evidently sent to Shanghai by transport. In it, he speculated on the probable course of events.

Japanese attacks had been expected farther south, but as the days passed without them, spirits rose among the Russians.

> Our fleet has made a great voyage and is bound to protect the transports. . . . In seven days, the world will be talking about our fleet. . . . There will probably be frantic torpedo attacks in the Straits of Korea. . . . The moon rises and makes the night attacks easier. . . . Probably Japanese mines have been planted at Vladivostok. . . . A great armada, . . . we must expect submarine boats and frantic torpedo attacks. . . .

In other letters, he told about deck loads of coal which undoubtedly prevented thorough drills except in turrets. Otherwise, the long voyage should have afforded time to train green crews and perfect preparations for battle, above and below.

The Admiral's decision to approach his port by the shortest route, was doubtless governed by fuel and food considerations which might not permit approaching Vladivostok from the East through Tsugaru Straits, or from the north through the Strait of La Pérouse. The route through the Korean Straits was some 500 miles shorter and the navigation easier, but it afforded every facility for Japanese attacks by day and by night and was close to their bases.

Togo had spent seven months preparing to meet Rojestvensky, but was not able to add to the number of his armored ships—four battleships, and eight armored cruisers. The Russians also had twelve armored

ships in their battle line, and two others—old armor-clads—with their cruiser squadron.

The Japanese fleet was at anchor on the night of May 26 at its base, a harbor in the Island of Tsushima. Tsushima divides the Korean Strait

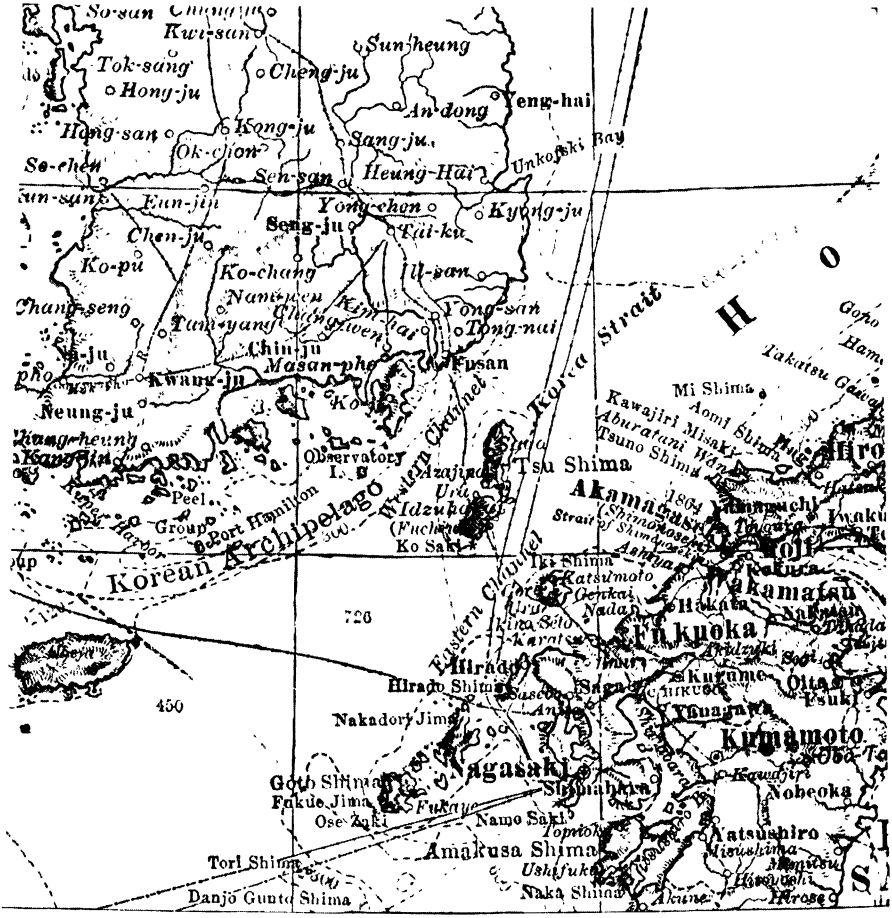


FIG. 125.—Tsushima. (*From "The Century Atlas of the World," D. Appleton-Century Company, Inc., New York*)

into two parts, known as the Eastern and Western Channels, the Eastern being the wider—about 30 miles at its narrowest part.

About five o'clock on the morning of the 27th, Japanese scouts reported the Russian fleet about to enter the Eastern Passage. Togo immediately got under way and steered for it.

Darrieus says, "In the Japanese fleet, they went eagerly to battle; on the Russian side, they submitted to it."

Rojestvensky's plan was to convoy his transports and train to Vladivostok, re-fit, and then seek battle, but he felt that such good fortune was most unlikely to come to him.

He was steaming in double column: two armored divisions of four ships each in the starboard column, one armored division and a cruiser division in the port column. Interval was about 1,000 yards between columns and 800 yards between the rear ship of a division and the leading ship of the following division. Four torpedo-boats were between the two leading divisions; five, between the two rear divisions. A cruiser was off each bow, and one off each quarter. Transports and auxiliaries steamed astern of the torpedo-boats between the rear divisions. In all the Russians numbered 38 ships; speed about 11 knots. Rojestvensky kept this formation until noon.

Togo approached from the north in single column, leading in the *Mikasa*. His battle line was made up of two divisions or squadrons of six ships each. Admiral Kamamura commanded the second squadron, leading it in the *Idzumo*. In advance, were four divisions of cruisers, 15 in all. Each division maneuvered as a separate command.

The account of the battle of Tsushima which follows is condensed from a description by Lieutenant R. D. White, U.S.N. (Naval Institute, 1906), and Darrieus' *War on the Sea* (Naval Institute, 1908).

Accounts of the battle differ in details, but not in the tactics employed. It is said that there were two causes for lack of agreement in different accounts; one that Admiral Rojestvensky had set the *Suvaroff's* clock ahead 30 minutes at noon, without signal, whereas other Russian ships did not change their clocks. The other cause was that Japanese time was 18 minutes slower than the *Suvaroff's* time and 12 minutes faster than that of the other Russian ships.

At about 12:30 P.M. Rojestvensky formed single column on the first division—his own. Later, he appears to have formed the three following divisions on the port quarter of his own division; stationed two cruisers and two torpedo-boats on his starboard quarter and two astern of his division.

Other torpedo-boats joined the train under Rear Admiral Enquist, which steamed well astern and to starboard.

Togo, at about 15 knots, approached on a course to the west of south, with the Russians on his port bow steering east of north through the Strait. It seemed as if they might pass on opposite courses, but Togo

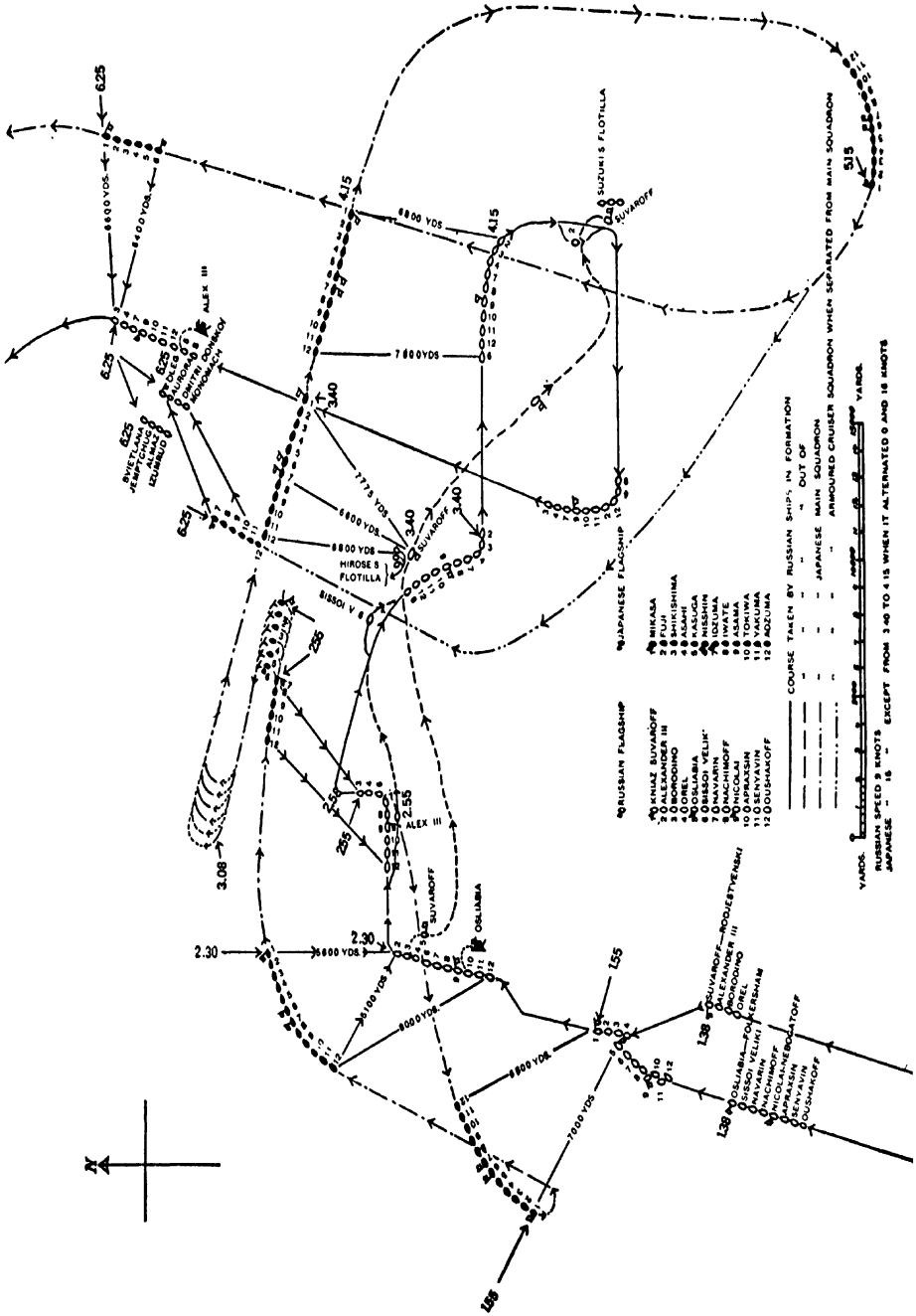


FIG. 125a.—Tsushima.

changed course to nearly east, to cross ahead of the Russian column.

At 1:40, the *Suvaroff* read the range to the middle of the Japanese fleet and made it 12,000 yards.

The order of armored ships in the two columns was: Japanese first division, *Mikasa* (flag), *Shikishima, Fuji, Asahi, Kasuga, Nisshin* (flag). Second division, *Idzumo* (flag), *Iwate, Asama, Tokiwa, Yakuma,* and *Adzuma.*

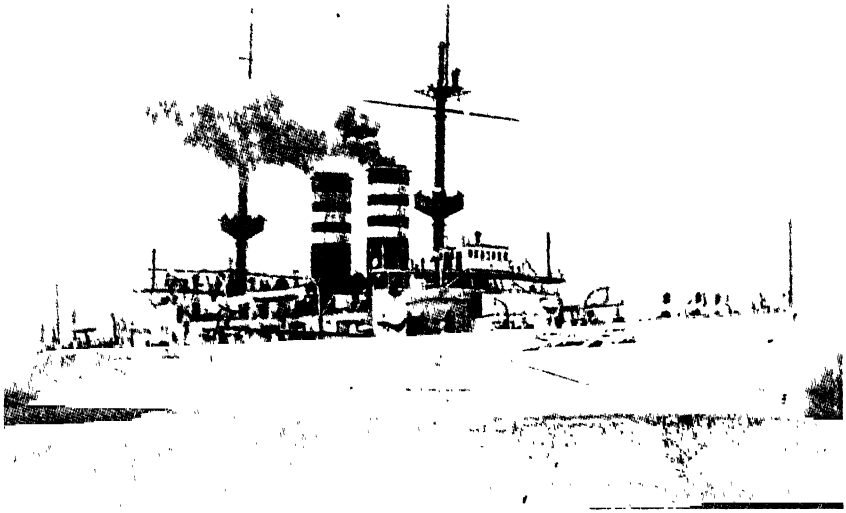


FIG. 125b.—Admiral of the Fleet, Marquis Heihachiro Togo, O.M. (*From Bodley's "Admiral Togo," published by Jarrolds Publishers (London) Limited*) Admiral Rojestvensky on board the battleship *Suvoroff.* (*From Ogasawara's "Life of Admiral Togo," Seito Shorin Press, Tokyo*)

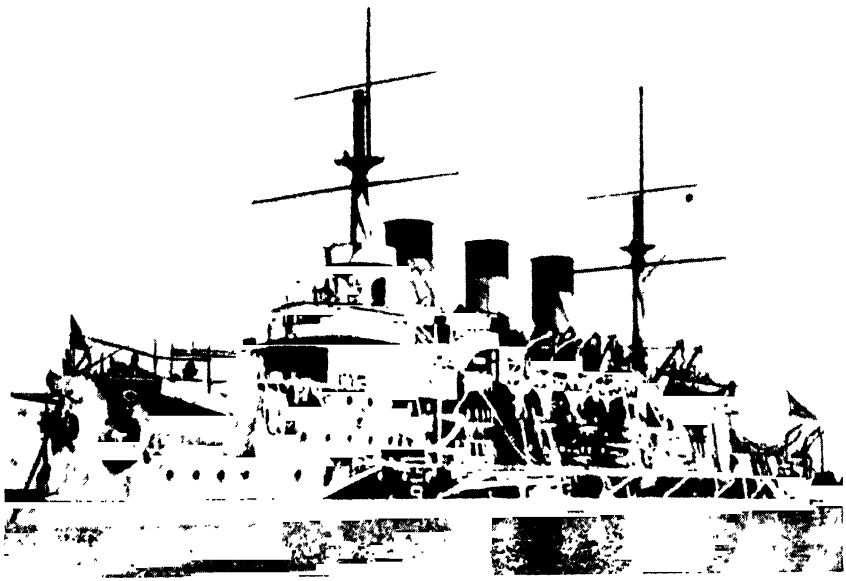
Russians: First division, *Suvaroff* (flag), *Alexander III, Borodino, Orel;* second division, *Osliabia* (flag), *Sissoi Veliki, Navarin, Nashimoff;* third division, *Nicolai I* (flag), *Apraxin, Seniavin, Oushakoff.*

At 1:55 (*Suvaroff's* time), the Japanese opened fire at about 6,000 yards. The *Suvaroff* turned to starboard to parallel the *Mikasa,* followed by the other ships of the first division. The *Osliabia,* flagship of the second division, was out of position, overlapping the two rear ships of the first division, the *Borodino* and *Orel.* After starting her turn the *Osliabia* had to stop to keep from fouling the *Orel,* which had not completed her turn. Ships of the second and third division had to stop, steer clear, or double up.

For a time, the first division, only, could return the Japanese fire. The



Mikasa



Osliabia

FIG. 125c —*Mikasa. (From Ogasawara's "Life of Admiral Togo," Seito Shorin Press, Tokyo) Osliabia. (From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co , Ltd., London)*

Osliabia, motionless for a few minutes, became the best target for the Japanese, as they turned to starboard to follow the *Mikasa.*

Togo, it has been generally agreed, had a speed advantage of from 4 to 6 knots. Some accounts say the Russians steamed at 9 knots; others, that their speed was from 11 to 12 knots.

The *Osliabia,* at the "knuckle," suffered severely. Her forward turret had been jammed by a Japanese shell after three rounds. Her water line was pierced and she took in water. She was soon down by the head, sheered out of column, and sank in about an hour.

The *Suvaroff* was disabled, took fire, and left column about 2:30.

Togo maintained the range between 5,000 and 6,000 yards and turned slowly from east toward south.

The *Alexander,* number two in column, led for about ten minutes when she had to leave position to extinguish a fire, rejoining later.

The *Borodino,* then leading, found her column so nearly capped that she turned to port to cross the Japanese rear. Togo then went right about with the ships of his own squadron. Kamamura, steering clear, and to starboard, kept up the fire until Togo's squadron was clear, when he reversed course and followed his chief.

While the action was on between the battle lines, Togo had detached his cruisers under Rear Admirals Dewa and Uriu and sent them around the Russian rear to attack the train and train-guard. Admiral Nebogatoff in the train-guard, had two old battleships, the *Dimitri Donskoi* and the *Vladimir Monomach,* in addition to some cruisers and the torpedo-boats sent to his aid.

The Japanese torpedo flotillas, during the main action, seem to have made attempts only against the *Suvaroff.*

While trying to cross the Japanese rear, the Russian course was northerly. When again nearly capped, they turned to starboard and steered to cross the Japanese rear a second time, but Togo reversed his course and took the lead, with his own squadron in natural order.

About four o'clock, smoke and haze obscured the columns from each other, and by four-thirty firing ceased.

What movements were made between 4:30 and 6:00 is not clear. The *Suvaroff* had been left to the southward; train and train-guard were probably to the southward. About 5:00, a Russian destroyer, flying Rojestvensky's flag, came near the *Nikolai* and signaled to Nebogatoff to take command, the commander-in-chief having been wounded.

Togo found the Russian battleships about 6:00 and resumed the action. The *Borodino* was still leading; course not known. The *Alex-*

ander was again in column, but towards the rear. The *Suvaroff* was drifting, and under attack from Japanese torpedo-boats, after having been fired at mistakenly by the Russians. After several torpedo hits, she sank about 7:00.

At 7:15 in the column fight, the *Borodino* blew up. The next ship, *Orel,* rear ship of the first division, was struck 15 times in a few minutes and set on fire.

Nebogatoff, with eight armored ships and what remained of the train, cruisers, and destroyers, turned west. Darkness intervened and Togo did not pursue, except with his torpedo flotillas. He took steps to ensure that he would find Nebogatoff the next day.

The latter got through the Strait and into the Sea of Japan during the night, but was overtaken by Togo during the forenoon. With no other alternative than to surrender or be destroyed, he chose the former.

Thus ended Japan's first war on the sea against a major naval power.

The account of the battle just given is, I believe, correct in essentials, but inaccurate in details. None of the track charts consulted agree. A partial reason for this has been given.

The tactics of Admirals Ito in the Japan-China war and Togo in the Japan-Russian war may be summed up as: follow the leader, open fire at effective range, maintain that range, and employ torpedo boats only against disabled ships or at night. There was no planned mêlée; no charge through; no ramming. Squadrons in column was the only Japanese battle formation. Admirals led their squadrons.

When Port Arthur fell, President Theodore Roosevelt successfully used his good offices to persuade Russia and Japan to agree to an armistice, preliminary to negotiating a peace. The Commissioners for this purpose met on August 9, 1905, at Portsmouth, New Hampshire, and a peace treaty was signed August 23. By it, Japan was confirmed in her occupation of Port Arthur, and her "sphere of influence" in Manchuria (of which she had been deprived by the Powers, ten years earlier) was recognized by Russia. China was not consulted.

Russia withdrew to the Siberian railway, ceded the southern half of Saghalien to Japan, and recognized that country as paramount in Korea.

Captain Seaton Schroeder, U.S.N., wrote of the battle of Tsushima, under the title "Gleanings from the Sea of Japan."

Among his conclusions were:

> It is evident that while the torpedo-boat is entitled to, at least, all the honors it has held, with greater, or less continuity, it is not in a position to assail the supremacy of the battleship [but] nothing can be more completely proven than the restriction of the torpedo-boat to the rôle of a supplementary weapon.

In regard to the ram, that very short range weapon may certainly be said to have received its quietus. . . . The battle developed nothing new concerning the influence of speed. A close study fails to reveal any material advantage closely attributable to it [speed] from the moment that tactical contact was established. . . . Nothing remained so steadily confirmed, as the supreme importance of the human factor, the personnel, the man behind the gun.

Armored ships laid down in the United States after 1906, were not designed with rams.

CHAPTER XLVIII

TACTICAL DISCUSSIONS, EARLY 20th CENTURY

THE NAVAL INSTITUTE prize for 1905 was awarded to Rear Admiral (then Commander) Bradley A. Fiske. The subject of his essay was "American Naval Policy."

Fiske concluded that "we may accept it as a principle, that our navy will be strong enough, when it is stronger than the enemy, and not before."

From this, he attempted to deduce the "Kind of Battle Fleet We Need." He said,

> . . . the first quality to be demanded in a fleet fight is speed. . . . It is in attaining positions of strategical and tactical importance that speed has its crowning value.

To maintain speed in the open sea in rough weather, "the ships of our battle fleet must be very long, deep, and massive." These requirements he felt, could be met on a displacement of 18,000 tons.

He spoke of "manageability," including in this, not only the maneuvering qualities of each ship, but its capability of maneuvering with other ships, as a unit, and the signaling equipment to make this available at any instant.

He believed that fleets, after sighting each other, would jockey for position and that "the value of quick and sure signaling may be so great as to decide which fleet will win."

> After our two fleets, after more or less maneuvering, get within effective gun range, the gunnery fight will begin between them, and it will continue until the battle is decided in favor of one contestant, or until one is able to escape.

He assumes a gunnery battle only. No ramming; no torpedoes from fighting ships, torpedo-boats, or submarines.

He went on to make a great generalization which, if accepted and acted upon, would govern the armament of ships and their tactics. He reached his conclusion by a course of reasoning which may be paraphrased as follows.

In the first place, "in an endeavor to get a clear idea of what will happen . . .," he had made some tables which accompanied his essay. These tables grew out of an attempt to ascertain "how the values of two contending forces change as the fight goes on." In the tables the offensive power of a stronger force, at the beginning, was given the

numerical value of 1,000, and those of weaker forces were assigned values from 900 down to 100.

The numerical values of offensive power were, he said,

> wholly arbitrary, and some may say, imaginary, but as they are intended merely to show the comparative strength of the two forces, they are a logical measure, because numerical; *there is always some numerical factor that expresses the comparative value of two contending forces, even though we never know what that numerical factor is.*

The numerical values given in the tables were supposed to be made up of all factors, ships, guns, officers and men, which affect the strength of a fleet.

Another convention was, that the damage that could be done by one force to another, in a given time, was proportional to the value of that force, at the beginning of that time; that the damage done could also be given a numerical value, and that the resultant strength of each force, at the end of a given period, was its strength at the beginning of the period, less the damage sustained during that period. For instance: a force of 1,000, could, in a given time, do twice as much damage as a force of 500 during the same time.

If a force of 1,000 could damage a force of 500, 100 points, in a given time, the force of 500 could damage the force of 1,000, only 50 points, and at the end of that time, the relative value of the two forces would be as 1,000 minus 50 is to 500 minus 100.

During a second period, each force continuing to damage the other proportionally to itself, the stronger force damages the weaker 95 points, while the weaker damages the stronger but 40 points.

At the beginning, the weak fleet was 50 percent of the strength of the strong fleet. At the end of the first period, its strength is 42 percent, and at the end of the second period, but 33 percent.

Fiske's great generalization was that the decrease in offensive power of a weaker fleet, fighting a stronger, is geometrical, instead of arithmetical, and that there is a continually increasing difference between the powers of two fleets as an action progresses which favors the stronger fleet.

This is a tactical maxim of the highest importance—the most comprehensive since Ward wrote:

> Whatever the course steered may be, the line of bearing is meant to be perpendicular to the direction of the enemy, when one is near . . . from whichever direction an attack may be apprehended or in which one may be contemplated.

Ward deduced the relation between his own course and the enemy's

bearing which would enable him to make the most effective use of his gun power.

Fiske showed the importance of keeping fleet power, which was *gun* power, always at its maximum.

Such customs, or maxims, as equalizing the line, maintaining a reserve, etc., would not have been evolved, had these truths been evident.

A corollary of Fiske's maxim is: center line batteries *to make all guns count at the same time.*

A second: simultaneous gun and torpedo attack.

A third: no reserves.

As long as all gun-power is not employed, Fiske's ratio of damage inflicted might be in favor of the fleet with the least potential power, but which effectively employed it all at the same time.

A fourth corollary might be: no enemy ship to be left in the full employment of its power; i.e., unattacked, if itself able to attack.

Fiske based his investigations on a further convention; that the chances of hitting and penetrability are equal for the ships of each fleet and that the chance of hitting and damaging does not change until one target is destroyed.

But two ships with the same offensive powers may present different effective targets. The chance of hitting one may be less than that of hitting the other. Or a ship with the same exposed area as another may have a larger area of impenetrable armor, so that more hits are without effect.

What of inequality in defensive power?

Fiske deduced from another set of tables that it is better to increase offensive power 10 per cent, even though at the same time we increase the chance of receiving injury 10 per cent. From this, he concluded that we must make our battleships as large as the state of the engineering arts would permit.

Fiske had served as executive officer of the *Massachusetts* of 10,500 tons. At the time he wrote, the United States was designing battleships of 16,000 tons (*Connecticut* class) and Great Britain was planning the *Dreadnaught,* the first all-big-gun ship with center-line battery, since the *Niagara.*

The United States had in commission, at this time, 13 battleships, 16 destroyers, and 8 small submarines. Fiske's essay did not include probabilities of future development in either destroyers or submarines. Both, like battleships, were increasing in offensive power, but for some years battleships were increasing in tonnage and in gun power at a

faster rate than submarines and destroyers in tonnage and torpedo power.

Battleship design, which usually preceded commissioning by about four years, soon reached displacements of 26,000 tons. For some years, belt, turret, and deck armor varied little in thickness, but improved in quality. Offensive power increased at a slower rate than tonnage, but carried with it speed increases.

In the *South Carolina* and *Michigan* eight 12-inch guns were mounted on a displacement of 16,000 tons. The *Wyoming* and *Arkansas,* completed three years later, mounted twelve 12-inch guns on a displacement of 26,000 tons. Discounting possible gun interference, gun power increased 50 per cent on a tonnage increase of 60 per cent. The speed increase was about 15 per cent, but speed was determined by other considerations than tonnage and gun power.

Fiske wrote at a time when rapidity and accuracy of individual gunfire at a fixed target, at short range, was nearing its maximum for guns of all calibers. Advances in fire control communications and instruments, including range-finders, led successive writers on gunnery and tactics to advocate opening fire at longer ranges.

One of Fiske's conclusions was that "the art and science of Naval Tactics are undeveloped." He might have been nearer the truth, if he had said "are developing."

Another over-statement appeared in the Institute *Proceedings,* the following year (1906) in the essay by Lieutenant Commander Albert P. Niblack, on "The Elements of Fleet Tactics." His essay received honorable mention in the prize essay contest for the year. Niblack's over-statement was to the effect that the U. S. Navy had no scheme of naval tactics.

Fiske wrote, "The service agrees with Mr. Niblack that we have no scheme of naval tactics, and that we need one."

As in an earlier essay, Niblack formulated a number of "axioms," based on attaining a "superior" position for "concentrated gun fire." Only his conclusion need be given here. This was to the effect that "a superior position can only be held by either superior speed or superior tactical skill."

Niblack's battle plan included a reserve, but in discussing comments on his essay which were addressed principally to his plans for concentration, he quoted with approval a statement of Captain J. B. Murdoch,

> Nothing will, I believe, be more potent in pricking bubbles, and in sifting right ideas

from wrong, than the one principle that *the aim of battle tactics is to keep the guns of all your ships, constantly bearing on the enemy.*

Murdoch had made the same statement, in effect, but in different words, when he said,

A fleet commander, in battle, should, whenever the enemy is within range, so handle his ships, as to keep their guns bearing. . . . [He continued] If he [the fleet commander] has developed the gunnery skill of his crews, he owes it to them and to his country, to offer the best possible chances he can, for this skill to act.

We might well study battle tactics, pure and simple, and bar from the tactical signal books, all movements which could not, or ought not, to be attempted under fire.

Professor Horatio Alger, U.S.N., a keen student of naval tactics, was more directly critical of plans for concentration of fire in battle. He said,

The fundamental end and aim of naval tactics, is, to so maneuver, as to make one of the enemy's ships the *best target* for several of your own ships. When this has been accomplished, then, and then only, is it allowable to concentrate your fire.

Early in the battle of Tsushima, the *Osliabia* from being out of position to port and stopped, or nearly so, was for a time the nearest vessel to two or more Japanese ships, and suffered accordingly.

Alger, also, criticized as unsound—his exact word was "imperfect"—a pronouncement of the War College that would indicate concentration was always desirable.

He quoted the War College dictum, as reading:

Concentration of gun-fire is practicable in any formation, by directing half, or all the vessels of a fleet against one of the enemy's ships. Thus *one* might be disabled by a total fire which would produce but little effect if spread over the whole of a fleet. When the ship was evidently disabled as a fighting unit, the gun-fire might be concentrated by signal against some other ship.

The War College ignored difficulty of fire control in each of two or more ships firing at the same target and also, what enemy ships *not* under fire could do.

Alger further said:

The greatest possible effect of a squadron's gun-fire can only result from directing the fire of each ship at the enemy nearest herself.

An officer attached to the War College, Commander W. W. Rush, took exception to the statement that we had no scheme of tactics and that we needed one. He said,

Up to date, theorists and students of naval battle tactics, who for years have *worked together in conference,* at a place and time, devoted to this one study, have

helped, in a great degree to crystallize *naval expert* opinion on Battle Tactics for the Squadrons.

He said that game-board studies showed rectangular movements, constant high speed (reserve of two knots) and standard helm angles were the only correct principles (axiom) on which to base naval tactics. "Line of bearing tactics are dead and gone. . . . We must learn to turn a corner, at 300 yards, at battle speed. . . ." (a large order) "We must learn to turn together, *any number of points*" (another large order, if it meant reversing course at his recommended battle speed, at 300 yards distance).

Niblack replied that he believed at one time "that rectangular movements were the only ones permissible, but the real test of any maneuver is the least disturbance of gun-fire."

Rush in a later article stated that the *one* aim of naval tactics is concentration; the whole of your fighting strength against a portion of the enemy, and that *skill* to enable this to be brought about was *continual drill at sea, in close order, at high speed.*

Referring to some of the criticisms of his essay, Niblack said that he could publish, on the subject of tactics, only what was considered by the Navy Department as in no manner outlining the contents of the official Tactical Signal book.

The Naval War College did not, at the time—nor for some years afterward—publish the results of its tactical studies. The only immediate benefit was to the officers attending the College. It is probable that the Navy Department did not wish to have the tactical maxims evolved at the College, made available to other nations.

The tactical signal-book was available to all officers, but could not be publicly discussed. Had there been any Fighting Instructions separate from the Signal Book, these would have been in the same category, as far as public discussion was concerned. War College dicta were secret, or semi-secret, either from inertia, design, or by order of the Navy Department.

The field for discussion of tactics in the service forum, the Naval Institute *Proceedings,* was—and is—limited.

Fiske, in a later essay (1907), again took up the subject of tactics, but made no reference to his tables. He did not agree that prolonged maneuvering for position was out of the question, after two fast fleets sighted each other, and before they took "the irrevocable step of closing." He made one incomplete statement,

. . . the time during which tactics rule, is only the interval between the instant

when the hostile fleets come within each other's presence and the time when they come to blows.

This would indicate that coming to blows—opening fire—brings on a mêlée. History, however, shows that tactics could—and frequently did—rule through an entire battle, usually on the side that won.

He further said,

Naval tactics may be divided into three parts:
The struggle for the better position.
The struggle to get out of an inferior position.
The struggle to prevent an enemy from getting out of an inferior position.

Sea, wind, and light, all affected gunnery, and therefore were factors in determining the better position at any given time.

It may be noted that *sea* does not *change* rapidly. Light, for gunnery, is affected by the bearing of the sun, and changes with the hours. Wind, is generally with the sea, but may have little relation to the swell. Fair constancy of wind direction is found solely in the trades. There, only, can the best enemy compass bearing for a gun duel be determined beforehand.

Fiske assumed battle range as 6,000 yards, "which now seems to be considered the standard fighting distance." He said that the battleship torpedo has "hardly yet entered into practical tactics, but we can see it coming."

That year (1907), the United States assembled—for the first time—for the purpose of tactical drills, a fleet of sixteen battleships.

Following Fiske's article in the Institute *Proceedings* was a reprint (December issue), of two articles by Lieutenant A. C. Dewar, R.N., on the value of *speed*. Like Fiske, he believed that maneuvering between two fleets for position of gunnery advantage, would begin at from four to ten miles, and that effective battle range was about 7,000 yards. He thought it worth while to attempt to gain the sun gauge, though it would require a speed superiority of three knots and might take nearly all day.

A speed superiority of two knots would not materially affect an action if the slower fleet were properly handled, but he concluded that a superiority of even four knots, could not permanently maintain a fast fleet in a position of advantage against a skillfully handled slow fleet.

He stated, "Speed binds the slow fleet down to particular tactics." All guns should be kept bearing, if within 6,000 yards.

Battle conditions are "fulfilled by the line of bearing of the column, being at right angles to the point of attack; a proposition clearly

formulated by the late Admiral May in 1897 and also by Lieutenant Commander Niblack in a paper on "Gunfire and Tactics" in 1903 (Ward, 1859).

In a discussion of Dewar's articles, Niblack made a sweeping statement:

> At best, the total output on the subject of naval tactics, when boiled down to form a text-book for students, consists of a few tactical axioms and a mass of general and sweeping statements, deduced from very hazy data, by earnestly inclined officers, who cannot, in the nature of things, deal more than with theories. . . .

He admitted that he had modified his own belief of 1896, that an approach should be made in *line,* to one that it should be made *"in line of bearing"* (the lasking approach of the end of the XVII century).

It is true that *line* can be defined as a ninety degree line of bearing. Advocates of approach in line assumed that the enemy bore ahead, and was approaching on the opposite course—a condition not likely to obtain.

Naval Tactics was again the subject of the Institute's prize essay for 1908; the winner was Rear Admiral (then Lieutenant) W. S. Pye; his subject, "A few Hints on the study of Naval Tactics."

Pye supplemented his text with some useful diagrams of squadron evolutions. Distance, 400 yards; standard speed, 15 knots; reserve speed, 18 knots; tactical diameter, 600 yards. These stipulations enabled him to make his drawings to scale (approximate), in time, distance, and direction (course) for each ship in each evolution.

He said that study had brought the United States and British navies to the conclusion that single line tactics—and in this, he included formations in column, line, and line of bearing—would be more effective than double line or group formation; the line of bearing to be as nearly as possible at right angles to the bearing of the enemy.

He called attention to a conclusion of Lieutenant Dewar's (also Wainwright's) that "fleets within gun range, endeavoring to exert their power of offense, tend to approximately parallel courses."

He was the first to point out the effect on gunnery of changes of speed, as well as of weather, sun, etc. Touching on the subject of concentration, he queried: Does the chance of disabling a squadron seem better by concentrating on one ship, and then on another, or by firing at each ship, or as many as possible?

His own conclusion was that if each ship is firing at its best target, it is a logical distribution of fire.

A further—immature—conclusion was that each ship's best target should be determined by its fire control officer, and that to enable him to select the best target, he must be thoroughly familiar with the tactics of the commander-in-chief. This statement detracted from the value of an otherwise sound essay.

Plans for distribution of fire are difficult to perfect, and will continue to offer problems, but the solution does not come from the individual fire-control officer.

Pye placed maximum torpedo range at 3,000 yards. He contemplated opening battle at a minimum of twice that distance. The stations he recommended for destroyers were 1,000 yards from the battle line until range was reduced to 5,000 yards; then each destroyer should take station 100 yards from its "protecting battleship," on the side away from the enemy.

Our ten submarines then in commission were not considered possible factors in fleet action, but mine layers (of floating mines) were taken into account and Pye recommended that a fleet should keep out of water where mine layers had been.

Professor Alger said that Pye's opinions on the distribution of fire had pricked what he (Alger) called the bubble of "concentration." Alger felt that the principle of concentrating the fire of several or all ships upon one of the enemy was a complete fallacy which had resulted from the war game rules.

Lieutenant Commander Yates Stirling, whose essay, "The Nation's Defense, the Offensive Fleet," received honorable mention, discussed the submarine as a possible component of a battle fleet and recommended that the answer be determined, practically, by attaching submarines to the fleet for battle drills.

Submarines, then in commission, displaced from 120 to 170 tons, but those building were considerably larger; about 300 tons, with a surface speed of 11 to 14 knots.

Stirling could see no advantage in speed, other than the power it gave to fight or to avoid battle, and to choose the range.

Either fleet, may, by its accidental position when the enemy is sighted, have both the sun, and the weather gauge, which become a factor in its chances for success.

Skill, he thought, could best be utilized by each ship firing at her opposite in the enemy's column, except when the relative position of two fleets afforded an opportunity to fire at a pronounced turning-point (knuckle) in the enemy's formation.

Pye saw a danger from floating mines. Stirling believed that a faster fleet could force an enemy into submarine range.

Lieutenant Paul Foley, in an article on "The Torpedo Service of To-day and To-morrow," said that the consensus of professional opinion, at home and abroad, of those who had investigated torpedo warfare, was that

> the submarine will shortly usurp—if it has not already usurped—the field occupied by the small torpedo boat; that the first field of the destroyer is on the scouting line and that the torpedo armament of such vessels, is, in a measure, of secondary importance. . . .

On the other hand, Stirling said of the torpedo, as had been practically said before ". . . in the hands of daring and skilled men, it may decide the fate of nations. . . ."

If the idea actually gained credence that the torpedo armament of destroyers was secondary to their employment in scouting, it was for a short time only. As torpedo-boats disappeared and gun range was still double torpedo range, the destroyer's role in torpedo attack became paramount.

Stirling, two years later, 1910, announced a torpedo range of from 4,000 to 6,000 yards and said that destroyers (then of about 1,000 tons) had "merged into a large sea-keeping torpedo-boat, useful for both offense and defense. . . ." and against which "a battleship cannot safely defend itself at night. . . ."

For a destroyer screen, or defense against destroyer attack, day and night, he estimated destroyers per battleship, at that time, as England, 3.7, Germany, 3.8, France, 3.9, Japan, 3.7, Italy 2.4. The United States, third in number of battleships, was lowest in relative number of destroyers.

He advocated a proportion of 4 to 1 for the United States. The actual ratio, at that time, was about 2.5 to 4.

The preceding year, 1909, a fleet of 16 U. S. battleships had completed a friendly cruise around the world, accompanied by destroyers, although strained relations between the United States and Japan existed for a portion of the time covered by the cruise.

Although advocated from time to time, no direct relation between numbers of battleships and destroyers was established.

For a time, writers on naval tactics, on both sides of the Atlantic, could not reconcile themselves to the truth, deduced by Wainwright and others, that "fleets within gun-range, endeavoring to exercise their power of offense, tend to turn to approximately parallel courses."

Much attention was given to the factors of wind, sun, and sea, as affecting the attainment of an advantageous position for opening gun fire.

Some heed must now be paid to the opinions of European authors of the time, on this and other tactical subjects.

A German author in the *Marine Rundschau* of July 1907 (translated by Lieutenant-Commander H. F. Bryan, U.S.N., and published by the Naval Institute in 1908) wrote on "The Fight for the Initial Position, A Study in Naval Tactics."

He defined "initial position as the relative position of two opposing forces, with reference to power of concentration, wind, weather, and sun, at the moment it becomes possible to commence an effective gun-fire." He remarked that "no one will deny that this initial position . . . is playing a great rôle in modern naval tactics . . . there are experts who even say that the outcome of the battle depends on this alone. . . ."

After considering the subject from every point of view, he concluded that no rule had been formulated to enable a superior initial position to be obtained. He had not found it, and believed it could not be found. Superior speed was a necessary and definite factor in obtaining a superior position but not a conclusive one. Time was another factor, and maybe a determining one, when such a position is sought. It must be reached in time to fight during daylight.

Each thrust has its riposte. This maxim is of general application.

In 1905, a commission revised French naval tactics. "Groups" were abolished. Only such movements were provided after action was joined, as would least disturb gun-fire. Instead of describing and providing signals for all forms of attack or maneuvers, and leaving to the commander-in-chief the choice of which he would apply, the new tactics reduced his discretion.

Fleet action was to be conducted by semi-independent squadrons, each in column and maneuvering in accordance with rules laid down in advance by the commander-in-chief of the fleet and guided by his movements.

In 1910, an Italian author, Commander Vannutelli, attempted to analyze night actions between ironclads and torpedo-boats. His formation was by squadrons of six boats each, subdivided into two divisions of three boats each.

The best method of attacking a single ship was from ahead, approaching by squadron, divisions separating for the attack, one on each bow. Firing would be simultaneous on such bearing that the torpedoes of

the leading boat of each division would strike the enemy ship at right angles from a range of 600 yards; torpedo-boats to steam at 200 yards distance.

His calculations were that on a normal night, the range, on discovery, would not exceed 2,000 yards; that the time between discovery and torpedo firing would not exceed one minute; that hits during that minute would not exceed 3 per cent of shots fired; boats to turn away immediately on firing. He recommended a shorter firing range, if practicable, but not a closer order of boats in formation, as this would assist in detection.

Another Italian author, Lieutenant Romeo Bernotti, addressed himself to "Fundamentals in Naval Tactics." He believed in maneuvering for "the initial advantage." He considered such a position had a double effect, moral as well as material. He connected it with what he called the position of "maximum utilization"; one in which a ship's *offensive* and *defensive* qualities are both at their maximum, ignoring, perhaps, the fact that there may be no such position.

Bernotti claimed Italian torpedoes that could range nearly 7,000 yards at 31 knots. This made 7,000 yards, the lower limit of battle range. He believed that 10 per cent of shot should hit a 650 foot ship, at that range. He called extreme battle ranges, 10,000 to 8,000 meters; long range, 8,000 to 5,000. In these two zones, he thought movements might be made to attain a position of advantage, but like the German author just quoted, he laid down no rules for attempting it, nor any for gaining the advantage of wind, sun, or sea.

He discussed concentration of fire and formations which he thought most adaptable to make concentration possible, but did not consider under what conditions concentration of fire might be detrimental; i.e. when enemy ships in position to fire were not fired upon.

Group formation was considered rarely—if ever—advantageous, unless a "fast wing" for enveloping the enemy (crossing the "T") could be employed, but the general definition of a "group" would not include a "fast wing."

Bernotti pointed out that the increase of effective gun range decreases the value of close order in a battle line. It was his opinion that distance should never be less than 400 meters, that at ranges from 7,000 to 10,000 meters it might be as much as 600 meters, and that it should always be greater than the minimum safe maneuvering distance.

He agreed, in general, with Vannutelli on formation and methods of

attack for torpedo craft. He referred to the submarine as a "weapon of opportunity . . . a slow and clumsy animal, but its bite is mortal. Keep out of its way. . . ."

Bernotti referred to steering by sight-vane in action—keeping the enemy bearing on a fixed angle with the keel line "regulating oneself by the enemy, in a continuous manner."

Three related factors, compass course, distance, and speed, governed successful steering by sight-vane. These factors and two others, enemy course and speed, were frequently irreconcilable. The idea was an attractive one, but was finally abandoned after extensive trial in the U. S. Navy.

The formation of Italy's battle fleet, as at this time existing, during its war with Turkey, was by divisions of four ships each, and its torpedo flotilla was composed of divisions of four boats each, instead of six-boat divisions with three-boat subdivisions, as advocated by Vannutelli and Bernotti.

The war—a very short one—dated from September 29, 1911. Turkeys' fleet was small in heavy ships, but included 11 destroyers and 35 torpedo-boats. There was no action between heavy ships. The main Turkish body, under command of Vice Admiral Williams of the British Navy, consisting of two battleships, two cruisers, and nine destroyers, escaped through the Dardanelles into the Sea of Marmora. Three Turkish torpedo-boats were sunk by an Italian flotilla of five destroyers, commanded by Rear Admiral, the Duke of the Abruzzi. There were no other sea actions.

Italian battleships were successfully employed to bombard Tripoli. They fired at a range of 7,700 yards. None was injured. The city surrendered, October 5, after bombardment on the two preceding days.

In anticipation of an effort by the Italians to force a passage through the Dardanelles, the Turks sank twelve hulks at Chanak, in the narrowest part of the Straits, and also laid mines. The width at Chanak is 1,300 meters.

Looking forward to events a few years later, it is of particular interest to quote the opinion of Admiral Fisher at this time. He said in part, ". . . in view of the topography and conditions in the Straits of Dardanelles, they could not be taken nor forced, unless the attacking fleet could afford to sacrifice twenty obsolete battleships and force the passage with the rest of the fleet which should be of the most modern type."

The Italians made no attempt to force a passage of the Dardanelles.

Naval operations of this war were not of important tactical interest.

In the decade 1900-1910, three French naval officers published books on naval strategy and tactics.

The earliest of these volumes was *War on the Sea* by Captain Gabriel Darrieus. He gave this title to a series of lectures which he delivered at the French Naval War College, in 1904-05, shortly after the Russo-Japanese War. He edited and assembled his lectures in book form and Professor Alger translated the volume for the U. S. Naval Institute.

In 1909, Commander Réné Daveluy re-edited two earlier studies of his own (on "Naval Combat" and "Naval Strategy") and published them under the title, *The Genius of Naval Warfare*. This was also translated by Professor Alger for the Naval Institute.

The third volume was *The Naval Battle* by Lieutenant A. Baudry, published in 1910 and translated for the British Navy, in 1914, by Admiral Sir Reginald N. Custance, R.N.

The three translations were supplied to ships' libraries by the U. S. Navy Department. They embody French tactical ideas of their time.

Captain Darrieus stated that the rapid fire gun and smokeless powder which permitted "regulation of gun fire at any distance, have favored the intuitive and unconscious progress of humanity in the search for battle at long range. . . ."

He said that the battle of Tsushima "afforded proof that henceforth the gun is to be the sovereign arbiter of the fate of naval battles. . . ."

However potentially powerful the torpedo, neither in the Japan-China War, nor the Japanese-Russian War, was it shown to be a decisive weapon in battle. Still faith in it continued to be shown in the steady building of torpedo-boats and destroyers by all naval powers. Darrieus was not a strong advocate of the torpedo nor of the submarine. Of the ram, he said, "No weapon has given occasion to overflowing enthusiasm more than this one; it has had, and still has (1905) fervent and convinced advocates."

He felt, however, that the data on ramming from our Civil War and from the battle of Lissa, was not conclusive as to the continued value of the ram.

He did not advocate heavy armor, but said,

> there exists a surer method of defending oneself, which consists in destroying the adversary by attacking him with fury. . . . The best protection we can have against the enemy's fire, is a well directed fire from our own guns. No one was better qualified than Farragut to express himself thus, and his deeds have proved the excellence of his opinion. . . .

He believed in large ships, heavily gunned, and that they should be armored—but not heavily. He saw no use for armored cruisers and held that scouts could be obtained from the merchant marine. He deplored the idea of coast defense ships, which had, to a large extent, influenced naval construction in France, and to a lesser degree, in other countries. He called a coast defense ship "an inadequate realization of an inexact idea."

While disclaiming any desire to stifle individual initiative, he did not favor the earlier French practice of tabulating all practicable fleet movements in the signal book and leaving the admiral an unfettered choice of methods of approach and attack. On the contrary, Darrieus advocated the issue by the Admiralty of what might be called tactical fighting instructions.

He noted a proposal of the British admiral, Lord Charles Beresford, for joint maneuvers of the British and American fleets, which Lord Charles thought would be valuable experience for both navies, and of interest to the world at large. Darrieus did not comment on the value to tactics of such a meeting, but evidently did consider the political significance of such a proposal, which he thought was one on which France should meditate.

In the field of strategy, he strongly recommended an "Inter-Seas" ship canal through France, connecting Toulon with the Bay of Biscay. Such a canal would greatly improve France's ability to unite her Atlantic and Mediterranean fleets, attempts to do which had been so often frustrated by the British.

Germany was digging the Kiel Canal, which gave her another, and a shorter outlet from the Baltic to the North Sea. This canal was opened in 1913, a year prior to the commencement of the World War. It enabled the German fleet to operate on "interior lines" which was the advantage Captain Darrieus visioned would accrue to the French by connecting the Bay of Biscay with the Mediterranean.

Daveluy joined with Darrieus in inveighing against a navy for local defense. He said:

> Under the pressure of public opinion, we have built two hundred coast defense torpedo-boats, and we have distributed them from Dunkirk to Villefranche, from Oran to Bizerta, seeking thus to assign each place a part proportional to its importance, so as to content everybody. Even this does not suffice; for once entered upon this way, there is no reason to stop. . . .
>
> . . . it is clear that we only undertook the construction of our coast-defense vessels [armored gunboats] in imitation of America and Germany, and that not until after having built them did we inquire what could be made of them. Is the French

navy so ignorant of the needs of war, as to be reduced to seeking direction from her younger sisters?

Daveluy indicates that in addition to torpedo-boats and armored gunboats, at particular stations, the official French views then favored the assignment of sea going

squadrons to the guard of a fixed stretch of coast. . . . As soon as hostilities are declared . . . the defense squadron gets under way and promenades along the coast, like a sentinel along a wall. The enemy who comes from seaward has it watched by his scouts, and when it reaches one of the two extremities of its zone of surveillance, attacks the other. . . .

He considered the only ship fit to give protection to definite points or stretches of coast, is the submarine,

. . . and this for two reasons; first, because it is invulnerable; second, because it cannot be combated with elements of the same nature. [His second reason had its limits of truth, as was shown in the World War] But considerations . . . will show us that only a moderate use of submarines is necessary for the protection of the coast.

He stated that what might be called the fleet of "the public folly" consisted of

18 coast defense vessels and 200 mobile defense torpedo-boats that are tied to the shore by lack of steaming radius and sea-going qualities. . . . There ought not to be two fleets; one fleet for the attack and the other for defense.

As a student at the French Naval War College, he gave the teaching there credit for gradually establishing a building doctrine which would, in future, direct French naval construction along correct lines; a sea-going and sea-keeping fleet.

Both Darrieus and Daveluy drew on naval history for the facts which led to their conclusions.

Daveluy decided always for the *offensive.*

The characteristic of the offensive is to *impose* the attack instead of submitting to it. It has manifested itself in history by the fact that almost all victories have been won on the enemy's coast.

He thought that the introduction of the line abreast (line) as a battle formation was due, entirely, to the ram and that Bouet-Willaumez's advocacy of oblique movements and their introduction was due to the same cause: viz., the (assumed) necessity of presenting the bow to the enemy, or rather, the duty not to present the broadside to the enemy's ram.

He remarked, truly,

. . . the ram is a weapon of contact, the orientation of which, matters little at a

distance. . . . In disappearing, ramming tactics left us a heritage; it bequeathed to us, oblique evolutions. . . . One of the indispensable conditions that a battle formation ought to fulfil, is to be completed at the moment when there is a need of it. Oblique evolutions gave a small chance of realizing this condition and they were more theoretical than practical.

When an artillery combat is spoken of, what is generally meant is a long range contest, in which the object sought is to put in line the greatest possible number of guns . . . in this order of ideas, the open column perpendicular to the line that joins the centers of the two forces, is certainly a rational formation. The enemy being free to maneuver (since a long distance is maintained), is likewise led to deploy, so as to unmask his guns.

Thenceforth, the combat reduces itself to an intense cannonade; it has, thus a great analogy with the actions in two parallel lines, which make up nine-tenths of naval chronology. We can, therefore, take them for examples, in spite of the difference of ships and guns, because the relative situation of the combatants remains the same.

Here, Daveluy forgets his own premise—that a long distance between the combatants is maintained, but still the ships are, on the whole, more vulnerable to the guns of his time than were the wooden ships of the line to the guns of the 17th and 18th centuries at point blank.

He continues,

This sort of combat has been tested; it is unproductive. Never has the enemy been annihilated, when the action has been limited to opposing guns to guns. Fruitful battles have been those in which the symmetry of positions disappeared. . . .

He thinks that the only way decisive results can be obtained, is to deploy "all one's means, while *preventing the enemy from doing likewise. . . .*"

He sees that concentration of several ships' batteries on one of the enemy is possible in combat on parallel lines,

Yet it does not seem that, in general, any great benefit can be derived from it, since the hostile vessels that are neglected, while concentrating one's fire upon the others, will fire with so much the more precision, as they are less disturbed.

[But] . . . in the conflict of artillery, the responsibility rests almost entirely upon the gunners; the command, the influence of which has always been preponderant, plays a part reduced to small importance; the rôle of the captain is insignificant. The tactics of the gun does not suit us, therefore.

This assertion will appear monstrous.

He asserted that Nelson's tactics were more than the tactics of the gun, as were likewise those of Admiral Togo. Each attacked, also, the morale of the enemy. He admits, however, that the results of the attack on morale may be delayed so long, as to make the attacker doubt their efficacy. "Victory declared itself at once . . . and at the moment when the Japanese admiral asked himself how the affair was going to turn out."

Combat with the ram, he likened to "a struggle between two characters . . . the less determined turns back first."

He said that the charge through, in line abreast, of two opposing fleets would occur only in tactical studies.

He thought that the fear of being torpedoed led to the discharge of torpedoes from battleships at distances too great to be effective, but that if an enemy had these weapons, the French would be forced to have them also, because,

> The suppression of torpedoes would place us under the control of the enemy on the field of battle; the fight would be lost morally before there was any material loss.
>
> And if other navies should kindly deprive themselves of their torpedoes, it would be needful to keep from following their examples. . . . Broadside torpedoes are defensive weapons, that forbid approaching a ship within fixed limits; the bow torpedo, alone, is offensive.

Daveluy expressed, in a measure, a general truth, when he wrote that the introduction of a new weapon, or class of ship forces its adoption upon both combatants. He stated too, another general truth, that

> when a destructive engine has proved its effectiveness, precautions are taken against the danger it presents, and one often succeeds, if not in rendering it impotent, at least in taking from it the chance of doing harm. The weapon then depreciates, little by little, and tends to disappear.

He summed up the principles of battle, as follows:

> To destroy the enemy's cohesion; to demoralize him; to incite him to give up the struggle by abandoning the stakes; such is the aim.
>
> To realize these different objectives, there is needed an instrument of irresistible strength, certain in its action. It is *mass* or concentration of force. This is the arm of victory . . . let us remember that the tactics of weapons ought to be subordinated to the tactics of masses.

Passing from generalities to particulars, he continues:

> We can deduce from what has been said that the gun is a permanent weapon, while the ram and the torpedo are only occasional weapons. The gun will, therefore, fix the range within the zone in which distance affords protection from the accidental hit of a torpedo. With this reservation, the range regulates itself. It should be that which will permit reducing the enemy most rapidly by giving the artillery its maximum efficiency . . . at very great ranges the regulation of gun fire is a problem that does not admit of an absolute solution. . . . The object sought [in firing] at great distances, is to secure *initial superiority* . . . [but] . . . The Commander . . . is inevitably led to adopt the range at which there will be the least possible number of shots thrown away . . . the sole anxiety . . . will be to place himself . . . in such a position that having a great superiority of fire over one part of the enemy's ships, he may be sheltered from the fire of the rest. . . . Nevertheless, a strong current of opinion manifests itself in favor of fighting at very great range. . . . The theory of long range fighting came into the world with the sound of the

guns of the Yalu. . . . Battle at long range . . . ought not to be sought, though one may be obliged to submit to it. . . .

One does not fight without order, whence it naturally results that there is an order of battle; at least this is an opinion that is held to be an axiom. . . . Some accept nothing but line ahead . . . others advocate the line of bearing . . . still others hold to triangular formations; . . . all seem to be right and the arguments that are developed are all the more convincing, because no one takes account of what the enemy will do . . . were the commander to subordinate his designs to the employment of a more or less attractive formation, he would become its slave and no longer have full liberty to do what he wished . . . we have not to inquire whether one order is better than another . . . the order is of less importance than the relative positions of the combatants. . . .

At short intervals . . . the Admiral may be led to make use of either line ahead or simultaneous movements . . . it suffices to maneuver with order. . . .

Of the approach, Daveluy said,

When foot has once been placed upon the field of battle, one will find himself caught in a mesh and it will be necessary to make a stand . . . a few simple maneuvers, foreseen and practiced in advance, will alone be possible; they will serve to bring the ships within effective range of the enemy, and in the position that appears to the admiral most favorable . . . tactics can do no more than aid the admiral in executing his design; it is powerless to suggest this design to him.

. . . it is easy to persuade oneself that battles will always be begun in the same way, the two forces advancing each towards the other, and that from this very fact they will be led to make the same movements . . . [but] it may be objected that the torpedoes will seldom hit upon the same plan, and that consequently, the first maneuvers will quickly destroy the symmetry of the initial positions.

The advantage [in battle] will be clearly revealed in favor of the vessel [and fleet] that was able first to secure superiority of fire."

The question of ammunition supply is one of the most acute to which modern material has given rise.

The utility of reserves is questioned . . . there can be no doubt that the arrival of the latter will contribute to the work already begun.

But he added, in substance, that the same result would be more easily obtained by beginning the action with all the ships.

He concludes, however, that a reserve is sometimes necessary, and that usually the "commander-in-chief will himself lead it." [An odd statement.]

The last sentence of his discussion on reserves, portrays, perhaps, unconsciously—although he was a destroyer captain—a rôle that destroyers have filled.

A part of the vessels fight without regard to anything else; the rest protect them; and the latter, free to move as they will furnish the former a protection, all the more efficient, that it is active and conforms to the exigencies of the moment.

It is difficult to believe in the possibility of fighting in darkness, without the occurrence of unfortunate confusion. How maintain control at night? How recognize the enemy's position? It would seem that night action must occasion a mere

mêlée in which it will be difficult to distinguish friend from foe. . . . The day when *a man who understands war, succeeds in overcoming difficulties that we consider insurmountable, he will not hesitate to engage in battle at night,* because he will *find a new element of success in the possibility of masking the movements of his* forces.

In any event, it will always be possible to take advantage of darkness to throw a numerous fleet into disorder, with a few well disposed vessels, and then give favorable opportunity for torpedo-boat attack. . . .

Both Darrieus and Daveluy stressed the importance of regular and frequent exercises in battle tactics as a fertile source of sound improvement. Both sought to deduce principles of tactics rather than to offer definite tactical maxims.

Lieutenant A. E. Baudry of the French navy, published his *Naval Battles* in 1910. It was translated into English, with a foreword, by Admiral Sir Reginald N. Custance, R.N.

The French élan for battle is sensed to a high degree in Baudry's writings. He touches on many phases of battle at sea, but is rarely specific in his tactical statements. This makes it impracticable to summarize his beliefs as a whole.

He advocated four types of regulations for the Navy to be established by law, or by the Ministry of Marine: Constituent Regulations, Regulations for Armaments, Training Regulations, and Maneuvering Regulations.

The first two of these included laws governing the number and types of ships and their armaments; numbers and relative rank of officers and men (this he called the "hierarchy"); and fleet organization. His new and unsound thought was that the latter should be established by law and should not be subject to change by the Ministry of Marine.

His Maneuver Regulations were to be supplemented by Fighting Regulations (Instructions). His Training Regulations were to prescribe the means for attaining the skill in handling ships and weapons which would make the Fighting and Maneuver Regulations effective.

The latter were to deal with "methods of fighting, as distinct from merely carrying out evolutions; methods appropriate to the reality of battle." Without specifying, he said "the regulation tactics should be adapted to the national character."

Our Regulations for Battle Maneuvers, after establishing the sure foundations of doctrine, would set forth the tactical means of "making numbers," tell us how to get into formations and positions of concentration, and show the typical battle "suited to our conditions," leaving it to the Admiral's temperament to rush, or to omit certain acts and transitional phases. Above all, they would denounce the *equilibrium battle,* and with all insistence urge on the admiral to decisive victory

By "making numbers," Baudry meant attaining a position for gunfire which would blank some of the enemy ships or render their fire ineffective, or attaining a position which would make his own fire effective, without opening the same opportunity to the enemy.

In his "Fighting Regulations," he proposed to deal with "the formations, evolutions, and transformations of the field of battle," and also with gunnery, signals in action, scouting, and work of light vessels outside the battle.

There should only be such formations

as are reasonable and useful in battle. . . . They will not be such that even passable station-keeping has to depend on a monopoly of attention . . . or make demands upon the reserve of speed and turning that a ship or group possesses. . . . In peace time cruising, war formations are to be strictly maintained whether these be actually battle formations, or others, subordinate and introductory there-to, i.e., formations of approach or maneuver. If this or that formation is to be considered as suitable for battle, it must not be open to the reproach of being dangerous in navigation. If it presents risks in this respect, it must be resolutely rejected. . . .

Under battle formations, he considered the function of the guide in action.

Can a fighting mass of any considerable size regulate itself on a guide? And can the commander of a mass, if his own ship is not the guide, effectively acquaint the guide with his objective intentions in battle unless . . . the guide carries these out on his own initiative, in virtue of accepted principles, known to all, and common to all, and without a signal? Is it not necessary stringently to forbid all mention of the points of the compass in ordering a course in battle?

Baudry seems to have in mind some form of "doctrine" which he does not clarify which would enable a guide—not the flagship—to steer as the commander-in-chief would steer, if he were the guide. The course would be based on the movements of the enemy.

Baudry's battle line was, in effect, column.

A properly developed firing line does not present a target of any depth to an enemy. Avoid bunching therefore, and stick to lines, single or double, dense or extended, straight or crooked, but *firing lines* throughout their whole length. . . . The whole secret of victory does not reside in geometrically accurate firing lines. Far from it. We can no more demand the parade precision of peace time in our battle formations, than we can expect school of gunnery percentages of hits when the target hits back.

He advocated units of two ships; guide and "matelot de combat"; and that this unit should have some freedom of movement. Also that an individual ship, being punished, should be free to alter the range.

His statements could be accepted, in effect, if qualified by the axiom

that ships in battle formation must, except for very brief intervals, pursue the same course and speed.

On signals, during action, he said,

> Let us have a simple alphabetical Code: one letter, or two, at most, for battle signals to be repeated all down the firing line, by bunting on every intact halliard, by wireless, by squealing sirens, by microphones, all at once. Let every vessel cry aloud the will of the chief, and so it will reach the rear ship, in one way or another. . . . The alphabet? *Morse;* and teach it in elementary schools.

For battle he proposed a slogan: "Maximum effect at the earliest moment, in the shortest time, and over the smallest area." He felt this precluded *reserves,* even of torpedo craft, except during a long range cannonade. When a range was reached at which ships' torpedoes might be effective, the torpedo-boat or destroyer attack should be made and all ships should fire their torpedoes and make the most effective use of every available gun.

This stage of a battle, he called the "Second Forced Attack," which might be followed by "close combat"—possibly a mêlée and ramming.

He fully appreciated the potential power of the submarine, but had no definite plan for employing it in a fleet engagement at speed.

As the first captain of the *Francais,* a submarine built by national subscription and commissioned near the end of the century, Baudry said:

> The plunging torpedo vessel—submarine or submersible; it is all one—seemed to me a glorious archangel, sent *to make peace upon the sea.* For, as with its advent, coast warfare became impossible, and as battle fleets must be based on coasts, it followed that the battleship was useless. What survives to-day of my novice's faith? Some distant hopes and latent energies. The instrument has not progressed in these ten years, as some of us hoped it would . . . a new period of development, it is true. But the fear of submarines has done nothing to check the building of Dreadnaughts and of Super-Dreadnaughts.

Like his brother officer, Baudry condemned regional coast defense and advocated attachment of all seaworthy torpedo craft to the battleship organization, as an integral part of a battle fleet.

He recognized the tendency in a fleet action for opponents to come to the same course; i.e., move in parallel lines, but he rebelled at the thought that this was—or would become—a tactical maxim. "Does this mean that the artillery duel, in this sense, will have become the general rule? No! a hundred times no!"

This thought led him to study means of breaking the "equilibrium" of parallel lines and placing one of two equal fleets in positions that would be advantageous compared with the other. He called this "mak-

ing numbers"; masking part of the opposing fleet; making its mean range greater than his own and holding such position, once gained. He fully realized the difficulty of achieving this against an antagonist presumably as skillful as himself.

His studies, somewhat along the line of the mathematical method pursued by Fiske, brought about nearly the same results; viz., when two firing lines composed of identical units, are opposed, the fighting value of these lines are, one to another, as the squares of their destructive values, or, what comes to the same thing, as the square of the number of ships in each line.

Like Fiske, he was careful to disclaim mathematical accuracy for his theorem. Its practical application lies, in indicating the value of priority of effective fire, either from getting on earlier; making hits at ranges greater than can be made by the enemy; or gaining such a position relative to the enemy as to mask more of his guns than of your own. (This is a form of concentration.)

It shows that preponderance, however attained, increases in proportion to itself; i.e., geometrically and arithmetically.

Baudry treats of concentration and distribution of fire; control of fire when more than one ship fires at the same target and when the same ship fires at more than one target.

> Let us . . . strain every nerve to give our gunnery the necessary flexibility (a) by training groups of three ships to concentrate upon the same target, (b) by habituating each individual ship to distribute its fire between two targets.

He thought a 9.4-inch gun firing three shots per minute "is the ideal battle gun." He evidently had in mind a "handy" gun whose shot could be given sufficient velocity to penetrate any armor at battle range and carry a bursting charge "to destroy, burn, and tear the whole compartment that it has entered; men, material, weapons, pipes, and wires—destruction, demoralization, disorganization . . . !!"

He thought that battle speeds might reach 18 knots; that a fleet need not deploy until within 11,000 yards; that the effective range of the torpedo of that time (1910) was about 3,000 yards, but that shots at a column or mass of ships at long range might be valuable.

Baudry's picturesque language is best shown in his description of a night attack by torpedo craft:

> Suddenly a brilliant beam of light crosses the sky. It is exploring, looking for you. It becomes steady. It has found something. Then a second and a third searchlight wake up and converge. The division is detected. . . . Under the peering eye that follows our movements, we are like Cain under the eye of God. . . .

> The light holds and blinds us. The officers put their hands over their eyes, trying to judge the distance somehow through half open fingers. The men turn their sou'westers around so as to be able to see their weapons. . . . The soul must be of good metal . . . not to forget that on the big ship herself the emotion produced by your threat is still greater then your own; that the men at the light guns are simply shooting, shooting, aiming at nothing at all . . . or a bird . . . or a foam speck. . . .

By such expressions as "lunge" and "throw" his forces upon the enemy, Baudry, like many other authors, partially or completely neglects to take the *time* element into full consideration. His book is well worth study.

In 1910, Adrien Edouard Baudry, born in 1867, was 43 years of age. He had been a lieutenant since 1896. His name last appears on the French navy list in 1914.

Pierre Joseph Gabriel George Darrieus, born in 1859, attained the rank of Vice-Admiral in 1916. Marie Isadore Réné Daveluy was born in 1863 and attained the rank of Rear-Admiral in 1918.

CHAPTER XLIX

SUBMARINES AND SUBMARINE TACTICS. ESSAYS ON BATTLE TACTICS

THE DEVELOPMENT of submarines for the United States Navy dates from 1887, when the Navy Department advertised for bids for the construction "of one submarine, complete with torpedo appendages." The specifications to which the boat was to be built were in advance of the performances of submarines built in Europe at that time. General operating requirements were that the submarine should be capable of



FIG. 126.—U. S. S. *Holland.* (*Courtesy Electric Boat Company*)

making 15 knots on the surface, 12 knots covered (awash), and 8 knots submerged for at least two hours; should discharge torpedoes with charges equal to 100 pounds of gun-cotton, be strong enough to stand safely a submergence of 150 feet; and be safe for the crew when submerged for not less than three hours.

Bidders were at liberty to offer boats varying from the specifications, which would be considered on their merits.

The Navy Department's advertisement eventually produced the *Holland,* U. S. Submarine No. 1, the contract for which was made with

the J. P. Holland Company of Baltimore in 1896. The ship was delivered in 1899, and one of her early assignments was at the U. S. Naval Academy for the instruction of midshipmen. Her first commanding officer was Lieutenant H. H. Caldwell, U.S.N.

In 1901, the late Rear Admiral W. W. Kimball, then a Commander, delivered a lecture at the Naval War College, published by the Institute, on the "Tactical Value, and Strategical Consideration" of the submarine.

He said, in part, and truly,

> . . . owing to the invulnerable defense of water cover, and the strong offensive power of her torpedoes [the submarine can] compel the battleship to move out of the very closely limited area of effectual action of the boat . . . therefore, a submarine must have some tactical value against a battleship.
>
> The chief factors that determine the boat's degree of value, are small radius of effective operation, slow speed in direct approach when invulnerable [submerged] . . . and the necessary giving up of complete invulnerability from time to time, for the sake of correcting the direction of approach.

Kimball thought an approach on the surface could be made, until within 6,000 yards. Then the approach would be by short dives, until within two thousand yards, to keep the bearing of the enemy target ship.

He considered firing range (sure torpedo range) 400 to 500 yards. If the submarine is seen, and "the ship runs away, the boat has accomplished something."

> I am strongly of the opinion that the primary tactical use of the submarine will consist in keeping hostile ships fifteen or twenty miles away from the defended place; in preventing them from passing through points at bombarding ranges . . . making blockades non-effective, no matter what the force employed. . . .
>
> . . . while there would be a certain concert of action, each boat would have to maneuver independently, under general orders to close and strike, when possible.
>
> There exists a considerable weight of authoritative opinion in favor of carrying small hoist-in submarines, aboard battleships and large armored cruisers [as was earlier advocated for torpedo-boats] but the hoist-out boat does not appeal to me . . . the idea of hoisting out submarines in the face of the enemy seems ridiculous. . . . Mahan tells us that "effective defense does not consist primarily in the power to protect, but in the power to injure." The submarine surely has the power to injure, in her torpedoes. . . .

He quoted an English naval authority, as saying, "The submarine boat has increased the value of the mechanical torpedo, tenfold."

Seven small submarines (120 tons) were completed between 1901-03, and twenty larger ones of gradually increasing size (170 to 400 tons) by 1911. Up to this time surface speed of submarines had not exceeded 14 knots.

In 1912, Rear Admiral (then Lieutenant) C. W. Nimitz, U.S.N., commanding the submarine flotilla, discussed their tactics and their military (naval) value in the *Proceedings* of the Institute.

He prefaced his discussion by citing four factors on which the value of men-of-war largely depend:

Communication, or the ability to transmit and receive information or battle orders, either before, or during contact with an enemy,

Mobility, or the ability to move quickly from place to place, in all conditions of weather. . . .

Invulnerability, or the ability to resist attack.

Offensive strength, or the ability to deal a telling blow when in contact with the enemy.

. . . leaving out the factor of mobility, which for submarine craft of the future will advance more rapidly than for surface craft, we find that submarine craft rank equally well, if not better, than surface craft.

For the discussion of tactics, he divided submarines into three classes: "harbor defense, coast defense, and sea-keeping, offensive submarines."

He considered that harbor defense submarines should be divided into groups of five.

Each boat of a group must be assigned a certain area outside of the harbor, which will be its zone of defense. These zones to be so selected, that all approaches to the harbor are protected, and to be at such a distance from the point of defense, that the enemy will never come within gun range.

Submarines anchor in the "awash" condition, radio up, in the center of their zones, and keep a look-out for the enemy . . . scouts in touch with the enemy, can easily keep the waiting group . . . informed as to the enemy's movements. . . . The waiting submarines . . . get up anchor, lay down their radio masts and submerge, as soon as smoke appears on the horizon. With a moderate amount of periscope exposed, a submarine can easily see a large ship in clear weather, for a distance of seven or eight miles.

. . . by the arrangement of zones, the enemy must approach close to one submarine. The other boats must then move over towards the enemy, at such speeds, and with just enough periscope exposure, to enable them to get within torpedo range without detection. Once within torpedo range, they keep their periscopes exposed, and make all speed possible to get within easy torpedo range to fire their torpedoes at that part of the enemy's formation, previously assigned to them.

In this last maneuver, they must act regardless of the other boats, and must take the risk of collision. On this final charge, the submarine bells may be rung continuously, to assist the submarines to keep clear of each other. Having fired their torpedoes, the boats submerge totally, and reload their tubes, if they have spare torpedoes. . . .

A submarine, having exhausted her torpedoes, has still a most formidable weapon in her ram.

. . . In considering the tactics of a group of "coast defense" boats . . . the group proceeds at its highest reliable speed in the "awash" condition, with radio up to intercept, or to come in contact with the enemy. . . . On sighting the smoke or masts of the hostile fleet, and having approximately determined his course, the entire group immediately submerges . . . and proceeds submerged, to about one-

half mile distance in the general direction of the enemy [Speeds as previously ordered]. They must then maneuver to keep a position on either bow of the enemy's column . . . this approach must be made totally submerged, with an occasional "porpoise" . . . to arrive within easy torpedo range [between 500 and 1,000 yards] each submarine fires its torpedo . . . [as described for harbor defense submarines].

Tables showing the proper bearings on which to fire torpedoes, with the maximum chances of hits, have been compiled for every formation [of the enemy].

"A sea-keeping offensive" submarine may be defined as a submarine which can keep the sea, ready for duty, under all possible conditions of weather, for indefinite periods. . . .

The tactics of such a group, after contact with the enemy, will be the same as the tactics already described for harbor defense and coast defense submarines. . . .

The problem of maneuvering such a group into contact with the enemy, or to more accurately state the case, the problem of maneuvering the enemy's fleet into the "submarine danger area" must be solved by the commander-in-chief.

. . . let it be assumed that the submarines have a surface speed capable of cruising with the fleet at any speed that may be required to keep up with the fleet. Let it be also assumed that the submerged speed and the radius of the submarine is about 12 knots for one hour, 8½ knots for four hours, or about 5 knots for fifteen hours. These assumptions are not excessive. Suppose also, that in cruising formation, submarine groups take position on either flank of the fleet. The submarine groups are in "awash" condition, ready for instant use.

Lieutenant Nimitz then described, in detail, plans to force the enemy into the "submarine danger area," both when the fleet is faster, and when it is slower, than the enemy fleet.

His valuable essay ended with this statement:

A logical and fairly accurate answer to all points under discussion can only be found by continuous combined battle maneuvers using all the necessary units of the fleet.

From its beginning in 1885 until 1911, the U. S. Naval War College Staff, in co-operation with groups of officers under instruction for short periods, conducted its studies by means of what was called the conference method, supplemented by lectures and tactical and strategical game board and chart maneuvers.

In June, 1911, a "long course" was inaugurated to last sixteen months. Two officers were detailed as students in the long course. They were graduated at the end of September, 1912.

The President of the College, then Captain W. L. Rodgers, recommended continuation of the long course, and that fifteen officers be assigned to it, divided in rank between Lieutenant Commanders and Lieutenants. The number of officers assigned to short courses should be regulated to have a student body of forty-five.

Long courses were later subdivided into senior and junior courses

at the college, and correspondence courses (voluntary) for officers on other duty.

The Naval Register for 1938 showed that 70 per cent of officers on the active list of the Navy in the grades of Rear Admiral and Captain had completed one or more of the War College courses in Strategy, Tactics, and International Law.

Captain Rodgers said that the subjects studied in 1912 were national and military policies, strategy, tactics, logistics, and international law. He added:

> It is the object of the War College to do as much strategic and tactical thinking for the navy as possible before the outbreak of war. It unifies the professional thought of the service in regard to strategic and tactical matters by turning out each year a number of officers who take the same view of tactical matters.

The last phrase may have somewhat overstated the fact, because officers differ on both major and minor tactical matters.

Captain Rodgers further said, "As a result of its studies it [the College] teaches a doctrine of war which embodies sound professional practice."

His statements were made in a discussion of the "Relations of the War College to the Navy Department."

The college did not publish the results of its studies in the Naval Institute *Proceedings* or elsewhere. They related to the possible, or actual, contents of the official tactical and General Signal Books.

As already remarked by Niblack (Ch. XLVIII), public discussion of tactics is limited by the Navy Department. Such limitations are imposed not only in the United States, but also by foreign Admiralties. With this impediment, efforts to trace the evolution of tactical maxims, except in their most general form, are impracticable.

Failure to disseminate information was the cause of some service antagonism to the War College as not completely fulfilling its function. This failure was voiced by the Institute's Prize Essayist in 1913, Rear Admiral (then Lieutenant Commander) H. E. Yarnell.

He said that in addition there were "officers who hold honest convictions that the only place for training officers is on ships at sea."

Yarnell in his essay stressed the importance of practicing battle approaches, as "The Greatest Need of the Atlantic Fleet." He said:

> The number of times the fleet has been exercised at battle approaches does not greatly exceed the number of attempted grand maneuvers. The formation and tactics by which a fleet is to be led in battle are by no means settled. . . . A certain officer has a method of battle approach by which he can defeat a greater

number of vessels on the game-board, provided a certain standard of signalling is assured. This method is unfavorably reported upon by the War College . . . the value, or otherwise, of the proposed method is of no moment for the present argument. The point it is desired to bring out, is that such a scheme is not seized upon with avidity by the fleet, discussed, dissected, analyzed, and tried out, under actual conditions. What could be of greater interest than any proposed method of gaining an advantage before gun fire begins? . . . In the minds of many officers, to this day, "fleet tactics" consist of the signal-book diagrams.

. . . The question of a practical method of defense against torpedo attacks, remains to be solved, and it cannot be solved, without long, consistent, and consecutive work. Enough has been done to lead one officer of high rank, to state that after opposing nets for thirty years, he was at last converted to a belief in their necessity, and to many expressions of opinion that search-lights are useless; all of which tends to show that there is much more still to be learned.

Up to the time of this essay, experience had shown that primarily the best defense against night-attack is silence, darkness, and change of course. This is an important tactical maxim.

Its corollary is that search-lights and guns are to be employed only when discovery is certain. A later development in night defense is the use of star shell to illuminate the attackers without betraying the bearing of the ships attacked.

A German view of the constantly recurring problem of the best battle station for a commander-in-chief is found in the Institute *Proceedings,* taken from an article in the *Marine Rundschau* of August, 1912, and translated by Commander H. F. Bryan, U.S.N. The author was discussing "Transmission of orders during the Naval Battles of the Russo-Japanese War." On the subject of the Admiral's battle station he said:

It is a question whether the leader in a naval battle should not place himself like a general in war on land, in the background, on a flagship to which would pour reports from all sides; where free from one sided impressions, uninfluenced by the picture of destruction which would present itself to him under certain circumstances if he were aboard a ship in the line, he could get a clear idea of the state of the battle on all sides. From here he could give his orders after calmly weighing them.

The question of a centralized leadership from such a retired position is not new. But up to the present time, just as soon as the idea is presented, it is condemned with earnest proofs.

The author concludes that "the leader in a naval battle will virtually have to depend on his own observations . . . a maneuver of the enemy often demands instant reply and seconds are costly. . . ." He thus condemns his own suggestion that the Admiral should be stationed on a ship behind the battle line.

The complete dissimilarity between a commanding general in a battle on shore and an admiral in a battle at sea must not be forgotten.

In the June issue of the Institute *Proceedings* for 1913, Ensign H. H. Frost offered a solution of the problem of firing torpedoes at a fleet under way.

He said that a torpedo fired at a range of 3,000 yards would miss if there was an error of one knot in the estimated speed of the target, or an error of ten degrees in the target's course. He believed that in a day action battleships and destroyers could hardly expect to approach closer than 6,000 yards of the enemy and that in such case the chance of hitting a particular ship would be small. The target therefore should be the enemy fleet. The same reasoning applied to destroyer night attacks. Even if they got within 2,000 yards before being discovered, plotting would be impossible. Under fire they could not wait to single out one ship.

Assuming a torpedo range of 10,000 yards at 25 knots, he calculated that the best chance of hitting would be from a position three degrees on the bow of an enemy column. If the enemy were approaching at 15 knots, it would be safe to fire at 16,000 yards. If the enemy were in line, the torpedo should be "fired from a position 20 degrees ahead of his line of bearing." He gave positions from which to fire if the enemy were in line of bearing.

He believed that ships in column had the least chance of being hit. Line was dangerous. In line of bearing hits were less likely to be made when firing from the side where bows were visible.

Destroyers could not be prevented from taking the position from which they were most likely to make hits.

In another article in the June issue (1913) on the "Organization of the Fleet for War" Rear Admiral (then Lieutenant) R. E. Ingersoll said that "it is highly improbable that the engagement will be simply a gunnery duel between the two main bodies of battleships."

It might be in part outside of the range of vision of the commander-in-chief, where commanders on the spot would exercise command.

He assigned no function to submarines in a fleet action, but foresaw that airplanes might have a rôle. His words were,

> At some time in the future, aeroplanes may have a definite place in this organization of a fleet, either as part of a large ship's equipment, or perhaps carried by a special vessel.

Experiments in launching airplanes from ships had been conducted for several years in the United States and elsewhere, and captive balloons towed by battleships had been used for improving the accuracy of gun fire at long ranges by observing and correcting the fall of shot.

Accurate measurements of ranges, by means of range-finders, was being sought with success.

Another article by Commander Romeo Bernotti, Italian Navy, was translated for the Naval Institute early in 1914 by Captain (then Lieutenant) C. C. Gill and Professor A. F. Westcott, U.S.N.A.

Bernotti's subject was "Concentration of Fire and the Numerical Strength of a Division." Some of his conclusions are of interest as bearing directly on fire tactics and fleet organization. He said four ships is "the greatest [number] that, in general, may maneuver by the simple method of follow the leader. Hence it is proper to consider the group of four ships as the tactical unit of a fleet. . . ." But he considered *two* as the maximum number of vessels that could concentrate their fire without loss of efficiency.

He does not speak of the difficulty of designating the target ship to the firing ships, when both head and rear of an enemy formation may not be observed, nor under what circumstances of firing ships should change targets. He was not blind, however, to the evil of having an enemy ship within range and free from attack.

Who should decide when, and upon what ship or ships, concentration should be attempted?

It must be recognized that rarely will opposing ships be equal in numbers. Dispersion, as well as concentration of fire may be necessary.

The difficult problem of distribution of fire in action has not been made less difficult of solution by increase of battle ranges.

In connection with his conclusion that four ships is the largest logical number to follow a leader, he advocated 400 meters distance between ships and 600 meters interval between divisions in column.

> The leaders of adjoining divisions should maneuver so as to keep the division line of bearing perpendicular to the line joining the center of the enemy . . . in this way the squadron will attain an advantageous position, or at least one equal to that of the enemy, and the ships will not mask each other's fire.

He preferred a squadron of two divisions—eight ships—and at most one of not more than three divisions. Beyond three divisions *two* squadrons should be formed "which should maneuver separately but co-ordinately"—but he neglected to designate the co-ordinator.

It is worthy of notice that, during the decade preceding the first World War, some students of tactics were voicing the opinion that, as in the short range combats of the days of sailing ships, modern battles would be conducted by subordinate commanders, the rôle of commander-in-chief being in abeyance during the engagement. One author

believed that the fire control officers of a ship should select its target.

This opinion emerged from an indeterminate "doctrine" which was to govern before and during battle and which provided scope for the "initiative of the subordinate"; ensured "loyalty to plan"; and assured the accomplishment of the "mission."

However earnest its proponents were, "doctrine" could not supersede or replace specific terms which have definite naval or military meanings—such as laws, regulations, signals, orders, and instructions.

Considerable foundation is found for designating as "doctrinaires" those who stressed the importance of "doctrine" and its rôle in naval warfare, without going into detail. A doctrinaire is "one who theorizes without sufficient regard to practical considerations."

One author—Rear Admiral (then Commander) Yarnell—formulated a definition of doctrine as "simply a code of rules upon which we act spontaneously and without orders for the accomplishment of the mission." He gave some specific examples of doctrine which might as well or better be described as tactical maxims or paragraphs in fighting instructions. Yarnell's definition of "doctrine" is acceptable, if there is need for the word in naval nomenclature.

However, it became clear that its employment, and that of its associated terms, were detrimental to clear thinking and all fell gradually into disuse. It is probable that "doctrine" would not have been offered as a naval term if "Fighting Instructions" had been in existence, separate from signal books.

Reverting to the statement of Admiral Niblack that he could only discuss naval tactics to the extent permitted by the Navy Department, the late Commander (then Ensign) H. H. Frost was accorded honorable mention for his essay on "Tactics" in the prize essay contest of 1915—but the Navy Department refused to permit its publication.

His article "Control of Fleets in Action" was published. In it he commented on the strength or weakness of the tactics in each of a number of well known naval battles. However well founded his criticisms, he came to the unsound conclusion that the commander-in-chief should command before action, surrender command to his subordinates during action, and resume command after action.

A contemporary article on "Battle Tactics" by Captain (then Lieutenant) R. A. Davis reviewed the advantages and disadvantages of column as a battle formation, and of different stations which the commander-in-chief might take. He concluded that the best position was on the unengaged side where he could better observe and if necessary

correct the actions of his subordinates. Division or squadron commanders were to be in control.

Davis appears to have overlooked the fact that the flagship's guns would be out of action. If his station for the commander-in-chief were correct, it would imply a ship without fighting value as the flagship. This was to a degree recognized for a short time some years later by stationing the commander-in-chief on what was called an "administrative" flagship. Yarnell's view was "that admirals, in future, will continue to lead in column," although such position was not necessary and did not carry any great advantage.

That no personal flags should be flown by fleet or division commanders.

That the flagship need not necessarily be the guide. If the flagship lead the column, it may be more desirable for the guide to be at the center of the column.

He also said that to change line of bearing quickly, "a solution might be to make the center unit the guide, with the slowest vessel near the center.

That in a fleet engagement, involving a large number of units of varying speed and power, the best position for the commander is a central one, where he can keep in touch, receive reports, and direct.

If the slowest units have a speed of 17 knots, a standard speed of about 14 knots appears reasonable.

He summed up the reasons against using "fast wings [heavily armed ships of considerably higher speed than the main body] of battle cruisers to cap the enemy, or force him to turn away . . ." but he thought "drill and experiment would prove their usefulness."

He took up the very important and very practical subject of "Concentration and Distribution of Fire," saying,

It is a problem which calls for considerable thought and experiment. Can it be controlled by rule or doctrine, or should it be done by a vessel back of the center of the line, in as good as possible a position to see the whole action?"

"Distribution of fire can be provided for in good visibility, i.e., all enemy ships visible to all of your own. Otherwise, no complete solution has been found.

Yarnell said, truly, and answering his own earlier question, "It is an accepted fact that there are no reserves in a naval battle. Every ship capable of playing a part must join action." This complied with Fiske's rule to keep every gun bearing. Yarnell realized the difficulty, perhaps the impracticability, of concentrating to advantage on any part of a skilled enemy's formation.

However, after action has been joined, and vessels have been disabled and control systems shot away, a certain confusion will result, and the commander-in-

chief who has his fleet best in hand, holds the advantage and may by skillful disposition gain a concentration which the enemy is unable to overcome.

His statement that "the commander-in-chief who has his fleet best in hand holds the advantage," is the exact opposite of the theory that when action begins the "initiative of the subordinate" should govern.

It is to enable the commander-in-chief to keep his fleet well in hand that alternate means of signaling are provided and every precaution taken to ensure that they will function during battle.

This is a vital tactical maxim.

Events abroad after the beginning of the World War in August, 1914, had a highly stimulating effect on naval aviation in the United States. An aviator, the late Lieutenant R. C. Saufley, wrote,

> So far, the development of aeronautics in the Navy includes only the licenses of a few pilots and the possession of a few Curtis hydroplanes. . . . In this connection it is well to remember that neither the torpedo-boat nor the submarine demonstrated its real value to the service until under close observation of the fleet. The newest branch of the naval service is making its advance not unlike the others; but that its worth may be developed without delay, there is need that the main body of the navy's commissioned personnel give it both scrutiny and co-operation.

The Navy Department had then in operation an aviation training base at Pensacola, Florida, on the Gulf of Mexico, and another contemplated at San Diego, California. A station ship was attached to Pensacola. The Naval War College was urged in an Institute article by Lieutenant T. D. Parker, to "impress upon the service the strategical and tactical aspects of aeronautics" and suggested that the value of airplanes be studied in connection with the solutions of strategic tactical problems on the game-board. Parker recommended a naval air fleet of 200 planes to combat enemy planes at sea.

Naval aviation was in its infancy, but it grew steadily.

Five valuable essays were contributed to the Naval Institute by Captain (then Lieutenant Commander) D. H. Knox, in 1913-'14-'15 and '16. They were the most comprehensive studies of battle at sea with existing ships and weapons that had yet been published. Two of them, "The Great Lesson of Nelson for Today" (1914) and "The Rôle of Doctrine in Naval Warfare" (1915), won the prizes for those years. All five will be considered briefly (with comments) in the order in which they were published. The author's words will be quoted, or paraphrased, as appears best.

Knox's first essay (1913) was on "Column as a Battle Formation." In this essay he said:

Within the last few years, a general opinion has gradually crystallized in the service that the conventional "column" is the best fighting formation, and that upon battle becoming imminent, our fleet should form column and retain the same throughout the fight, following the leader closely on the same courses and at the same speeds. . . .

Such tactical conceptions are the natural outcome of a period of tremendous gunnery development . . . it is urged that the ability to shoot . . . is not the sum total of war, nor even of tactics . . . when column is formed with a view to its permanent retention during the remainder of the battle, come what will, what then has become of the offensive idea? Certainly the fight is not being forced, but submitted to.

Knox then asks a series of questions, the answers to which, he seems to intimate, would be unfavorable to column as a fighting formation, though he may mean as *always* the best formation, or as *the* fighting formation.

He queries, "Of how much use is the power to shoot well, if our personnel lacks steadiness, combative ardor, or stamina?"

It might well be replied that knowledge of the power to shoot well tends to produce both steadiness and combative ardor and is not inimical to stamina. It makes stamina useful.

What will gunnery profit us if admirals and captains fail in their mission of using it, at the right time and the right place and in an advantageous manner? Will not good shooting be fruitless, unless that of each ship is co-ordinated with the remainder of the fleet to produce mutually supported effect? Are good crews and good ordnance an asset, if the mobility and the power of maneuver are lacking to get them in action? . . . the art of war consists of making the most of the means at hand. Every single factor that can in any degree contribute to success, must be developed during peace, and used in war to the limit of its possibilities. This is a far cry from limiting our fleet tactics to that of the *gun*, to the exclusion of all other tactical elements, which is, in effect, the substance of the narrow "column doctrine" now existing.

It might fairly be stated that this *narrowing* of the "column doctrine" is Knox's own, and not that of its advocates as the best fighting formation.

It is a formation in which Fiske's sound statement, "make every gun count," can be realized. It can be said that its advocates, then, and now, would have no objection to *any* formation which would make every gun count and—*or*—keep some or every gun of the enemy from counting, which column formation does not exist to effect, but which it might accomplish.

Knox then takes up the Moral Factor in Tactics, which, like the French, he insists is highly important. Concentration on good gunnery he considers,

. . . has evolved a material conception of battle, to a degree that is disquieting.

Probably, the adherents of the "column doctrine," as outlined in the introduction to this paper, will not admit that it is a defensive doctrine. . . .

Second to no other consideration in its influence on morale, is surprise. Does the "column doctrine" favor surprising the enemy? . . . Does the column doctrine render the fleet adopting it, susceptible and sensitive to surprise?

He asks other questions that indicate that the enemy might advantageously divide, and attack the head or rear of a column. The leading ships might run on to a mine field, or receive an unexpected torpedo attack. A part of the column might be placed under a smoke screen or attacked by submarines.

These are very pertinent questions, but he offers no solutions. He assumes that the advocates of column, as the best formation, have no knowledge of any other tactics, which is improbable. That is, he somewhat overstates his case; probably to bring into prominence what he calls "group column" doctrine and the "initiative of the subordinate."

Group column may very well turn out to be a useful modification of strict and invariable single column for all ships, which he assumes, at the start, had gradually crystallized into what he would call a "doctrine."

It is interesting to see students who had become imbued with the idea that column battles were inevitably indecisive, combat the return of column as a battle formation. Mahan's apprehensions, in this respect, have already been cited.

But the increase of probable battle ranges, brought on by improvements in guns and gunnery, and by increased torpedo ranges, was gradually forcing the adoption of column, at right angles to the bearing of the enemy, as the only practicable means of applying a fleet's whole offensive power—its guns—to obtain initial superiority, while avoiding torpedo attacks.

Knox continues,

There is no valid reason for adhering to the snake column; on the contrary, there is very vital reason for having an "organized column." By the latter term is meant a formation in which subdivisions, comprising three or more ships, each have a commander whose duty it is, to carry on the fight largely on his own initiative.

He at once perceives, however, that this is a dangerous "doctrine," and goes on to cite certain indefinite restrictions, which include uniform indoctrination, loyalty to plan, confidence in the commander-in-chief, acquaintance with his plans, proficiency in tactics, etc. But no combination of all of these fixes the stage at which the "initiative of the subordinate" governs.

He concludes that unreliability of signals, inability of the commander-in-chief to overlook the battle field, and the element of time, will make the subordinate supreme, and that "once begun in earnest, the battle must resolve itself into the algebraic sum of the conduct of the subordinate commanders."

He says, however, that (independent?) movements of the previously subordinate commanders should be well co-ordinated, but does not mention how this is to be accomplished, except "that they should be loyal to a good plan" but the rub is, *how* or *when* to put the plan in operation.

He might have been more definite and said that a group commander should be authorized to direct the course and speed of his group (division), and its formation to avoid torpedoes, to keep his guns bearing, etc., provided this action does not prevent like action by any other division commander, or expose his own or other divisions to attack by guns or torpedoes.

He considered undisturbed gun-fire a narrow and dangerous end to pursue, as opposed to "the broader and saner object of the concentration of *mass* against fractions and the disruption of the enemy *morale*."

Undisturbed gun-fire is presumably the most effective fire. Concentration of mass (mass of what? *Gun-fire*) against fractions of the enemy's ships is an excellent objective, but it is *gun-fire* that is being concentrated. *Mass* has no meaning here. *Volume of effective fire* is what it connotes, and this, to a very large extent, is *undisturbed gun-fire.*

Knox's very interesting article was discussed—generally, with approval—by Commander W. V. Pratt and Lieutenant Commanders A. Bronson, E. J. King, and Lyman Cotton, but all saw the difficulties in the way of giving authority to subordinate commanders to change course, speed, and formation, each according to his own judgment.

Lieutenant-Commander Bronson put the question well, when he said,

> If it be admitted that could a fleet be so fought, with proper co-ordination of its parts, it would be more formidable than the same fleet in column, the question at issue then becomes merely the possibility of obtaining such co-ordination. While there yet exists no exact knowledge which would render possible an authoritative answer in the affirmative to this question, there is also in existence, no exact knowledge which would render possible the answer in the negative. The dependent stake is large; the answer should be found.

A valid comment on both the essayist and those who discussed his essay, is that all assumed the *early inability* of the commander-in-chief

to *command,* and that, in any case, the judgment of his subordinates in battle very quickly becomes superior to his own, whether, or not, signaling systems are intact.

The commander-in-chief's work is assumed to be completed when he brings his fleet to the battle area.

Of course neither author nor commentators would agree to this view, but it is true that all stress "the initiative of the subordinate" without considering the real *limits* of its *exercise,* expressed in terms of course, speed, and formation. They deal only in *generalities* and with the *battle line,* solely.

In his second essay, which was the Prize Essay for 1914, "The Great Lesson of Nelson for Today," Knox develops the application of Nelson's methods, after describing them, and then expands, to some extent, the ideas already expressed in his essay on "Column as a Battle Formation."

In the discussion upon this essay that followed, Rear Admiral Fiske injects a few words of caution in the application of "doctrine."

> . . . the doctrine is doing good work, and is going to do more and more good work, as it becomes better and better understood. But let us not over-estimate its scope . . . a little caution seems advisable, lest we gather the idea that because "intelligent co-operation is of infinitely more value than mechanical obedience," obedience is therefore of no value . . .obedience is just as valuable as ever . . . the difficulty of foreseeing and of indicating (before battle) to subordinates, the intention of the commander-in-chief in various possible contingences, will be greater than in Nelson's day. . . .
>
> Let us remember too, that radio will give the commander-in-chief a means which Nelson did not have, of giving commands, and these commands must be obeyed . . . commands are needed, commands are given, and obedience is required. Intelligent co-operation does not meet all the requirements of even a football team.

Knox's third essay also published in 1914 was entitled "Old Practices and Modern Applications." In this he supplemented his introductory reflections by discussions of the battles of the Texel (1673), Trafalgar (1805), Lissa (1866), and Tsushima (1905).

He then took up modern tactics and developed his views on fleet actions:

> A fleet action will probably be preceded by vigorous and extensive operations on each side, with a view to (a) locating and delivering a night destroyer attack on the enemy main body.
>
> (b) Denying the enemy information of the whereabouts of our own main body, and the avoidance by the latter of the enemy's destroyer attack. . . . .
>
> The scouts should keep close touch with the enemy main body, trusting to their speed to keep out of trouble. Destroyers should act on the information given by scouts, as well as do some searching on their own account; deployment (preferably

by small groups) is necessary during the search, followed by concentration, before, and during the attack. . . .

It is desirable to precede the main (destroyer) attack by a feint, or secondary attack from an opposite direction, so that the fleet will turn into the main attack.

During the daylight hours preceding a destroyer attack, both sides will try to drive in opposing destroyers. Scouts and destroyers will be employed for this purpose, and these should be supported by fast battleships. The latter, in turn, should be supported by submarines, which are also of use in penetrating enemy screens and obtaining information of his main body, even after the surface scouting force be driven off. . . .

A wise commander-in-chief will, at night . . . disperse his battleships rather widely, so as to reduce the torpedo-target of the formation . . . 2,000 yards between ships and 4,000 between divisions does not seem too great a dispersion, and with a long range torpedo, even wider deployment may be advisable. The least valuable battleships should be used, as a last resort, to screen the more modern ships . . . the fleet must be prepared to concentrate as day breaks, in order to meet a battleship attack. . . .

. . . having gotten into sight contact by day, the functions of the various types change materially . . . the gun being the main [only?] weapon of the battleship, the latter type will naturally form in line of bearing about at right angles to the general bearing of the enemy. The types whose chief weapon is the torpedo, will naturally seek a position on the bow of the enemy's formation.

The water in advance of the two fleets will thus become the battle ground of destroyers, supported by such fast and powerful types as may be available. . . .

It should be the aim to deliver these torpedo attacks after the main fleets have joined action, so as to force either a decided change of the enemy fleet under gun fire, or an acceptance by him of the risk of torpedo damage.

The faster fleet will draw ahead, isolating the rear of the slow fleet, and enveloping its head, unless the slow fleet turns away and moves on an inner circle.

With submarines present, they must have a high surface speed if they are to be of use to a fast fleet in turning enemy head.

The slow fleet, on the other hand, may protect its head with slower submarines, moving on interior lines.

The slow submarines of a fast fleet may, however, attack through its own column in safety, and deliver a torpedo attack on enemy center or rear of a long column . . . the long range torpedo . . . will have a marked effect on tactics.

Fast battleships, equipped with this torpedo, may get within torpedo range, at the expense of but slight gun fire to themselves. . . . When this weapon [the long range torpedo] comes into general use . . . it may be . . . expected that the range at which guns will be used will be markedly increased . . . the interval [distance] between ships must be increased . . . it seems likely that effort will be made to inflict torpedo damage in the early action, and before closing the range. Thus, an intermediate step will be introduced between the "approach" and the deliberate general engagement at medium ranges.

This may be termed the "torpedo" stage of the battle. . . .

It should be a good precautionary measure against a torpedo drive from ahead, as well as against a fast wing . . . to open out some of the leading ships of the main column, several thousand yards in advance of that column.

Knox is the first contributor to the *Proceedings* who discusses the simultaneous use of battleships, battle-cruisers, cruisers, destroyers,

and submarines in a pitched battle, and his opinions are of particular interest in connection with the one major fleet action of the World War.

Under the head "Co-ordination," he said:

> During the approach, and during the torpedo stage of an action where gun fire is light, co-ordination is comparatively simple . . . as the torpedo stage develops, in more general and closer contact . . . situations will change so rapidly that interior direction by the commander-in-chief will be impracticable. There is then necessity for a substitute for personal direction by the commanding admiral. No other method can be sound than a uniform system of command by which it will be well understood just what the function of each commander is to be in any undertaking which may arise.

Both in the prize essay, and in his "Lessons from Nelson for Today" Knox stresses "indoctrination" (training?), "loyalty to plan," and "initiative of subordinate," as a substitute for signals conveying the orders of the commander-in-chief. The underlying assumption seems to be that subordinates can co-ordinate without the commander-in-chief, better than with him.

The author would certainly deny this, but Fiske observed it and commented upon it in the first article, and the same apparent idea runs through the one now being considered. Pye also, as previously noted, believed that the gunnery officer of a single ship was better fitted than the captain to select the target in battle, and should do so.

In both cases, the essayists concentrate on what subordinates should be free to do, without keeping constantly in mind that the limits of their freedom are to be the subject of prior instruction by a common senior, and, in general, can only operate after that senior is incapacitated for any reason, and the second in command cannot act.

With this proviso, his conclusions may be considered as sound, in general, and apply to the whole fleet, as well as to subdivisions acting singly.

He then discusses the "Time element." He expresses Fiske's and Baudry's ideas concerning the effect of relative superiority, by saying,

> A slight superiority of gun fire will, in a few minutes, become a great superiority. . . . It is this time element which makes it so advisable to tell off a reserve force at sea . . . the battle will . . . probably be lost before a reserve force can get into action. . . . This time factor also makes a containing force inadvisable to use. . . . Better, by far, to get the containing force at the point of major contact a few minutes in advance of the force that would otherwise be contained . . . . an exception to this may be made where submarines are available for use as a containing force. . . .
>
> Of the plan of action, it must be imparted to all principal subordinates, in order that they may co-ordinate their efforts among themselves, and with the commander-in-chief, himself, to the end that unity of action may be obtained. . . .

But he added later,

. . . the unlimited discretion of the enemy precludes any possibility of carrying out a plan which projects much beyond the first few operations after the battle opens. The *plan* then is merely an introduction to the fight.

This being true, the fleet is conducted into action by the commander-in-chief. Here "loyalty to plan," as Fiske points out, is obedience to signals.

Knox continues:

As a rule, the two fleets will move in the same general direction, and at the best speed which each can maintain.

Formation is, of course, merely a means, and not, in itself, an end to be attained.

The formation should . . . conform with the fundamental tactical rule of concentrating the major portion of one's own force [by which he means gun fire] against weaker parts of the enemy [providing other parts of the enemy are out of range] . . . it will also mean that full broadsides should be brought to bear on the enemy ["make every gun count"] and that when superior [having superior fire] at a point of contact, the range should be reduced as much as practicable.

But Knox dislikes a slavish adherence—in plans—to column. All authors who seek only concentration, tend to condemn column, but fail to offer a substitute. He very properly says, "the best manner for the employment of all our weapons should be adopted."

That term, "organized column" in his previous article, is a good one, as denoting flexibility.

Many believe that dreadnaughts should be concentrated at one end [of a formation]; others that they should be concentrated in the center.

He summed up the advantages of these positions and of dividing the dreadnaughts between the van and rear, assuming them to be faster, or more heavily gunned, than ships of earlier date.

What he would do, depended on the speed of the enemy in relation to his own.

Movement, in general, under fire, is better done by division columns. Simultaneous movements of single ships are, no doubt, impracticable. . . . Division column movements require well trained division commanders, who will take the initiative, whenever the occasion demands, without trepidation for the responsibility assumed.

He seems to intimate that division column movements cannot be ordered by signal, or any division or ship made to take any station the commander-in-chief may desire, also by signal.

Divisions of three ships better serve the division column tactics than do those of four ships.

[On account of smoke and powder gases], . . . the lee gage is generally con-

sidered preferable, notwithstanding the other handicaps of spray from wind and sea and from enemy shots, and of spotters having to face the wind. Perhaps further experience and other considerations may modify opinions in this respect.

Among other considerations was the accidental, or intentional effect of smoke from a windward fleet cutting off part of the enemy's gun-fire.

This essay on the whole deserves the highest commendation. An improvement might have been the use of "fighting instructions" for indoctrination and loyalty to plan.

In his fourth essay, "The Rôle of Doctrine in Naval Warfare," Knox quotes Rear Admiral (then Commander) Schofield:

> In a military service, where many intellects must co-operate towards a single aim, and where the stress of events forbids the actual interchange of ideas when the need is most felt, there must be a governing idea, to which every situation may be referred, and from which there may be derived a sound course of action. It is only thus, that the full driving power of an organization can make itself felt. . . . Such an organization . . . is a matter of long and patient educational effort, that eventually centers around a doctrine of military conduct to which every act, either of preparation, or of execution, is automatically referred. When such a stage of development is achieved, a spirit of confidence becomes diffused throughout the service that invests it with a moral power of great value.

After further discussion, Knox says,

> One is irresistibly led to the conclusion, that the formulation and promulgation of doctrine, as well as its acceptance by all concerned, is a practical and essential element in the peace preparation for war. . . .
>
> * * * * *
>
> It is hoped that the foregoing has shown that,
>
> (a). A military doctrine is distinct from a military principle, rule or method, and has an entirely different military function.
>
> (b). Concrete doctrine flows from a conception of war, which is based upon a particular alloy of principle.
>
> (c). Common doctrine gives birth to harmonized methods, rules, and actions.
>
> (d). Universal understanding and acceptance of common doctrine is necessary before concerted action is possible; it is an indispensable element of command, and an essential prelude to great success in war.

The foregoing statements are no doubt true in general; but they are too broad—or rather, too indefinite—abstract instead of concrete.

Knox in his earlier essays had striven in plainer language to tell how a naval battle should be fought.

Here "military doctrine," "concrete doctrine," "common doctrine" might include patriotic fervor, the "will to win" or other general expressions.

Tactical maxims could be more definitely evolved if the word "doctrine" were omitted. It soon came to be applied to many other naval matters great and small and deservedly fell into disrepute.

Fiske's objective, to make every gun (weapon) count simultaneously, in the best foundation on which to base tactical maxims.

A "common doctrine" with such a base brings about the desired meeting of minds.

Knox queried

> Whether or not any navy has formulated a conception of modern warfare. . . . Both ashore and afloat, we therefore imperatively need first a conception of war, and when this is created, we will be enabled to proceed.

Thus this essay ended with the pessimistic idea that nowhere in our navy, or any other, was there at that time, 1915, a conception of war, and the author felt himself unable to evolve one.

While the "Articles for the Government of the Navy" and the Navy Regulations based on these and other laws do not define war, they do very definitely direct conduct essential to the effective prosecution, and we can safely proceed from the base they furnish. The circumstances surrounding each war govern largely the manner of the prosecution and to some extent the details of fighting instruction, i.e., the tactics, also the strategy.

Naval laws and regulation require frequent scrutiny. Fighting instructions and tactical signal books require continuous scrutiny and test to keep the navy *ready*.

The discussion of Knox's fourth essay was, almost uniformly, complimentary. No one offered a conception of war, but it was agreed that much could be learned by the study of history—a fact that has never been seriously questioned.

Under the title "The General Principles of Naval Warfare" Knox's fifth essay was published by the Naval Institute in 1916. In this he reaffirmed the importance of a "conception of war" and "indoctrination" of the personnel.

Had he, and others, thought of "doctrine" as fighting instructions and of "indoctrination" as training their conclusions might have been more definite and possibly more valuable.

No one wishes to detract from, but rather to preserve and foster the "initiative of the subordinate" wherever applicable, but sound tactics require that wide initiative must be permitted to the commander-in-chief. He has the tools which enable him to exercise it.

Writers on the rôle of "doctrine" in naval warfare draw inapplicable illustrations from land warfare, where subordinates are not as at sea under a senior's eye.

In 1915 or earlier standard forms of operation orders began to be

employed afloat. These in the concrete form developed at the Naval War College proved a useful contribution.

The late Rear Admiral Austin M. Knight, then President of the College, contributed to the Institute an essay on "The Estimate of the Situation" in which he gave good reasons why the method of reaching decisions on war problems standardized at the college was more likely to produce sound decisions than any other method. He said that every naval war problem was treated under four heads:

1. The mission.
2. The enemy forces, their strength, disposition, and probable intentions.
3. Our own forces. Their strength, disposition, and the courses open to us.
4. Decision.

It was believed that comprehensive orders standardized in form would result from estimating each situation in the manner outlined above.

Such orders are strategical rather than tactical; but are germane to the history of tactics--such decisions include the composition of the forces to be employed against enemy forces and thus determine the tactics at the point of contact.

CHAPTER L

THE WORLD WAR, 1914-1918

THE MOST useful comparison with the battle tactics advocated by Knox and other authors is the actual conduct of the Battle of Jutland in 1916 between the British Grand Fleet under Admiral Sir John Jellicoe and Sir David Beatty and the German High Sea Fleet under Admirals Scheer and Hipper, which is the principal subject of this chapter.

In his fifth essay Knox discussed the possible uses of battle cruisers. The Battle of Jutland and earlier lesser engagements threw some light on that question also.

On June 28, 1914, Archduke Franz Ferdinand, heir apparent to the Austrian throne, and his wife were assassinated in an automobile being driven through a street in Sarajevo, the capital of Bosnia, a province of Austria which the latter had taken from Turkey in 1909.

The Austrian government, after investigation, announced that the murder was the result of a plot made in Belgrade, the Capital of Servia.

On July 23, Austria made ten demands on Servia which were in the nature of an ultimatum. Sixty hours were allowed for Servia's reply. The Servian government acceded to the majority of Austria's demands in 24 hours after they were received, and asked for arbitration of the others either by the Hague International Tribunal or by the Great Powers.

Austria considered the reply unsatisfactory, and on July 25 severed diplomatic relations with Servia and began to mass troops on the Servian frontier.

Russia requested Germany to use her influence to restrain Austria, and the British Foreign Minister, Sir Edward Grey, asked the Great Powers, with the exception of Austria and Russia, to confer, with a view to adjusting Austrian-Servian difficulties.

On July 27, Austria declared war against Servia and commenced hostilities.

Strong sympathy for Servia, as a Slav state, developed in Russia, and on July 28, mobilization orders for Russian troops were issued. This created general European alarm. The British fleet was assembled, and Germany and France prepared to mobilize their armies.

On July 30, Germany demanded that Russia stop mobilizing and declare her intentions. Russia replied that it was technically impossible to stop mobilization. Thereupon the Kaiser proclaimed martial law in Germany, declared a state of war existed in that country, and on August 1 declared war on Russia.

On August 2, Germany, fearing that France would forestall her, invaded the neutral state of Luxembourg, and asked Belgium to violate her neutrality by permitting the passage of German troops to attack France, though Germany herself, as well as France was a guarantor of Belgium's neutrality. Belgium refused, and was at once (August 2) invaded by Germany.

On August 3, England (also a guarantor of Belgian neutrality) and France declared war against Germany and Germany declared war against them.

On August 6, Austria declared war on Russia. On August 10, France, and on the 12th, Great Britain, declared war against Austria.

On August 15, Japan, as an ally of England in the Far East since July 13, 1911, sent an ultimatum to Germany demanding immediate withdrawal of German men-of-war from the Orient, and the surrender to Japan of Kiao-chau (Tsing-tau), taken from China by Germany in 1904. On August 24, Germany not having complied, Japan declared war.

On November 5, England and France declared war against Turkey. Italy, a member of the Triple Alliance, remained neutral for a time, but in the following year joined in the war against her former Allies, Germany and Austria.

The German Squadron in Asiatic waters, at the outbreak of war, was in command of Vice Admiral Count Von Spee. His principal ships were the 8″ gun armored cruisers *Scharnhorst* (flag) and *Gneisenau,* and the smaller, unarmored, 4″ gun cruisers, *Leipsig, Nürnberg, Emden,* and *Dresden.*

The exploits and the final destruction of the *Emden* by the 6″ cruiser *Sydney,* off Keeling Island in the South Pacific, November 9, 1914, engaged the attention of the world.

Von Spee's whereabouts, during the major part of this period, were unknown. He had steamed into the Pacific after detaching the *Emden* and was believed to be heading for a German home port, with the secondary object of injuring the enemy to the greatest possible extent while en route.

On November 1, eight days previous to the destruction of the *Emden,* a British cruiser squadron of four ships, under Rear Admiral Sir

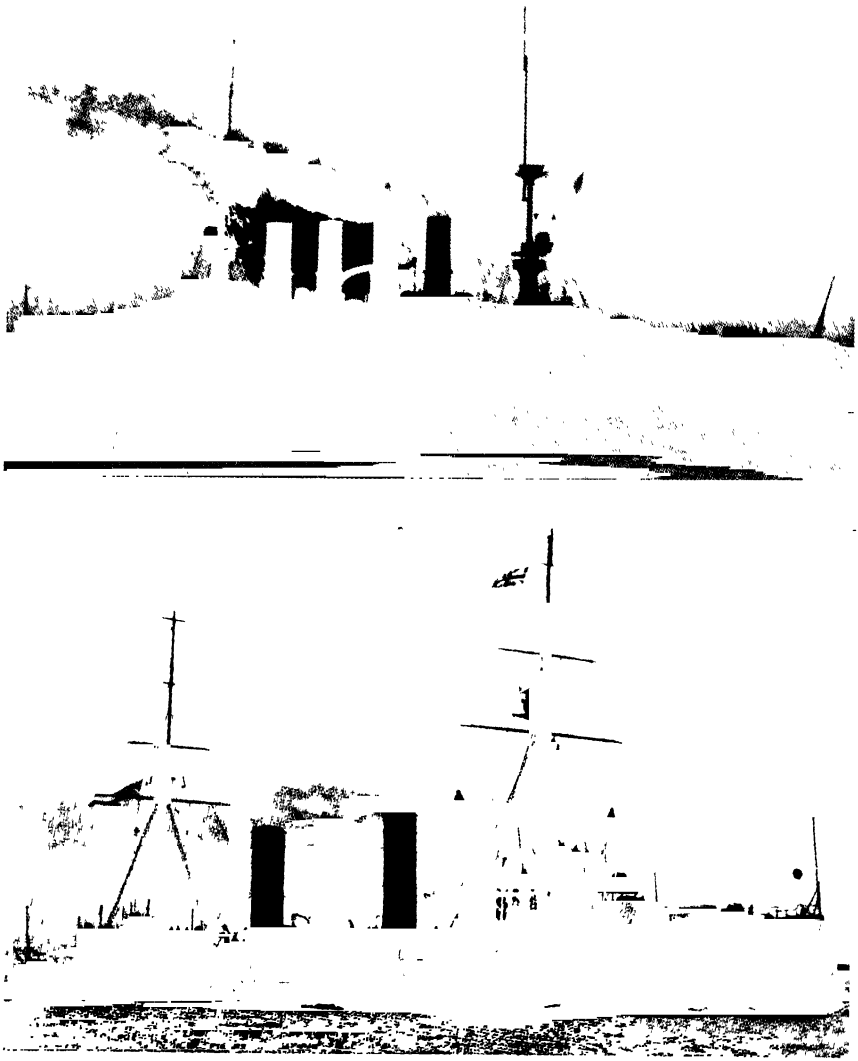


FIG. 127.—*Scharnhorst. Good Hope. (From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd, London)*

Christopher Cradock, R.N., was cruising off Coronel, Chili, in scouting formation, with the hope of intercepting Von Spee, whose appearance on the South American coast was expected.

The *Canopus,* second-class battleship of Cradock's command, was 300 miles to the southward. With him were the armored cruiser *Good Hope* (flag), cruisers *Monmouth* and *Glasgow,* and auxiliary cruiser *Otranto.* His only armor piercing guns were two 9.2″ of the *Good Hope.* Her secondary battery and the main batteries of the other ships were 6″—32 guns in all. These four ships, as Cradock well knew, were not a match for the *Scharnhorst* and *Gneisenau,* each with a broadside of six 8″ and three 6″, but he had determined to attack if the Germans were found.

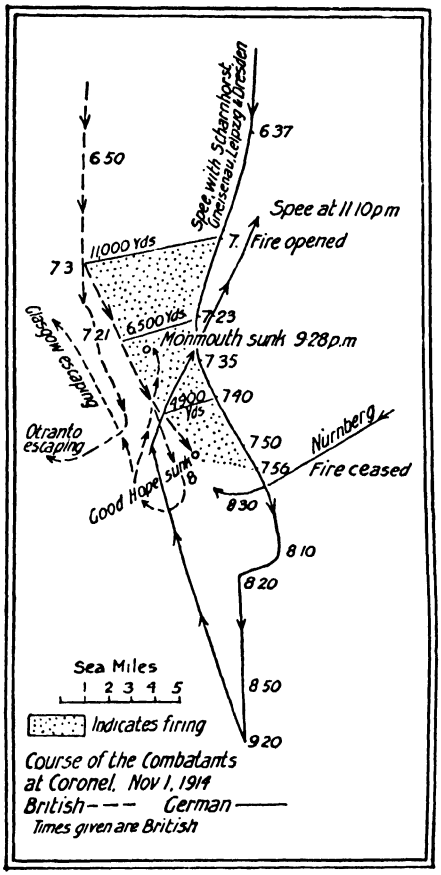


FIG. 127a.—(*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

His scouting line was steering about northeast at 15 knots before a heavy southwest swell, with a fresh southerly wind and rain squalls. At 4:20 P.M. his easternmost ship sighted the Germans steaming southward. By 5:30 he had formed column and was steering to intercept Von Spee, who with the *Scharnhorst, Gneisenau, Leipsig, Dresden,* and *Nürnberg* continued his southern course. His light cruisers were laboring in the swell, *Nürnberg* well in the rear, and *Leipsig* and *Dresden* not well closed up. Von Spee edged away, preventing Cradock from reaching firing range until the sun had set and the British ships were clearly defined targets against the western horizon. He opened fire on the *Good Hope* at 7:03, range 11,000 yds. The *Gneisenau's* target was the *Monmouth.* Cradock continued to close and opened fire at 7:05. The Germans made hits on the third salvo. Fires broke out on both *Good Hope* and *Monmouth.* An easterly moon lighted up the German ships between clouds but to no avail. They were only hit six times in all. As darkness came on the British were lit up by their

own fires. When the range had decreased to less than 8,000 yds., the battle was only target practice for the Germans.

Just before 8:00 the *Good Hope* blew up. A heavy rain squall ensued. When it cleared no trace of ship or crew was seen. The *Monmouth,* down by the head, turned stern to sea and disappeared in the darkness. The *Glasgow* and *Otranto* had steered to the southwest, pursued by the *Leipsig* and *Dresden.* They escaped.

The *Nürnberg,* reaching the scene of battle about 9:00, discovered the helpless *Monmouth,* missed her with a torpedo, and then with shells pierced her waterline. She soon capsized and sank with all on board.

Wilson says,

> The Germans heard the British gun crews being piped to their guns, and thus we know that among the old reservists in that dying ship, fighting an entirely hopeless battle, discipline was faithfully maintained unto the very end.

He gives the British loss as 1,654; German, 2 wounded on the *Gneisenau.* Shots fired by German 8.2″ guns were: *Scharnhorst,* 422, *Gneisenau,* 442, an average of about 34 rounds per gun in an action of 54 minutes. The *Nürnberg* reported firing 135 4.1″ armor-piercing shell at the *Monmouth.*

Cradock fell, but Von Spee was nearing his end, and the end of all his ships except the *Dresden.*

The *Canopus, Glasgow,* and *Otranto* returned to Port Stanley, the British base in the Falkland Islands, Von Spee made short visits to the island of Juan Fernandez and Valparaiso, and then joined his train in the Gulf of Penas in about 47° 30′ S., where he coaled, equalized his ammunition supply, and sailed for the Falklands on November 26.

In the meantime the British Admiralty had despatched two battle cruisers, the *Invincible* and *Inflexible,* under Vice Admiral Sir Doveton Sturdee, to intercept the German squadron. At the end of November these ships joined with the *Canopus* and the cruisers *Carnarvon, Cornwall, Glasgow,* and *Kent,* at Port Stanley.

On December 8, this squadron was taking on coal and supplies when Von Spee was sighted, approaching the harbor with the same five ships which had comprised his force off Coronel. He stood in until he sighted the tripod masts of the British battle cruisers, when he turned east. He was fired upon by the *Canopus* over the intervening land, at a range of 11,000 yards. This was at 9:20 A.M.

At 9:45, when the *Invincible,* Sturdee's flagship, cleared the harbor, Von Spee was hull down to the southeast. A chase began, which brought

the British within 20,000 yards of the German squadron by noon, though at 11:15, Sturdee had slowed the battle cruisers to allow the other cruisers to join.

He opened fire at 12:55 on the German rear, at 16,500 yards.

At 1:25, the *Leipsig, Nürnberg,* and *Dresden* turned south in an endeavor to escape, pursued by the *Glasgow, Cornwall,* and *Kent.* The speed was then about 26 knots and the range 13,500 yards.

The heavier ships continued the engagement, with some changes of course, speed, and range, until the *Scharnhorst* was sunk, shortly after 4 P.M., and the *Gneisenau* at 6 P.M.

Sturdee, having the advantages of speed and battery, altered the range at will, as the German shell struck, or fell short.

Off Coronel, 8″ guns won a victory over 6″. Off the Falklands, 12″ guns won over 8″.

The *Leipsig* was overtaken by the *Glasgow* and *Cornwall;* the *Nürnberg* by the *Kent.* The *Leipsig* was sunk at 9:23, the *Nürnberg* at 7:27. Eighteen were rescued from the *Leipsig,* seven from the *Nürnberg.* The *Dresden* escaped for the time; but the hunt was on. She was found, March 14 of the next year, near the island of Juan Fernandez, and sunk by the *Glasgow* and *Kent.*

Off the Falklands, 187 were rescued from the *Gneisenau,* but none from the *Scharnhorst.* German losses from the two ships were about 1,540; British losses 1 killed and 3 wounded. German losses on the *Leipsig* were 280; British casualties, 1 killed, 4 wounded. German losses on *Nürnberg* were 290; British losses, none killed, 12 wounded. After the Falklands some Germans were saved, whereas at Coronel life saving was prevented by strong wind and heavy seas. No ship surrendered either off Coronel or the Falklands.

Passing over less important naval events, we come to the Battle of Dogger Bank in the North Sea, January 24, 1915, between four German and five British battle cruisers.

Vice Admiral Hipper in the *Seydlitz* (flag) with the *Derfflinger Moltke,* and *Blücher,* escorted by light cruisers and destroyers, had been sent to reconnoiter off the Dogger Bank "and there to destroy any of the enemy light forces to be met with"; to avoid contacts with merchant ships on the outward voyage, and capture fishing vessels on the way back.

It was a night's run to the bank and Hipper was due off its S.E. edge at daybreak on January 24. Unknown to the Germans the British

Grand Fleet was at sea and Vice Admiral David Beatty in command of the battle cruiser squadrons had been sent with the *Lion* (flag), *Tiger, Princess Royal, New Zealand,* and *Indomitable,* escorted by light cruisers and destroyers, to make "a sweep of the southern portion of the North Sea in conjunction with the Harwich force."

At 7:30 in the morning Beatty reported to Admiral Sir John Jellicoe, Commander-in-Chief, that he had sighted German battle cruisers and cruisers bearing S.E., steering east and later S.E. and south (Chart II).

He set course S.S.E., increased speed to 22 knots, then gradually to 28.5. Jellicoe to the northward also increased speed to 19 knots, detached a battle squadron to support Beatty, and a cruiser squadron to steer full speed for Helgoland—some 200 miles south of east.

Hipper reported being chased and all of the High Seas Fleet available assembled in Schillig Roads and put to sea about 9:00 British time. The scene was set for a fleet battle which did not take place.

The *Lion,* leading, began at 8:52 to fire trial shots at the *Blücher,* Hipper's rear cruiser, range about 20,000 yds. At 9:09 the *Blücher* was hit. Five minutes later Hipper's squadron opened on the *Lion.* Beatty, still gaining, shifted *Lion's* and *Tiger's* fire to *Seydlitz* next ahead of the *Blücher,* while other ships had the *Blücher* for their target.

By 9:45 *Blücher* had lost speed and *Seydlitz* was afire. Hipper changed course to port, and sent destroyers to attack, but these were driven off and the chase continued. At 10:54 *Blücher* hauled off to port. At 11:00 the *Lion's* port engine was disabled and she had to drop out of the line.

At 11:35 Beatty shifted his flag to a destroyer. He overtook the battle cruisers and boarded the *Princess Royal* at 12:20. He found his squadron then steaming N.N.W., and was informed that the *Blücher* had capsized shortly after noon, and that "the enemy battle cruisers had continued their course to the eastward in a considerably damaged condition."

No adequate reason for giving over the chase has yet been disclosed. At 5:00 the *Lion,* which could steam but very slowly, was taken in tow by the *Indomitable.*

Scheer's account reads, in part,

> Soon after the fighting began, the *Seydlitz* was badly hit, and both her after turrets, with their two 28 c.m. guns, were put out of action, while fires were caused in them by exploding ammunition . . . the gunners in both turrets were killed. . . .

The turrets that were put out of action and the magazines had to be flooded, on account of fire. Water from the magazines entered her

stern compartments and she had another leak from a hit on her side armor.

The *Derfflinger* was also damaged.

On the British side, the only hits were on the *Lion* and *Tiger*.

German time was two hours faster than British time, but even taking this into consideration, it is not possible to reconcile all the times given in the two accounts of the battle.



FIG. 128.—Admiral Earl Beatty. Admiral Hipper. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Scheer states that "the fighting had lasted more than three hours." He also says, "At 1:45, the enemy was lost to view, the *Seydlitz* being then 25 nautical miles north of the mouth of the Elbe. At 3:30 P.M., the forces that had run out from the Jade joined the returning cruisers and again entered the rivers."

Jellicoe says that the Battle Squadron which he had despatched to Helgoland, reported at 2:00 P.M. that it "was returned to the northward, having all the battle cruisers in sight."

The track chart shows that the battle cruisers turned to a northwesterly course at noon (2:00 P.M., German time). How, and why, Hipper outdistanced them is unexplained.

Earle (Naval Institute, 1922) in "Mutual Relations of Gunnery and

Tactics," shows a more detailed track chart, which indicates that the British stood northeast for some 40 minutes after Hipper had turned northward under a smoke screen and then east without being detected; also that Beatty at 11:07, after the *Lion* was disabled, hoisted a signal "Keep nearer the enemy" which was not understood or not carried out.

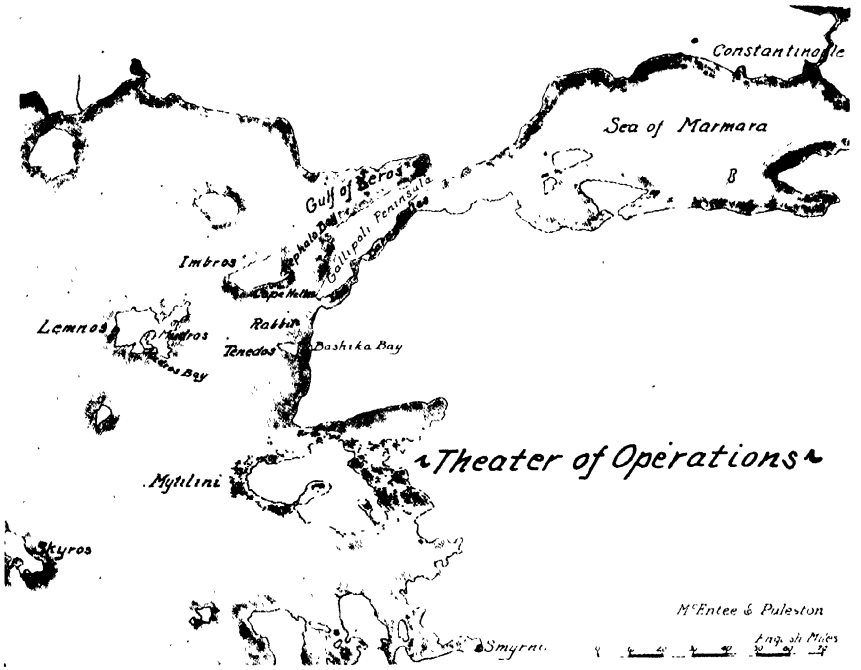


FIG. 129.—Vicinity of the Dardanelles. (*From Puleston's "Dardanelles Expedition," U. S. Naval Institute*)

Earle says the Germans zig-zagged to bring their guns to bear and to confuse British fire control. Beatty, having greater speed, controlled the range, which did not fall below 13,500 yds. What should have been a major victory was through faults of personnel only a minor one. The battle furnishes no tactical lessons. Cruisers and destroyers played a very minor rôle on both sides. Wilson gives the losses as: British 10 killed, 28 wounded, all on *Lion* and *Tiger;* German 951 killed and drowned, 78 wounded, all on *Blücher* and *Seydlitz,* 189 saved from *Blücher* by British destroyers. Ammunition from heavy guns was: British 958 rounds, German 1,276. German hits were 12 on *Lion,* 2 on *Tiger.*

Less than a month after the Dogger Bank affair, the Allies, France and England, began to pit ships against forts and mines with disastrous results in the end.

On February 19, a fleet of seven British and three French battleships, commanded by the British Vice Admiral S. H. Carden and having in company cruisers, submarines, destroyers, and mine sweepers, bombarded the forts at the western entrance to the Dardanelles, preparatory to forcing a passage through some 36 miles of mined waters guarded by forts on both sides mounting some 150 guns of 6-inch caliber and above.

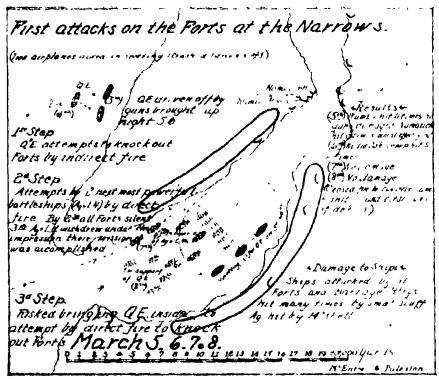


FIG. 129a.—(*From Puleston's "Dardanelles Expedition," U. S. Naval Institute*)

Opening fire on the 19th at about 12,000 yds. and later closing in the naval forces got results that appeared fairly satisfactory. Bad weather intervening, the attack was not resumed until February 23. Results that day warranted an effort at mine sweeping, attempted on the 26th under protection of the fire of three battleships in the entrance. Landing parties from the ships had some success in destroying guns. Two days of inaction caused by bad weather followed. Scouting planes from the *Ark Royal* reported additional guns being installed on shore. On the night of March 1 mine sweeping was again attempted but the sweepers were driven off on that and the following night after a day of bombardment by four battleships. On March 3 bad weather prevented much mine sweeping. Next day two landing parties were repulsed. On March 5, *Queen Elizabeth*, the new 15″ gun British battleship, attempted long-range bombarding over the Gallipoli peninsula at the Hamedieh 14″ gun batteries; but the fall of shot could not be observed and the attack failed. Next day she again bombarded where shot could be spotted, but Turkish fire forced her withdrawal.

On March 7, two powerful British battleships and three French attacked forts at the Narrows from positions well inside the entrance. The attack failed and the *Lord Nelson* was badly damaged. The current was too strong for mine sweepers that night some four miles below the Narrows. On March 8 the *Queen Elizabeth* was brought well inside to attack the Narrows (Chanak) forts without result.

Wilson says:

At the juncture, [Carden] was given urgent instructions from the Admiralty to force a passage bringing his maximum strength into play. He was told that the very modest degree of success already obtained would justify the loss of ships and men.

Attempts at mine sweeping on the nights of March 10, 11, and 14 again failed due to strong currents and gun fire protecting the mine fields. The admiralty now decided to send 30 trawlers that could work in the three to five knot current.

Carden's health failed; he was relieved on March 16 by Vice Admiral J. M. de Robeck. Sixteen pre-dreadnaughts, French and English, one super-dreadnaught, *Queen Elizabeth,* and the battle cruiser *Inflexible* returned from the Falklands—eighteen armored ships in all, made up De Robeck's fleet. He set March 18 to carry out the instructions of the First Lord of the Admiralty Mr. Winston Churchill (who as Prime Minister of England is, in a later war, faced with still greater naval problems).

Sixteen of the 18 ships attacked supported by destroyers. Guns and mines worked havoc. The *Inflexible* was put out of action, also the *Gaulois*. The *Bouvet* and *Irresistible* were sunk during the battle, and the *Ocean* by a mine during the withdrawal. *Suffren, Charlemagne, Agamemnon,* and *Albion* were badly damaged. On March 23 it was decided not to renew the naval attack.

This log of the attempt to subdue sea coast forts with ships alone is condensed from Wilson's *Battleships in Action.* It brings to mind DuPont and Dahlgren hammering away without success at Charleston until troops could co-operate, and similar attempts on Fort Fisher.

In the Dardanelles mines—in the incipient stage during the Charleston attacks—had been made more dangerous, and torpedoes had been perfected. Rate of gun fire had been increased and range finders adopted to make gun fire effective. Search lights and star shells illuminated night targets. All could assist the defense, though it is not of record that all were available to the Turks. What they had was sufficient.

It is of record that several British and French submarines threaded their way through the mine fields, entered the Sea of Marmora, and returned, but could inflict no important damage.

The historic Gallipoli campaign affords no other lesson of tactical value. It closed on January 9, 1916, on the withdrawal of the last land and naval forces.

During 1915 Germany was [redacted] was called her "U-Boat Campaign," or "Trade War." A proclamation issued February 4, to become effective February 18, gave the limit of a "war zone" around England, Scotland, and Ireland within which hostile merchant ships would be destroyed without regard to the safety of their crews. The proclamation warned neutral ships against entering the zone because it might not be possible to distinguish them from enemy ships, or they might fall victims "to an attack directed against an enemy ship."

This was the beginning of what became known as "unrestricted submarine warfare," which had the effect, to a large extent, of uniting the world against Germany.

Colomb in *Naval Warfare* (1899) charts what he called the "British Sea," bounded by a line extending west from Cape Finisterre in Spain to 23° W. Long., thence north to Lat. 63°, thence east to the coast of Norway. This area over which the English at one time claimed sovereignty was a wide extension of her "Narrow Seas." The German "War Zone" was somewhat less in area, its shape nearly the same. Chart III shows the boundaries of the "British Seas," the "German War Zone," and the safe-channel prescribed by Germany for a weekly steamer from the U.S. to Falmouth and return. Such steamers were to carry day and night markings, also prescribed by Germany.

Later in the war sinkings without warning overflowed the boundaries of the War Zone of 1915. A summary of the results of the new mode of warfare is given near the end of this chapter.

Shortly after the beginning of the war the British changed the name of the Home, or Channel Fleet to "Grand Fleet," the revival of an old title, and ordered Admiral Sir John Jellicoe to command. Jellicoe was a recognized authority on ordnance and gunnery. Born in 1859, he entered the Navy in 1872 and had advanced to the rank of rear-admiral in 1907 at the age of forty-eight. When ordered to command the Grand Fleet he was on duty at the Admiralty as Second Sea Lord.

Jellicoe hoisted his flag on the *Iron Duke* on August 5, 1914, as the relief of Admiral Sir George Callaghan. The *Iron Duke,* a battleship of 25,000 tons displacement, was Jellicoe's flagship until November, 1917, when he was made First Sea Lord. His successor in the Grand Fleet was Admiral Sir David Beatty, who continued as Commander-in-Chief until after the end of the war.

Opposed to the Grand Fleet was the German "High Sea" fleet, officially so designated, first commanded during the war by Admiral

von Ingenohl, later by Admiral von Pohl. The latter was transferred to a hospital in January, 1916, and soon afterward died. His successor, and Jellicoe's principal antagonist, was Admiral Reinhard von Scheer.

Scheer, born in 1863, entered the Navy in 1879 and reached flag rank in 1910 at the age of forty-seven. He had served in command of Squadron II of the High Sea Fleet since February, 1913.

The main base of the Grand Fleet was in Scapa Flow, a harbor between three of the largest of the Orkney Islands about 15 miles north of the northern extremity of the Scottish mainland, lat. 58° 53′ N.; Long. 3° W. The German main base was at Wilhelmshaven and its vicinity, in Lat. apx. 53° 40′ N.; Long. apx. 8° E.

Separated by less than 600 miles, the two fleets, if each so willed, could have met any day within 14 hours after leaving port. England, with the more powerful fleet, sought action. Germany pursued a war of attrition, hoping by means of submarines, mines, and minor engagements to reduce England's strength to a point where a major sea battle might be successful.

Operations of both fleets were practically confined to the North Sea and to such parts of that sea as had not been mined by one or both.

Jellicoe made periodic sweeps with the Grand Fleet hoping to find the enemy fleet at sea, interpose between it and its base, and force it to battle. The Germans were cautious, but sea training was necessary for the personnel. Hence the High Sea Fleet did not remain in port, but its sweeps covered less area than those of the Grand Fleet. Detachments of the latter were frequently employed to convoy merchant fleets to and from Norway. The High Sea Fleet had safe entrance to the Baltic via the Kiel Canal, which had been completed to transmit large ships in 1913. The Baltic afforded a safe maneuvering area for Germany throughout the war. Early in the war Atlantic waters were safe for the British fleet but this condition did not long obtain.

Lagging at first, it may fairly be said that England, after the first year of the war, had developed its information (spy) system and the use of radio bearings to a point that the Admiralty had, daily and hourly, better knowledge of the position and movements of German ships than the German Admiralty had of British ships.

Both naval commanders-in-chief had nearly two years for intensive planning of their battle tactics before they finally confronted each other at sea, on May 31, 1916.

Scheer, who believed in vigorous action, resolved or was directed to



FIG. 130.—Vice-Admiral Sir John Jellicoe, K.C.B., K.C.V.O. (*J. Russell & Sons, Royal Photographers, Southsea*) Admiral Scheer. (*From Scheer's "Germany's High Sea Fleet in the World War," Peter Smith, New York*)

undertake the bombardment of Sunderland, on the North Sea coast of England south of the mouth of the Tyne. The object of this apparently useless undertaking was set forth in his orders:

The bombardment of Sunderland by our cruisers is intended to compel the enemy to send out forces against us. For attack on the advancing enemy, the High Sea Fleet forces to be south of the Dogger Bank, and the U-boats to be stationed for the attack of the east coast of England. . . . The enemy's ports of sortie will be closed by mines. . . . If time and circumstances permit trade war [submarine attacks on merchant shipping] will be carried on during proceedings. . . .

Scheer's narrative continues:

. . . sixteen of our U-boats were told off for the purpose . . . [to reconnoiter in the North Sea from May 15 to May 23, and from that date to June 1, to lie off specified British ports].

Provision was also made for the largest possible number of our airships to assist the enterprise by reconnaissance from the air. The fact that the U-boats could only remain out for a certain period put a limit to the execution of the plan.

Weather that made airship scouting impracticable, continued for so long that the plan to bombard Sunderland was changed for "a campaign against cruisers and merchantmen outside and in the Skagerrack."

High Sea Fleet cruisers were ordered "to keep in sight of the coast

of Norway, so that the enemy might be notified" that the Germans were at sea.

Scheer had ten airships, but was unable to employ any of them up to May 30. He said that without an extensive aerial reconnaissance, an advance on Sunderland was unwise "as it would lead into waters where we could not allow ourselves to be forced into giving battle. . . ."

> Our U-boats were in position, some of them, in fact, facing Scapa Flow, one boat off Moray Firth, a large number off the Firth of Forth, several off the Humber, and the remainder, north of the Terschelling Bank. . . .

Scheer put to sea with his surface fleet on May 31. His scouting force, in command of Admiral Hipper in the battle cruiser *Lützow,* sailed from the Jade Basin (outside of Wilhelmshaven), at 4 A.M. with orders to keep out of sight of the Danish coast, show itself off the Norwegian coast before dark, cruise in the Skagerrack during the night, and join the main fleet at noon the next day.

With Hipper were Scouting Division I—five battle cruisers; Scouting Division II—four cruisers; and Torpedo Flotillas II, VI and IX, led by the light cruiser *Regensburg* and divided into "Half Flotillas" averaging about six destroyers each.

The main fleet, under Scheer in the *Friedrich der Grosse,* sailed at 4:30 A.M. It consisted of battleship Squadrons I, II, and III, composed respectively of eight, six, and seven ships—a total, including the flagship of the Commander-in-Chief, of 22 battleships. With the battleships were Scouting Division IV of four cruisers, Torpedo Flotillas II, V, and VII and half of Flotilla I, led by the light cruiser *Rostock.*

Mine sweepers preceded both detachments, until clear of possible mine fields. ". . . visibility was good, with a light northwesterly wind, and there was no sea on."

The advance to the northward was without important incident, until afternoon. Between twelve and one P.M., five airships

> ascended for long distance reconnaissance in the sector north to west of Heligoland. They took no part in the battle that so soon was to follow, neither did they see anything of their own Main Fleet, nor of the enemy, nor hear anything of the battle. (Scheer)

At half-past two (English time) it was reported that the westernmost cruiser *Elbing* of the scouting force had sighted some enemy cruisers, while steering west to examine a merchant steamer.

"It was thanks to that steamer that the engagement took place,"

otherwise "our course might ha
without sighting them.

As soon as the enemy, comprising eight light cruisers . . . sighted our forces, he turned off to the north, Admiral Bödecker gave chase with his cruisers [Scouting Division II].

[At 3:20, Hipper] . . . sighted in a westerly direction, two columns of large vessels taking an easterly course. These soon showed themselves to be six battle-cruisers . . . besides numbers of light forces.

Hipper recalled his cruisers and prepared to attack.

The enemy deployed to the south in fighting line. It was Vice Admiral Beatty, with the First and Second English Battle Cruiser Squadrons [six ships]. That the enemy deployed to the south was a very welcome fact for us. [Hipper] followed the movement, maneuvered to get within effective firing range, and opened fire at 5:49 P.M. [3:49] at a range of about 130 h.m. [about 14,200 yards]. The fighting proceeded on a south-easterly course. [Hipper] kept the enemy at effective distance. The batteries fixed their aim well; hits were observed on all enemy ships. [Quotations from Scheer]

The German battle cruisers were, on the whole, more heavily armored and lighter armed than the British.

Turning to the British account, Admiral Jellicoe says:

The Grand Fleet put to sea on May 30, for the purpose of carrying out one of its periodical sweeps in the North Sea. The orders from me, under which the Fleet acted, were as follows:

Vice Admiral Sir Martyn Jerram, with the 2nd Battle Squadron from Cromarty, was directed . . . to meet the remainder of the Battle Fleet at 2 P.M. on the 31st . . . in Lat. 57.45 N., Long. 4.15 E.

Vice Admiral Sir David Beatty, with the Battle Cruiser Fleet and the 5th Battle Squadron, was directed to be in Lat. 56.40 N., Long. 5 E., . . . at 2 P.M. . . . after which he was directed to stand to the northward to get into visual touch with the Battle Fleet.

The *Iron Duke* and the 1st and 4th Battle Squadrons, together with the 3rd Battle Cruiser Squadron . . . left [Scapa] . . . during the evening of May 30th, and proceeded towards . . . [rendezvous].

Jellicoe met Admiral Jerram before noon, but at 2 P.M., owing to delays in examining merchantmen, he was about 18 miles northwestward of the position in which he had expected to be at that time.

The Battle Fleet was in line of divisions, screened by three destroyer flotillas and a light cruiser squadron, three miles ahead. Sixteen miles ahead, was another screen of six armored cruisers, eight miles apart, with a ninth vessel astern of the center, and a linking ship astern of the screen. The 3rd Battle Cruiser Squadron (three ships), accompanied by two light cruisers, was four miles ahead of the outer cruiser screen (i.e. 20 miles ahead of the main body).

The fleet was zigzagging at a speed that advanced it 14 knots per hour on its mean course of S. 50 E.

The battleships, 24 in number, were organized in three squadrons of two divisions each, Admiral Jellicoe in the *Iron Duke* leading the

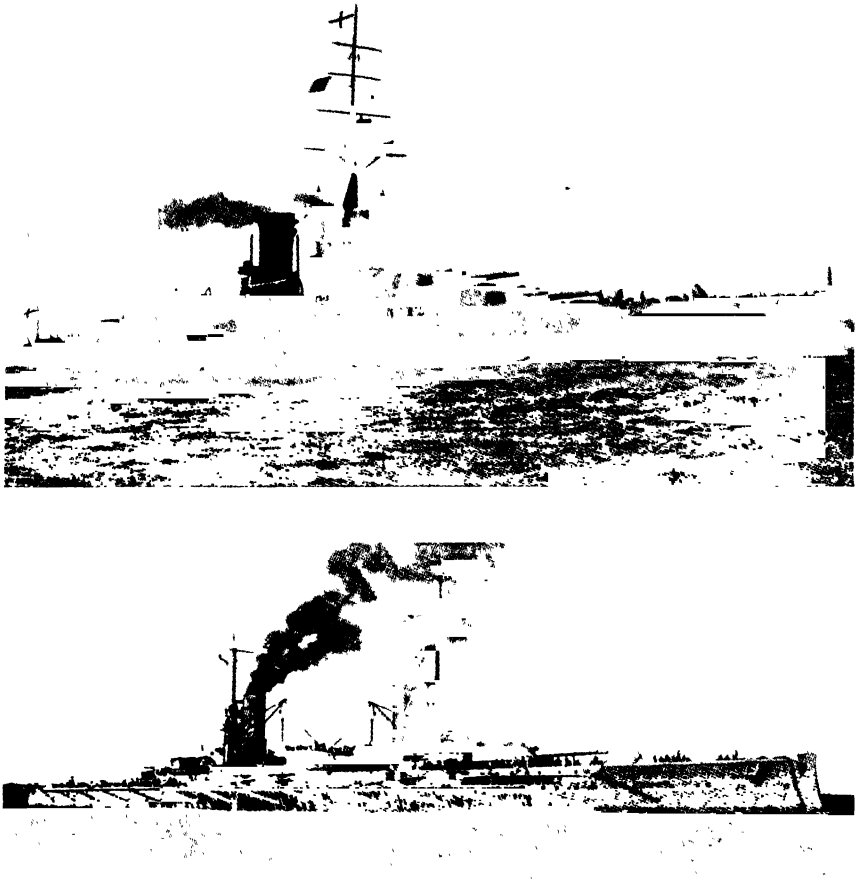


FIG. 130a.—*Iron Duke*, Flagship of Sir J. Jellicoe at Jutland. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*) *Friedrich der Grosse.* (*From "Jane's Fighting Ships," 1914 edition, published by Sampson, Low, Marston & Co., Ltd., London*)

first division of the second squadron. Radio silence was maintained within the fleet.

It is to be noted that the smallest battleship sub-division was the

division of four ships, while in the Battle Cruiser Fleet a smaller number of ships (three) was called a squadron.

At 2 P.M., Admiral Beatty, in the *Lion,* with the 1st Battle Cruiser Squadron, was in Lat. 56.46 N., Long. 4.40 E., steering N. by E. at 19½ knots to join Jellicoe, his squadrons of heavy ships in columns, each screened by light cruisers and destroyers. The 2nd Battle Cruiser Squadron was three miles E.N.E. of the flag, and the 5th Battle Squadron (four battleships), five miles N.N.W. of the flag.

A light cruiser screen, with ships five miles apart, on a line of bearing E.N.E. and W.S.W., its center eight miles S.S.E. from the flag, was connected by a linking ship, for visual signals. Radio silence was also maintained in Beatty's fleet.

At 2:20, the *Galatea,* an eastern ship of the screen, sighted two enemy vessels, bearing E.S.E., "apparently stopped and engaged in boarding a steamer."

Beatty immediately changed the fleet course to S.S.E., steering for Horn Reef "to get between the enemy and his base."

"At 2:35, the *Galatea* reported a large amount of smoke 'as from a fleet,' bearing E.N.E. [on Beatty's port beam] . . . Steering north."

Beatty changed course to N.E., and at 3:31 identified Hipper's five battle cruisers, accompanied by destroyers. Beatty's cruiser squadrons "spread to the east without waiting for orders," formed a screen in advance, and were soon engaged with Hipper's light vessels.

Among the British light cruisers, was the *Engadine,* a seaplane carrier. Beatty had ordered a seaplane launched upon the *Galatea's* first report. The plane reported seeing light cruisers, and being fired upon, at 3:30 P.M.

On sighting Hipper's heavy ships, Beatty formed his line on course E.S.E., Battle Cruiser Squadrons in line of bearing to clear smoke, speed 25 knots, 5th Battle Squadron in column, 10,000 yards N.N.W. of Commander-in-Chief. "Weather favourable, wind S.E. and visibility good, Course slightly converging on enemy."

Jellicoe, having intercepted wireless reports from the *Galatea* and *Lion,* ordered steam for full speed and preparations for action, and at 3:30, directed division flag officers "to inform their ships of the situation."

The 3rd Battle Cruiser Squadron was directed to prevent the enemy (believed to be light cruisers and destroyers only) from escaping via the Skagerrack, but at four o'clock, after enemy battle cruisers were

At that time the German main fleet was steaming on a northerly course, at 14 knots, screened by destroyers and light cruisers. The battleships were in the following order, "Squadrons III, I, II, the flagship at the head of Squadron I, [evidently column open order] distance between vessels 7 h.m. (about 760 yards), distance between the squadrons 35 h.m. (about 3,800 yards).

"At 3:35, the first report was sent that heavy forces had been sighted. . . ." At that time, Scheer and Hipper were about 50 miles apart.

"On receipt of this message, the fighting line was opened (that is, the distance between the squadrons was reduced to 1,000 m. and between vessels to 500 m.) and the order was given to clear ships for action."

At 3:45, Hipper reported "that he was engaged with six enemy battle cruisers on a southeasterly course."

At 4:05, Scheer states, "I took a northwesterly course at a speed of 15 knots."

At 4:20, he altered to a westerly course "in order to place the enemy between two fires."

While altering course, he received a message that five English battleships had joined in the fight. This was the 5th Battle Squadron of four ships.

"The situation was becoming critical for" Hipper. Scheer changed back to a northerly course to join as soon as possible. He sighted the engaged ships at 4:30.

"At 4:45, Squadrons I and III opened fire, while" Hipper, "with the forces allotted to him, placed himself at the head of the Main Fleet."

Scheer was firing at Beatty's light cruisers, which "veered at once to the west, and as soon as they were out of firing range, turned northwards" (Beatty started his turn at 4:42, three minutes before Scheer opened fire). The latter intimates that Beatty's cruisers and destroyers "were confused on sighting the German battle fleet ahead, and did not know which way to turn"; also that the 5th Battle Squadron, turning to follow Beatty, "came very much nearer to our Main Fleet, and we came on at a firing distance of 17 h.m. or less."

Scheer's leading destroyers made a torpedo attack, but without result.

Scheer's diagram shows his Main Fleet at 4:55, battleships in six divisions in line of bearing, firing at the 5th Battle Squadron, at a

range of about 17,000 yards and at Beatty's rear, at a range of about 19,000 yards.

The fighting which now ensued, developed into a stern chase. . . . Our ships in Squadron III attained a speed of over 20 knots. . . . By . . . the Fleet flagship, 20 knots was achieved and maintained. . . . The hope that one of the ships pursued would be so damaged as to fall a prey to our Main Fleet was not fulfilled. . . . Two modern destroyers, the *Nestor* and *Nomad,* were all that fell to the share of the main fleet.

At 5:20 . . . the leaders of the fleet were under the impression that the enemy was succeeding in getting away and gave orders [to Hipper] . . . and to all fighting forces "to give chase." Meanwhile the previously clear weather had become less clear and the wind had changed from N.W. to S.W. Powder fumes and smoke from the funnels hung over the sea and cut off all view from the north and east. Only now and then could we see our own reconnaissance [Hipper's] forces. . . . A message which was to have been sent by [Hipper] could not be despatched, owing to damage to the principal and reserve stations on his flagship [the *Lützow.* Hipper had apparently sighted Jellicoe's fleet and wished to report it].

When, therefore, enemy light forces began a torpedo attack on our battle cruisers, at 5:40, [Hipper] had no alternative but to maneuver, and finally bring the unit round to S.W. in an endeavor to close up with the Main Fleet, as it was impossible to return the enemy's fire. . . .

Early in the afternoon, Hipper knew Beatty was approaching the German Main Fleet on his fighting course, S.E. Beatty did not know the Main Fleet was out.

After his turn to N.W., Beatty was aware that his own fleet and the High Sea Fleet were approaching Jellicoe, who also knew this, but both Hipper and Scheer were ignorant of the fact that the entire Grand Fleet was at sea.

Beatty says that weather conditions became unfavorable after the turn,

our ships being silhouetted against a clear horizon to the westward, while the enemy were, for the most part, obscured by mist, only showing up clearly at intervals.

The 5th Battle Squadron turned 15 minutes after Beatty's cruisers. They came under fire of the leading German battleships, and the *Barham* (flag) and *Valiant*

supported our battle cruisers by their fire, whilst the two rear ships . . . the *Warspite* and *Malaya* engaged the leading ships of the enemy's Battle Fleet, as long as their guns would bear, at a range of about 19,000 yards.

Scheer's 20 knots was not fast enough. He fell to the rear of the British, as well as of Hipper, who, however, lost bearing on Beatty, while firing, at times "with some accuracy."

Beatty, as he gained, changed course to northward and eastward,

the range being about 14,000 yards. He states: "At 5:35, our course was N.N.E. and the estimated position of the Grand Fleet was N. 16 W." (on course S.E.)

The Germans, in chase, conformed to Beatty's changes of course. Hipper dared not close after the German battleships had fallen behind.

The entire Grand Fleet and the High Sea Fleet were nearing each other at the rate of nearly 30 knots per hour, on courses almost at right angles to each other, but the Germans, unlike the British, did not know this.

At four o'clock, Jellicoe had sent the 3rd Battle Cruiser Squadron, under Rear Admiral Hood, to re-enforce Beatty. Hood stationed his light forces as a submarine screen, and steered south by east, at 25 knots, in variable and decreasing visibility.

At 5:30, his light cruiser *Chester,* five miles on his starboard quarter, heard firing to the southwestward, and turned in that direction to investigate. At 5:36, she sighted an enemy cruiser and one or two destroyers, and turned west. During the turn, she sighted two more light cruisers, all within gun range, less than 8,000 yards, visibility being low.

The *Chester* turned towards the flag (*Invincible*), chased by the enemy and considerably damaged by enemy fire. Hood had seen the flashes and turned to starboard, bringing the enemy on his port bow.

At 5:55, Hood opened fire at a range of 10,000 to 12,000 yards. The Germans attacked with torpedoes, five of which were seen approaching at 6:10, and the three battle cruisers maneuvered independently to avoid them.

Jellicoe's advanced screen of armored cruisers, 16 miles ahead of the main body, had heard the firing at 5:40, and shortly after, the *Minotaur,* the third ship from the eastern end of the screen, saw ships emerging from the mist.

The screen was ordered to concentrate and engage, when fortunately it was discovered that the vessels were Hood's "engaged with enemy light cruisers to port."

After clearing the torpedoes, Hood sighted Beatty at 6:16. He hoisted the signal to form column "and turned to take station ahead of the *Lion*" (which had been heading a little south of east, but was then heading about east by north).

At 6:20, Hood sighted and engaged Hipper, at a range of 8,600 yards. A furious action ensued.

At 6:34, the *Invincible,* which had withstood a number of heavy

hits without much damage, "was struck [like the *Queen Mary*] in Q. turret." Its roof blew off; her magazine exploded. She broke in half and sank at once, with the loss of all hands except two officers and four men.

At the moment (6:16) that Hood turned to join Beatty, Jellicoe, who had been receiving conflicting reports as to the enemy's bearing, and who had changed course, first to south, and then to southeast, and reduced speed to 18 knots, decided to deploy to port, on a course S.E. by E., and made signal to that effect, having previously, at 6:08, directed his destroyer flotillas to take battle stations (Fig. 130d).

Deployment from line of divisions "would take some twenty minutes to complete the formation of the line of battle."

At 6:06, Rear Admiral Evan Thomas, with the 5th Battle Squadron, astern of Beatty, had sighted the *Marlborough,* leading ship of the starboard division of battleships, and thinking she was "leading the whole line" decided to take station ahead of her. Then he saw other divisions turning to port and executed the same maneuver with his squadron in order to fall in astern of the *Marlborough's* division. During the turn, the *Warspite's* rudder jammed. This forced her to continue turning towards the German battleships, then in sight, and she received such injuries as required her to steam for port, "considerably down by the stern."

Jellicoe reduced speed, during the deployment, to 14 knots, to allow Beatty to take station ahead of the battleship column. He said that this caused some "bunching" at the rear of the line (column).

After deployment, he fixed the fleet speed at 17 knots, since,

> Experience at all Fleet exercises had shown the necessity for keeping a reserve of some three knots of speed in hand in the case of a long line of ships. . . .
>
> . . . the *Marlborough's* Division . . . became engaged with some ships of the enemy's Battle Fleet, at 6:17 P.M., immediately after turning [to N.E.] for the deployment. At this time, fire was opened by the *Marlborough* on a ship stated to be of the *Kaiser* class, at a range of 13,000 yards, and on a bearing 20° abaft the starboard beam.

This ship belonged to Squadron III, which was the leading German battleship squadron.

Jellicoe had waited until the last minute to take his battle formation, and, as it was, the bunching of his ships and the second turn caused overlapping and some blanketing of his fire.

At 5:40, being attacked with torpedoes, Hipper had reversed course to S.W. to join the German main body. Scheer, shortly afterwards, 5:45, had reduced speed to 15 knots to close his battleships, which had become separated, in the endeavor to make 20 knots. He states

that his course, at this time, was northwesterly, but modifies this by saying that "our line by degrees veered around to the east," following the English.

His cruiser division, scouting ahead, had engaged the *Chester,* and meeting larger ships, had turned to close the main body, under protection of "artificial smoke," leaving the *Wiesbaden,* disabled under enemy fire at 6:02. He says,

> While this encounter . . . was taking place, we, on our flagship, were occupied in debating how much longer to continue the pursuit in view of the advanced time . . . we were bound to take into consideration that the English Fleet, if at sea, which was obvious from the ships we had encountered, would offer battle the next day. Some steps would have to be taken to shake off the English light forces before darkness fell. . . . I turned with the Fleet, two points to port to draw nearer the group and render assistance to the *Wiesbaden.* [He turned a fleet to aid a light cruiser.]

He gives a diagram of his position at 6:16, just before he turned two points to port, and at the moment when Jellicoe made the signal to deploy. Hipper had joined, and his squadron was close on the *König's* starboard bow. The course of the German battleship column was about N.E. by N., the light forces to starboard.

Scheer continues,

> A fresh unit of cruisers [enemy] bore down from the north. . . . It was now quite obvious that we were confronted by a large portion of the English Fleet, and a few minutes later, their presence was notified, on the horizon, directly ahead of us, by rounds of firing from guns of heavy caliber, the entire arc, stretching from north to east, was a sea of fire . . . though the ships, themselves, were not distinguishable. . . . The leaders of our battleship squadrons, the Fifth Division, [Admiral Behncke, in the *König*] turned at once for a running fight, carried on at about 13,000 m. The other divisions followed this movement, on orders signalled from the flagship. . . . [This turn was to starboard.]

Returning for a moment to the *Minotaur* and her consorts, which, at about 5:45, had withheld their fire on recognizing Hood's *Invincible* and her sister ships, at 5:47, the *Defence,* Rear Admiral Arbuthnot, with the *Warrior* astern, sighted several enemy light cruisers, bearing about south by west. Arbuthnot changed course three points to port, bringing them nearly on the starboard beam, commenced firing, his course E. by S., and then turned to the westward to bring them on the port bow. He again opened fire at 6:05 and shortly after passed ahead of the *Lion* close aboard.

The *Defence* and *Warrior* disabled the *Wiesbaden,* but immediately afterward came under the fire of the heavy ships of Hipper and Scheer. The *Defence* blew up, at 6:16, and the *Warrior* was badly damaged.

The two other ships of Arbuthnot's division, the *Duke of Edinburgh* and *Black Prince,* had tried to join the *Defence* and *Warrior,* but being unable to get across the *Lion's* bows, they turned to port. The *Black Prince* was never definitely seen again, though a wireless signal from her, at 8:48, reported a submarine in sight.

Scheer, after describing his engagement with the cruisers just mentioned, says, rather obscurely,

I could see nothing of our cruisers, which were still further forward. Owing to the turning aside, that was inevitable in drawing nearer, they found themselves between the fire of both lines. For this reason, I decided to turn our line and bring it on an opposite course. Otherwise an awkward situation would have risen around the pivot, which the enemy line, by degrees, was passing . . . a running artillery fight on a southerly course would not have been advantageous to us. . . .

He was capped, and the English had better visibility to the westward, than he to the eastward.

He gives a diagram of his position at 6:35, when he made the signal to turn to starboard and head *westerly.* (He said later, that he steered southwestward.) The diagram shows Hipper's battle cruisers, in column, steaming south and some distance ahead of the *König,* the leading German battleship. The other German battleships had followed in the *König's* wake as she turned from northeast to south, to avoid Jellicoe, so that the German column was a pronounced curve, convex to the north. A simultaneous turn to starboard of from 90 to 180°, of each ship of such a column, was a dangerous evolution, but Scheer was desperate, and his ships managed to avoid each other as they turned and withdrew from action, under cover of a destroyer smoke screen.

Scheer's turn away was made just before Jellicoe completed deployment, on course S.E. by E.

Scheer said

The enemy line did not follow our veer around . . . it . . . could have held us still further surrounded, if by a simultaneous turn to a westerly course, it had kept firmly to our line. It may be that the leader did not grasp the situation, and was afraid to come any nearer for fear of torpedo attacks.

Jellicoe's deployment, beginning at 6:16, required 22 minutes to complete. He says,

By 6:38, the remaining ships of the 5th Battle Squadron were in station astern of the *Agincourt,* the last ship of the line (Fig. 130e, p. 873).

Jellicoe had steamed at 14 knots during the deployment, "until the battle cruisers had formed ahead." They were clear, at 6:33, and speed was increased to 17 knots.

Some, or all, of the British battleships had been firing, during deployment, at whatever ships they could discern. The *Iron Duke* fired a few turret salvoes at the *Wiesbaden,* at 6:20, as did many other battleships as they passed.

At 6:30, the *Iron Duke* engaged what appeared to be the leading German battleship, at a range of 12,000 yards, on a bearing 20° before the starboard beam. It appeared as if all the enemy ships at that time in sight from the *Iron Duke* (not more than three or four, owing to smoke and mist), were receiving heavy punishment.

It was not possible . . . to distribute the fire of the battleships by signal, in the customary manner; the only course to adopt was for the captains to direct the fire of their guns on any target which they could distinguish.

. . . The van had hauled on to southeast without signal, shortly after deployment in order to close the enemy, and at 6:50 as the range was apparently opening [Scheer had turned to the westward] . . . the course was altered by signal to south. . . . The leader [*King George V*] had just anticipated this signal by turning south. The alteration was made "by divisions," instead of "in succession," in order that the enemy might be closed more rapidly.

It is evident that some of the enemy were still in sight, at 6:50, because Jellicoe says,

This large turn (of four points) "by divisions," involved some small amount of blanketing . . . at one time the *Thunderer* was firing over the bows of the *Iron Duke,* causing some slight inconvenience on the bridge of the latter ship. . . .

The *Marlborough,* flagship of Vice Admiral Burney, was struck by a torpedo, and later avoided three more torpedoes by using her helm. She reported re-opening fire, at 7:03, and beginning at 7:12, fired fourteen salvoes at a ship of the *König* class.

Jellicoe, after forming line of bearing, by divisions, on course south, formed column on the same course, and at 7:05 formed line of bearing, south, on course S.W. by S., to close the range.

At 6:55, he had passed the wreck of the *Invincible,* "the center portion apparently resting on the bottom . . . the bow and stern standing out of the water." [Part of the action was fought in water not exceeding 15 fathoms in depth.]

Between 7:00 and 7:30 P.M., the Battle Fleet was again in action with battleships, and also with battle cruisers, as they could be distinguished in the haze, which at that period was very baffling.

The renewal of the action between capital ships was brought on by Scheer, who had a change of heart. He says,

. . . if the enemy followed us, our action . . . would partake of the nature of a retreat, and in the event of any damage to our ships in the rear, the Fleet would

be compelled to sacrifice them. . . . Still less was it feasible to strive at detaching oneself from the enemy, leaving it to him to decide when he would elect to meet us the next morning. There was but one way of averting this—to force the enemy into a second battle by another determined advance, and forcibly compel his torpedo-boats to attack. . . .

This reasoning is not very clear.

Scheer continues:

. . . the fight of the *Wiesbaden* helped also my resolve to make an effort to render assistance to her and at least save her crew. Accordingly, after we had been on the new course [west or S.W.] about a quarter of an hour, the line was again swung round to starboard, on an easterly course at 6.55. The battle cruisers were ordered to operate full strength on the enemy's leading point, all the torpedo-boat flotillas were ordered to attack, and the First Leader . . . was instructed to send his boats to rescue the *Wiesbaden's* crew. . . .

Scheer, having been on a southwesterly course for about a quarter of an hour, should have opened the range by about 5,000 yards by his own movement. Jellicoe, not having been steering south during all of this time, must have added to the separation of the two battle lines. He does not mention any general cessation of fire, so it appears that up to the point when Scheer went about again and steered easterly courses, the two fleets had not entirely lost sight of each other.

Scheer says, ". . . the battle that developed after the second change of course . . . became the same running fight as the previous one, in order to bring the whole of the guns into action." That is, his head of column kept turning to starboard. He continues,

This time, however, in spite of "crossing the T," the acknowledged purpose was to deal a blow at the center of the enemy line.

The behavior of the battle cruisers is specially deserving of the highest praise . . . obeying the given signal "at the enemy," they advanced recklessly to the attack. The ships suffered all the more, as they could see little of the enemy . . . while they . . . apparently offered a good target. . . .

He also commended highly the conduct of Rear Admiral Behncke, who commanded the leading squadron of battleships.

He gives a diagram showing his torpedo flotillas advancing to the attack at 7:17.

Flotillas VI and IX . . . carried the attack to within 70 h.m. against the center of a line, comprising more than twenty large battleships, steering in a circle, E.S.E. to S. . . . all other boats returned, and in doing so, sent out dense clouds of smoke between the enemy and our own main fleet. . . .

At the same time, Scheer again "swung around on to a westerly course," all ships turning simultaneously to starboard, except his flagship, the *Friedrich der Grosse,* which turned to port by his order.

". . . my intention to get through and save the ships in front of the *Friedrich der Grosse* from a difficult situation, was rightly understood. . . ."

At this time, the *Iron Duke* was engaging "a hostile battleship at 15,000 yards range and on a bearing 74 degrees from right ahead. At 7:20, she trained her guns on a battle cruiser of the *Lützow* type, abaft the beam, which had hid herself by a destroyer smoke screen."

The *Lützow,* Hipper's flagship, had been so badly damaged that he had been "compelled at 7:00, to leave the ship under the enemy's fire and transfer to the *Moltke*. . . ."

As previously stated, Jellicoe had changed course in line of bearing to S.W. by S., at 7:05. At 7:10, a submarine was reported and he observed a German flotilla of destroyers, supported by a cruiser, approaching on S. 50 W. He at once changed course to south (column) and opened fire on the destroyers at 10,000 to 6,500 yards.

> At the latter range, the destroyers turned and passed towards the rear of the line, under a heavy smoke screen.
>
> . . . at a sufficient interval before it was considered that the torpedoes . . . would cross our line, a signal was made . . . to turn two points to port by subdivisions. [The first and third ship of each division turned on signal. The second and fourth followed in the wakes of the first and third, respectively.] . . . some minutes later, a report was made to me that this turn was insufficient to clear the torpedoes . . . a further turn of two points was then made, for a short time.
>
> Some twenty or more torpedoes were observed to cross the track of the Battle Fleet in spite of our turn . . . they were all avoided by the very skilful handling of their ships by the captains. . . . The captains were most ably assisted by the admirable look-out of the organization that existed for dealing with this danger.
>
> The total amount by which the range was opened by the turns (away) was about 1750 yards.

Jellicoe says that a light cruiser squadron and two destroyer flotillas whose action stations were in the van, did not reach there until 7:10. They were immediately ordered to counter the German destroyer attack, but were successful only to the extent of causing the Germans to launch their torpedoes at ranges above 7,000 yards.

He continues:

> The destroyer attacks were combined with a retiring movement on the part of the enemy's Battle Fleet, the movement being covered with the aid of a heavy smoke screen . . . this retirement was not visible from the *Iron Duke* . . . and was . . . not known to me until after the action. It was clearly seen from the rear of our line. . . .

The Grand Fleet took up a south by west course, at 7:33—and at 7:59 turned west without sighting the enemy. The day action was

over. Scheer's last turn away had begun one hour after Jellicoe started to deploy.

After 7:17, the High Sea Fleet's only thought was to escape. Jellicoe's cruisers did not keep touch with the Germans, nor did Scheer's cruisers keep touch with the British. Neither commander-in-chief knew where the other was, nor made any persistent effort to find out. The night engagements which ensued were fiercely fought, but were entirely accidental and not premeditated.

Scheer states that after his turn at 7:17 to a westerly course, he changed to

a southwesterly, southerly, and finally to a southeasterly course to meet the enemy's encircling movement and keep open a way for our return [to port].

. . . if we could succeed in warding off the enemy's encircling movement, and could be the first to reach Horn's Reef, then the liberty of decision for the next morning was assured to us. . . . The Main Fleet, in close formation, was to make for Horn's Reef by the shortest route, and defying all enemy attacks, keep on that course. . . . The leaders of the torpedo-boats were instructed to arrange night attacks for the flotillas . . . a great many of the boats had fired off all their torpedoes during the battle. Some [of these] were left behind for the protection of the badly damaged *Lützow* [which subsequently sank].

While endeavoring to reform the Main Fleet, which was in disorder largely as the result of Scheer's counter-march and the slow speed of Battleship Squadron II, the Germans came into contact with enemy ships. Their leading ships—cruisers, battle cruisers, and battleships—again withdrew; this time without signal, causing still greater confusion. As there was no pursuit, however, Scheer managed to partially re-form his fleet. He writes,

Attempts to bring the admirals ahead were abandoned, owing to the darkness and lack of time. The conduct of the line was entrusted to Captain Redlich of the *Westfalen.*

At 9 P.M., the head of the line stood at 56°, 37′, north latitude, and 5°, 31′, east longitude. At 9:06 P.M., the order for the night was "course S.S.E. ¼ E., speed 16 knots."

Jellicoe says that the Germans ". . . were located for a moment, at 8:20 . . . disappeared again at once . . . they were once more located and effectively engaged" (by Beatty) between 8:22 and 8:28 P.M. at about 10,000 yards range. They turned away once more, and were finally lost to sight by the 3rd Light Cruiser Squadron (the last ships to keep in touch) at 8:38 P.M., steaming to the westward.

Beatty, after Scheer's turn at 7:17, continued to fire for three minutes. His next and last opportunity was, as stated, for six minutes, between 8:22 and 8:28.

Jellicoe's conclusion was that the enemy was well to the westward. He says,

> The situation . . . had never been at all clear to me, owing to the fact that I had not seen more than a few ships at a time. . . .
>
> The possibility of a night action was, of course, present to my mind, but for several reasons it was not my intention to seek such an action between the heavy ships . . . the result of night actions between heavy ships must always be very largely a matter of chance, as there is little opportunity for skill on either side. . . .
>
> The question then remained as to the course to be steered . . . to keep the British Fleet between the enemy and his bases, so as to be in a position to renew the action at dawn. . . .
>
> I considered that a southerly course would meet the situation . . . and if I put the destroyers astern . . . they would be in an excellent position for attacking the enemy's fleet should it also turn to the southward, with a view to regaining its bases during the night . . . they would be clear of our own ships, and the danger of their attacking our battleships, in error, or our battleships firing on them, would be reduced to a minimum. Accordingly, at 9 P.M., I signalled . . . course . . . south [by divisions].

His diagram shows line of squadrons, interval, one mile. Beatty and the commanders of light cruiser squadrons were ordered to conform. After the battleships were formed, ". . . the destroyer flotillas were directed to take station, five miles astern." At 9:32, the *Abdiel,* minelayer, was signaled

> to lay a mine-field in a defined area, some 15 miles from the Vyl Lightship, over which it was expected the High Sea Fleet would pass, if the ships attempted to regain their ports during the night, via the Horn Reef.
>
> At 10 P.M., the position of the *Iron Duke* was Lat. 56, 22, N., Long. 5, 47, E., course south, speed 17 knots.

This position was some 15 miles south and 10 miles east of Scheer's estimated position, an hour earlier, and Scheer was steering S.S.E. ¼ E. at 16 knots. He says his destroyers were stationed "in an E.N.E. and S.S.W. direction, which was where the enemy Main Fleet could be expected." (S.S.W. appears to be a misprint. It should read W.S.W.)

Assuming the positions, as stated by the two Commanders-in-Chief, to be approximately correct, it will be seen that at 10 o'clock the head of the German fleet was about to cut across the rear of the British fleet, at an angle of about 25 degrees. With this small difference in courses, and a difference of but one knot in speeds, the two fleets, once in contact, were sure to remain so for a long time, and such proved to be the case.

From 10:04 P.M. until after 2 A.M. there were fierce encounters between destroyers and cruisers of both fleets and some of the German

battleships were engaged. Intentional and accidental rammings of friends and foes occurred. A true mêlée! Visibility was reported as from 2,000 to 3,000 yards. On the whole, the Germans were the greater sufferers, losing the *Pommern* by torpedoes. Scheer says:

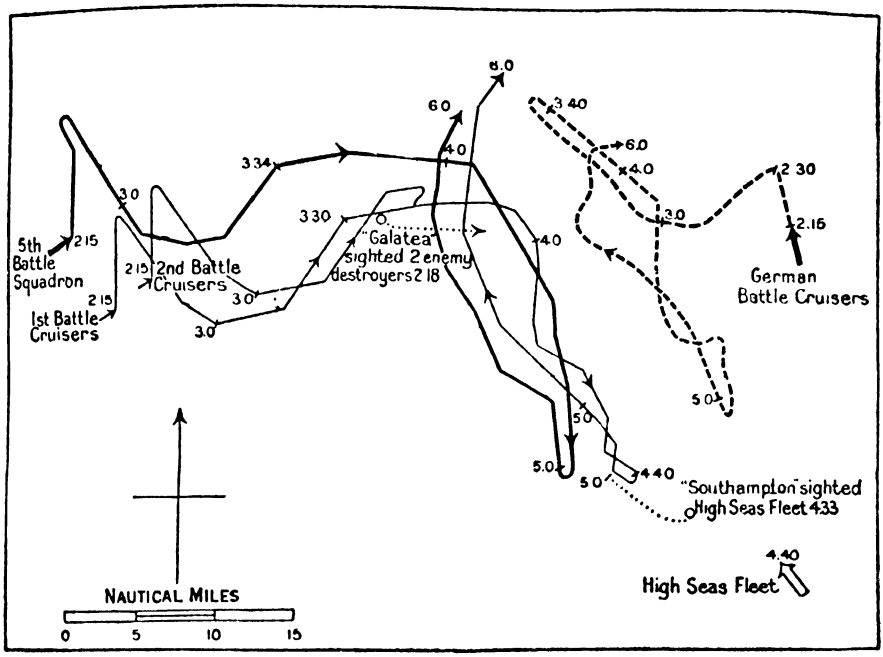


FIG. 130c.—First Contact of Opposing Fleets and the Battle Cruiser Action. (*Courtesy Encyclopaedia Britannica*)

To meet these attacks in time, bring the enemy under fire, and by suitable maneuvering evade his torpedoes, demanded the most careful observation on board the vessels. Consequently the line was in constant movement, and it required great skill on the part of the commanders, to get into position again. . . . Very little use was made of the search-lights. It had been proved that the fire from the attacking boats was aimed chiefly at these illuminated targets.

The *Lützow* was kept afloat until 1:45 A.M. . . . all efforts to stop the water pouring in were fruitless. . . . The crew, with all the wounded, were taken off by the torpedo-boats . . . and the *Lützow* was sunk by a torpedo . . . [to prevent her falling into enemy hands].

On arriving at Horn's Reef, at 3 A.M., I decided to remain there and await the *Lützow*. I had not then heard of her fate.

As the enemy did not come down from the north, it was evident that he was retiring.

. . . the reports received from the battle cruisers showed that Scouting Division I would not be capable of sustaining a serious fight, besides which, the leading ships

of Squadron III could not have fought for any length of time, owing to the reduction in their supply of munitions by the long spell of firing. The *Frankfurt*, *Pillau*, and *Regensburg* were the only fast light cruisers now available, and in such misty weather, there was no depending on aerial reconnaissance. There was, therefore, no certain prospect of defeating the enemy reported in the south [by the *L-11*].

An encounter and the consequences thereof, had to be left to chance. I therefore abandoned the idea of further operations and returned to port. On the way back . . .

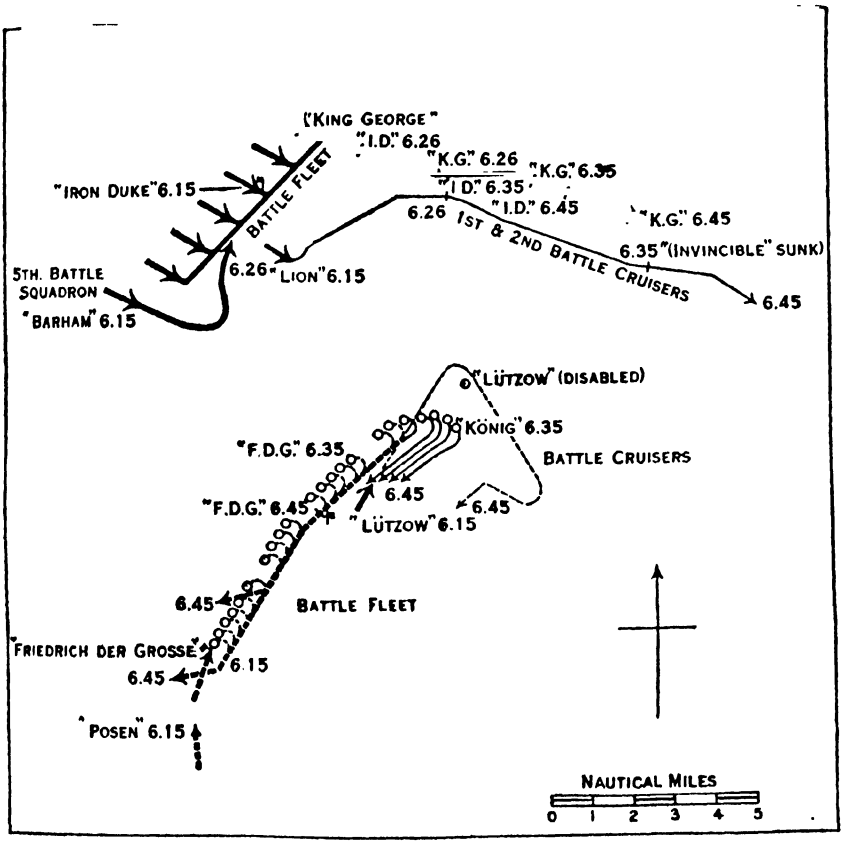


FIG. 130d.—Deployment of British Battle Fleet and First Retirement of the German Fleet. (*Courtesy Encyclopaedia Britannica*)

the *Ostfriesland*, at 5:30 A.M., struck a mine, one that evidently belonged to a hitherto unknown and recently laid enemy mine field [*Abdiel's*]. The damage was slight. . . . Several submarine attacks failed entirely.

Special mention must be made of the bringing in of the *Seydlitz* (Captain von Egidy), badly damaged at her bows. That the vessel ever reached harbor, is due to the remarkable seamanship of her commander and crew.

During the course of the day, all ships and boats were safely in their haven.

Turning now to Jellicoe's account of the night actions and his subsequent movements:

At 1:45 A.M., Captain Stirling, leading the flotilla [12th] in the *Faulknor,* sighted on the starboard bow, this battleship squadron, consisting of six ships, steering southeast. He paralleled their course, increased speed to 25 knots, attacked at 2 A.M., at an estimated range of 3,000 yards, and is believed to have sunk the *Pommern.*

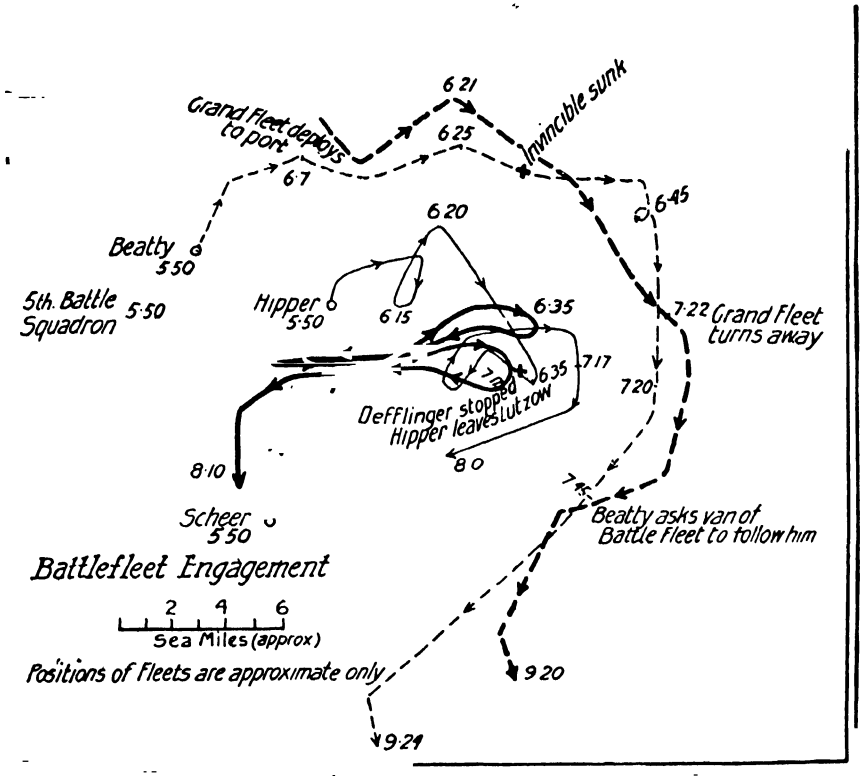


FIG. 130e.—Battle of Jutland, May 31, 1916. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

When Captain Stirling had located the enemy s battle squadron, he reported the fact by wireless, but the signal was unfortunately not received by any ship. . . .

Shortly before the turn of the Fleet to the southward, for the night, a destroyer attack took place on the 2nd Light Cruiser Squadron. . . . This was reported to me shortly after 9 P.M., but . . . a further report stated that the enemy had been driven off to the northwest.

From the Battle Fleet, it was evident, shortly after dark, that our destroyers were in action. Star shells were fired with great frequency by the enemy. . . .

Gun-fire and under-water explosions were heard at intervals during the night. . . .

At 2:45 A.M., as dawn was breaking, the Fleet altered course to north, and

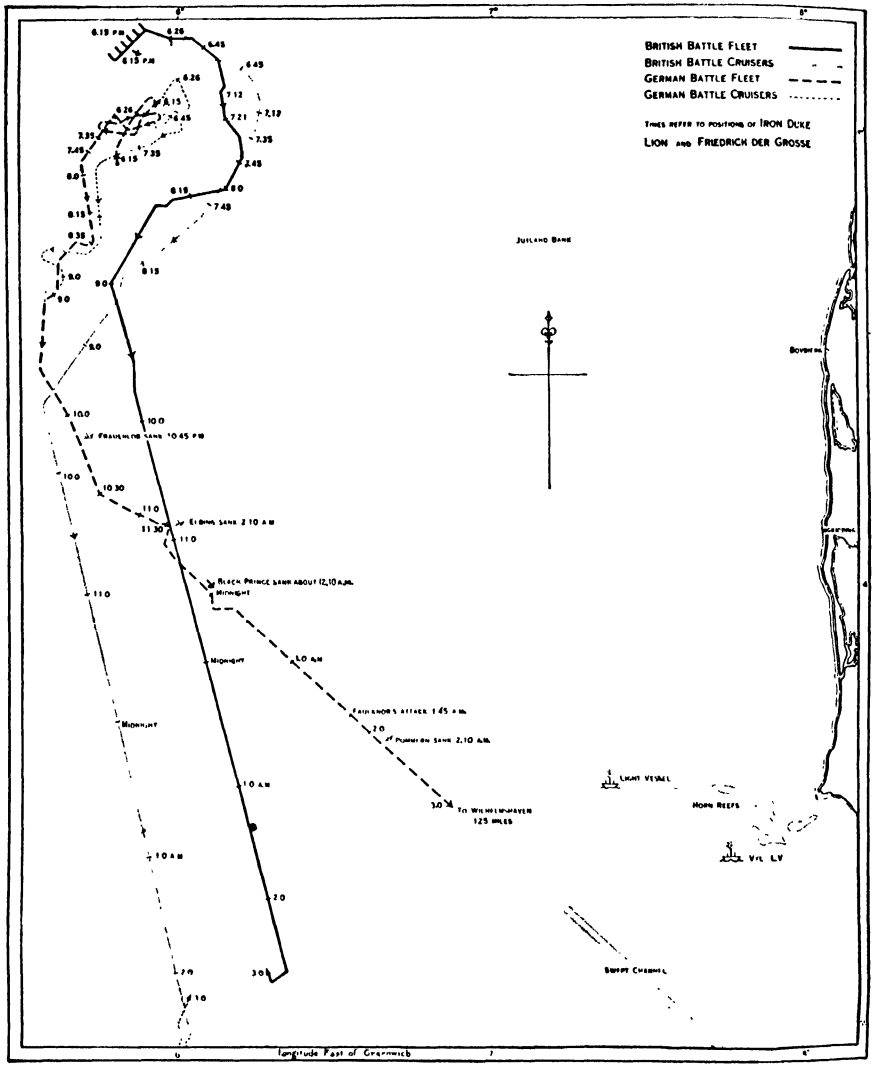


FIG. 130f.—Course of Main Action and Escape of German Fleet (6:15 P.M. to 3:00 A.M.). (*Courtesy Encyclopaedia Britannica*)

formed single line ahead. . . . [This was 13 minutes before Scheer arrived off Horn's Reef.]

The weather was misty and visibility even less than on May 31, being only some three or four miles.

I was not in touch with either my cruisers or destroyers.

The 6th Division of the Battle Fleet was not in sight . . . having dropped

astern during the night, owing to the reduction in speed of the *Marlborough* and the change of flag [Vice Admiral Burney] . . . to the *Revenge*.

The *Marlborough* could only make 12 knots, and at 2 A.M. was directed to return to port, after transferring Burney's flag.

. . . considerable difficulty was experienced in collecting the Fleet. . . . The cruisers were not sighted until 6 A.M., and the destroyers did not join the Battle Fleet until 9 A.M.

Errors in dead reckoning, as the result of the night actions, had made the positions of destroyers and cruisers uncertain, and low visibility added to the difficulty of rejoining.

. . . the 6th Division of the Battle Fleet, with the Vice Admiral of the 1st Battle Squadron, was not in company until the evening.

It was obviously necessary to concentrate the Battle Fleet and the destroyers before renewing action.

This separation of fleet units "rendered it undesirable for the Battle Fleet to close the Horn Reef at daylight, as had been my intention, when deciding to steer southward during the night."

The Zeppelin *L-11,* which had sighted the British at daylight and reported to Scheer, was sighted by the British at 3:30 A.M., and fired on.

Jellicoe heard the firing and received a report that the *L-11* was to the westward. "Course was altered by divisions to west, at 3:44 A.M., as it seemed that the presence of the airship might possibly indicate the presence of the High Sea Fleet." Seeing nothing but the Zeppelin, he returned to his former course, and at 4:10 formed line of divisions "to widen the front and reduce the risk of submarine attack."

At 5:15 A.M. the Battle Cruiser Fleet joined the Battle Fleet. The Battle Fleet subsequently steered various courses at 17 knots, searching for a German cruiser and some destroyers reported as having been seen, and endeavoring to join its own destroyers.

Between 8 A.M. and 9 A.M., a considerable amount of wreckage was passed and the bodies of dead German blue jackets were seen in the water. . . . Drifting mines were seen in considerable numbers the whole forenoon.

At noon, "I decided to return with the whole fleet."

Commenting on Jellicoe's account, Scheer wrote,

Nor can it be understood how it was that the enemy's light forces, which were engaged with our Main Fleet up to 2:36 A.M., and thus were in touch with us the whole night, could [not?] find a way to inform Admiral Jellicoe and Admiral Beatty of our course and navigation. . . . In any case, it is a fact that on the morning of June 1, the enemy's heavy forces were broken up into three detachments; one in the north, a second with Admiral Beatty in the northwest, and the third with Admiral Jellicoe, southwest of Horn's Reef. It is obvious that this scattering of

the forces—which can only be explained by the fact that after the day battle, Admiral Jellicoe had lost the general command—induced the Commander to avoid a fresh battle.

With dawn, on June 1, at 2:47, and Scheer at that time within about five miles of Horn's Reef, had Jellicoe preceded him there, the two fleets—both badly formed, or not formed at all—would have met under circumstances that could only have resulted in a mêlée. But despite the absence of their destroyers, battle cruisers, and a division of battleships, the advantage should have been with the British.

It is possible that mine-fields, the general location of which were known to both fleets, made maneuvering near Horn's Reef too dangerous to risk an action there.

It appears that Jellicoe, while deliberately avoiding a night action with his heavy ships, expected his rear-guard of destroyers and cruisers to be engaged, but did not inform them of his expected position at daylight. The Germans all knew their objective—Horn's Reef, but the British ships, or groups, separated from their Commander-in-Chief, had no rendezvous for which to steer.

It was possible for Jellicoe to have communicated his intentions more definitely to his fleet than he seems to have done, immediately after making his dispositions for the night at 9:00 P.M.

We have given this account of the greatest sea battle of modern times, practically in the words of the two commanders-in-chief. Some of their technical comments remain to be added.

Scheer said that, during the war,

> Owing to our shortage of cruisers, our scouting was inadequate and had to be supplemented by aerial means. Before any encounter with the enemy, and during an advance, every precaution had to be taken to prevent our being exposed to any damage from submarines; moreover, a careful search for mines, the driving away of enemy submarines from our coastal waters, precautions to be observed by torpedo-boats against submarine attacks, and the highest possible speed under way, were all matters of the greatest importance.

In the matter of cruising at battle speed, Jellicoe was of the same opinion as Scheer, subject to his experience that a reserve of three knots should be kept, except in emergencies.

Scheer says further:

> In order not to keep the entire Fleet constantly under steam, and thus overtire both men and machinery and use up material to no purpose, and yet provide that they should be ready with considerable forces for any enemy enterprises, an outpost service was organized.
>
> In the Jade, there lay in readiness, a squadron of battleships, two battle cruisers, a cruiser leader of torpedo-boats, and a torpedo-boat flotilla; a scouting division of

light cruisers were in the Jade and the Weser, a torpedo-boat flotilla in Heligoland harbor, half the ships of Squadron II in Cuxhaven Roads . . . and if sufficient torpedo-boats were available another half flotilla was stationed in the Ems, or in List Deep (at Sylt), constituting, approximately, half the total forces of the High Sea Fleet.

The ships were kept clear to put to sea from their stations, three-quarters of an hour after the order reached them [except the flotilla at Heligoland, which was always ready to get under way].

At the British main base, Scapa Flow, ships raised steam for 18 knots, at two hours notice. At other times they were free to work on machinery upkeep.

The organization for getting to sea, and returning to the base anchorage, was elaborate and effective in its precautions against submarine and mine attacks, and against the very strong tides of Pentland Firth, which crossed the harbor entrance.

The "departure" organization was based on clearing the harbor of the entire fleet "in an hour and a half after the signal was made to proceed. On dark nights, this time was lengthened by half an hour."

A different organization for leaving in a fog was made, but never used.

Scheer discusses the tactical co-operation of submarines with surface ships in battle. ". . . no preliminary work had been done in that respect, and it would have been a very risky experiment to take U-boats into battle without a thorough trial. The two principal drawbacks are their inadequate speed and the possibility of their not distinguishing between friend and foe." Decision was reached to employ them off the entrances to enemy bases, when not engaged in "trade warfare," and none were with the fleet at the battle of Jutland, although so reported by the British.

On the moot question of the position of the commander-in-chief, Scheer remarked,

In the fighting line, the Commander-in-chief of the fleet is not tied to any fixed position. When there is a question of leading several squadrons, it is not advisable to take up a position at the head of the line, as it is not possible from there to watch the direction in which the fight develops, as that greatly depends on the movements of the enemy. Being bound to any such position, might lead to the Commander-in-chief finding himself at the rear, instead of at the head of his assembled line.

A position in the center, or at a third of the line (according to the number of units) is more advantageous.

In the course of events, the place of the eighth ship in the line for the flagship has been tested and approved of. [He is speaking of the battle line of the High Sea Fleet, as it then existed.]

From this position, during the battle of Jutland, he said, ". . . the whole time that fighting was going on, I had a clear look-out over the whole line" (more than 10 kilometers in length) "and was able to signal with great rapidity in both directions."

Jellicoe, in the *Iron Duke,* led the Third Division of the British battle line, of six divisions of four ships each. He says:

> It will be observed that all the large alterations of course by the Battle Fleet during the engagement were made by divisions, instead of "in succession from the van, or together."
>
> The reason was, that in this way, the whole fleet could be brought closer to the enemy with far greater rapidity, and in a more ordered formation, than if the movement had been carried out by the line "in succession."
>
> The objection to altering by turning all ships together was the inevitable confusion that would have ensued as the result of such a maneuver, carried out with a very large Fleet, under action conditions in misty weather, particularly, if the ships were thus kept on a line of bearing for a long period.

Jellicoe considered German search-lights, at that time, excelled those of the English, and that ship compartmentation, and distribution and thickness of armor on German battle cruisers were also superior. That the latter were much better battle units was amply proved. They withstood much greater punishment than any of Beatty's, from the guns of battleships, as well as from those of Beatty's battle cruisers. Nevertheless, it was only by good fortune that the *Seydlitz* got into port. The *Lützow* finally sank, and the *Derfflinger* was practically hors de combat. Of Beatty's nine battle cruisers, three were completely and almost instantaneously destroyed, but he had six others, while Hipper had only two of his original five in fighting condition.

Continuing Jellicoe's comments:

> There is no doubt at all, that the German organization for night action was of a remarkably high standard. In the first place, the use of *star shell,* at that time unfamiliar to us, was of the greatest use to them in locating our destroyers without revealing their own positions. . . . It also appeared that some system of director firing was fitted to the guns of their secondary armament.

In his "Reflections on Battle," he says,

> The Battle of Jutland was the first Fleet action since Trafalgar, if we except the actions in the Russo-Japanese War, and advantage was naturally taken of the experience to make some changes in the Battle Orders; but there were *no* surprises in the way of enemy tactics, and therefore, no radical alterations were necessary.
>
> As the Chief of Staff remarked to me during the Battle Fleet engagement: This is all going according to expectations. We did, however, obtain confirmation of our views as to the probable retiring tactics [smoke screen?] that would be adopted by the German fleet.

According to Jellicoe, the principal changes in standing orders were

emphasizing the discretionary power of "Flag officers commanding Squadrons" owing to the difficulty which the Commander-in-Chief would experience in controlling the whole fleet in the heat of action, and

defining still further, the different movements that might be adopted to deal with torpedo attacks . . . stress was once more laid on the policy of keeping the center and rear of the Battle Fleet outside torpedo range from the enemy's battle line *in ordinary circumstances.*

Grand Fleet Battle Orders already recognized "The necessity for wide decentralization of command . . . combined with a close watch on the movements of the Commander-in-Chief, with which flag officers should generally conform."

Circumstances which might call for independent action of Flag Officers were low visibility, smoke from stacks and guns, and lack of communication.

The instructions as to my intentions as the Commander-in-Chief, in regard to the ranges at which the opening phases of the action should be fought, remained unaltered.

If the battle formations and tactics of the two combatants—except Scheer's counter-marches—are compared with those advocated in the essays of Knox no substantial differences will be found.

This shows that similar tactical maxims governed the battle dispositions of two of the principal naval powers, in 1916, and, very probably, those of all others.

The losses in killed and wounded in the battle of Jutland were: Germans, 3,076; British, about 6,600.

The tonnage losses were nearly in the same proportion: German, 60,190; British, 111,980.

The Germans lost one battleship, one battle cruiser, and four smaller cruisers.

The British lost three battle cruisers and three armored cruisers.

The British had two battleships badly damaged. The Germans had three battleships and two battle cruisers badly damaged.

British torpedoes seem to have made more hits than German torpedoes.

Frost's compilation, published by the U. S. Office of Naval Intelligence, 1924, gives the number of hits made by main battery guns: British, 110; German, 150.

The Austro-Hungarian Naval Attaché made a report to his govern-

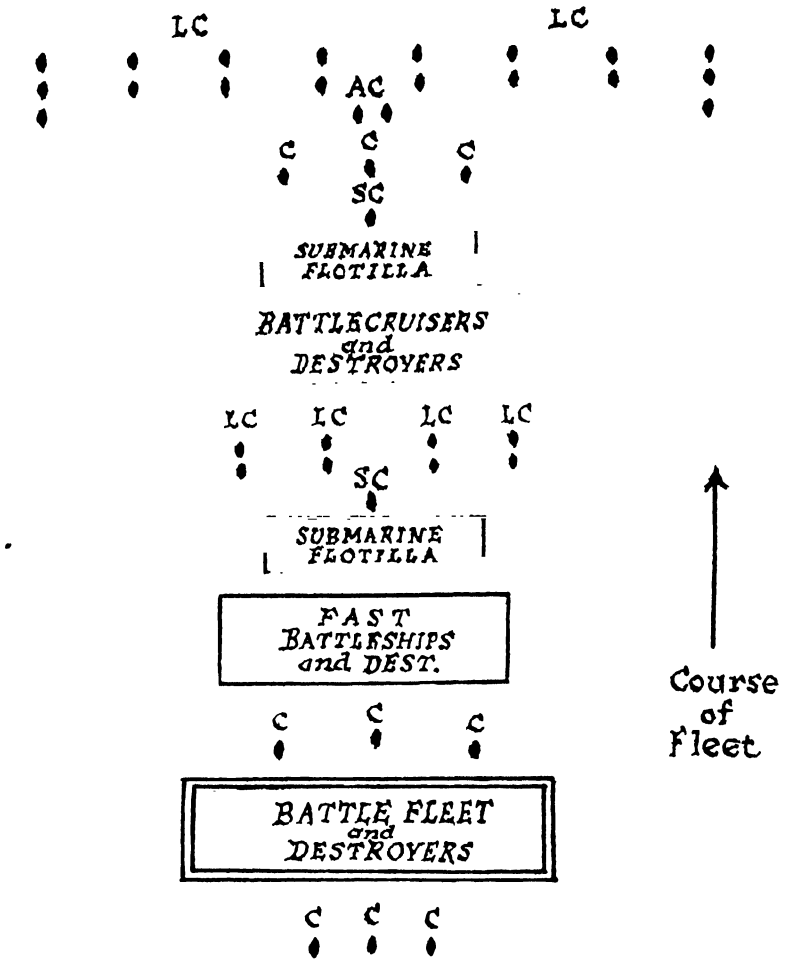


FIG. 131.—A Grand Fleet Cruising Formation—All Units Present.
(Scale: 1 inch = 10 mi.)

ment, as the result of a three day visit to the High Sea Fleet, shortly after its return. It reads, in part:

The fleet is absolutely enthusiastic and intoxicated with victory . . . the technical supremacy over the enemy has been ascertained; it is now known that the right course has been pursued, and that there is no need of changing methods; it is known that the perforating effect of their [German] projectiles is more effective than that of the enemy; it is known that it is possible to have absolute faith in the flotillas which were always considered by the Germans to be the principal factor in naval warfare. Finally, it is known that the great ships can withstand the violent fire of artillery and the greatest damages . . . and that they are not easily sunk.

The English naval technique and the immense perforating effect, at the greatest distances of large caliber projectiles, made a great impression because they exceeded all expectations. . . .

There is not the slightest danger that such well balanced heads as those of Admiral Scheer and his Chief of Staff will allow themselves to be tempted by their success and venture in future in risky adventures.

They do not deny that they had wonderful luck. . . .

Further information on British cruising and battle formations, which are pertinent to a study of this battle are given in *The Journal of the Royal Artillery* for April, 1921 (Fig. 131, p. 880).

Commander R. F. Seymour, R.N., a member of Admiral Beatty's staff, during the war, and afterwards on duty in the Admiralty's Tactical Section, delivered a lecture to the "Royal Artillery Institution" on "The Conduct of a Naval Battle." He showed a Grand Fleet cruising formation, and a battle formation, presumably official. He said:

A battle at sea . . . under modern conditions, is fought at extremely high speed, with the Fleets engaged over a wide area. . . . Perhaps the two most important factors in a sea-battle, may be said to be *time* and *weather* . . . the exactly right timing of the attack is of almost more importance than the actual material gain or loss resulting from it . . . an attack made a moment too soon may be a stroke in the air, and an attack made a moment too late may miss an opportunity which will probably not occur again for many months.

The weather . . . is almost as much a cause for thought and trouble to an Admiral as the actions of the enemy himself . . . again, although in battle, too much reliance should not be placed on signals . . . yet the Commander-in-Chief can, by his own personal movements—the movements of his flagship—by his own personal effort and will, very largely dominate or retrieve a situation in battle.

Referring to Nelson's Memorandum, Commander Seymour speaks of his decision

to expose his ships during the mutual contact to greater risk of damage, in order to defeat those two factors—time and weather . . . of course, there is a limit to the risks to which ships can be exposed on initial contact.

The Admiralty issues instructions dealing with the general principles on which a battle is fought and the Commander-in-Chief issues his standing instructions as to the different tactics he will pursue under different circumstances . . . according to what Force is placed under his command.

The Admiralty system was evolved over one hundred years ago. . . . Fighting Instructions, Tactical movements and all the Signals . . . were compressed into one Volume, the Signal Book, and the Signal Book formed the basis of Tactical Training for the whole Navy.

. . . for the last ten years before the war, a tremendous effort was made and the Fighting Instructions were separated and taken out of the Signal Books. The books themselves were revised, but, unfortunately, when war broke out, these new books were never actually put in force, and during the war, the instructions on which we acted and on which we fought . . . were the Grand Fleet Battle Instructions. which were Tactical Orders, built up by the Commander-in-Chief of the Grand

Fleet. . . . They were separated from the Signal Book . . . and not perfectly co-ordinated with it.

. . . we have now reverted to a system of Admiralty Instructions, dealing with general principles, which will form a basis for tactical training . . . throughout the Service, and the Commanders-in-Chief issue their own particular fighting instructions and plans for the Forces under their command.

Seymour describes a Grand Fleet cruising disposition, as follows:

We have the advanced line of light cruisers disposed about five miles apart, and about 35 miles ahead of the Battle Fleet . . . as a look-out screen.

Positions 10 miles further ahead are provided for airships or aircraft and for an air screen at visibility distance ahead of the Light Cruiser screen. [Astern of the center of the air screen] we have the aircraft carriers . . . on the enemy being reported it was the function of those aircraft carriers to despatch further aircraft, to look out for and discover the enemy.

In the rear of the light cruiser screen were stationed the supports, which included the battle cruisers and their accompanying destroyers.

The light cruiser screen, the supports, and the aircraft carriers comprised the Battle Cruiser Force.

It was not invariably stationed in the manner just described, and could be employed independently.

Astern of the battle cruisers is the reserve screen . . . of light cruisers.

Two submarine flotillas usually accompanied the Fleet . . . [J&K classes] they had a surface speed which enabled them to keep with the Fleet. . . . They acted independently from the time the enemy's main Battle Fleet was reported. [There were no submarines with either fleet at Jutland.]

Astern of the reserve screen is the fast Battle Squadron, which acted as supports to this reserve Light Cruiser Line. Next astern are the linking ships: . . . and finally there is the Battle Fleet, consisting of about 36 battleships and about 100 attendant destroyers.

The method of reporting the enemy . . . is very rigidly laid down.

One of the factors governing the cruising disposition used to be that every unit had to be within sight of its next outer ship or unit, because when we went to sea, it was of the utmost importance that we should not touch a wireless key . . . before the enemy was encountered.

. . . enemy reports, when sent off by wireless . . . are received by all Commanders of Units and individual ships . . . and they are plotted on a board.

. . . certain ships in the Fleet were fitted with directional wireless . . . [and shore wireless stations took bearings of the enemy's wireless signals and informed the Commander-in-Chief].

A fleet track chart was kept and all reports of enemy positions plotted on it.

In the World War, the Grand Fleet Battle Instructions provided that the first duty of the Commander-in-Chief was to place his fleet between the Germans and their base, and secondly, "to dispose the guides of the Battle Fleet at right angles to the bearing of the center of the enemy." (Cf. Ward, 1859.)

In his diagram of a battle formation of the Grand Fleet, Commander Seymour shows in the van, three light cruiser squadrons, in column, followed by the battle cruisers and their screening destroyers. A fourth light cruiser squadron astern of the battle cruisers; then, the destroyer screen of the leading squadron of battleships. All units so far listed are in an approximate line of bearing, inclined towards the enemy, and about two points from the course.

The battle fleet follows, in division, or squadron columns, with their screen of destroyers astern, and on the quarter towards the enemy, and two light cruiser squadrons on the quarter of the rear battleship squadron towards the enemy. . . .

The battle cruisers, in battle, were to engage the enemy's battle cruisers and to prevent them from interfering in any manner with the attack of our torpedo craft.

The function of the Light Cruiser Squadrons is . . . to prevent the enemy's destroyers . . . from interfering with, or making their attack on our own Battle Fleet and also to clear the way for our destroyers to make their torpedo attack on the enemy.

The Unit of attack for a destroyer Flotilla is that they move out by Flotillas, but their actual handling is by half Flotillas. The first half Flotilla's function is to deal with any of the enemy's destroyers with which the Light Cruiser Squadrons have failed to deal, while the second half makes its attack with torpedoes . . . if they do not meet with opposition, both the Light Cruisers and the first half Flotilla fire their torpedoes at the enemy as soon as they get in a position to do so.

. . . we have to station a certain proportion of vessels astern of the Fleet because the enemy may, at any moment, reverse his course and endeavour to escape, and if we reversed our course to meet his movement, we should then find ourselves in a position of inferiority in the [new] "van."

The Germans, as a matter of fact, stationed most of their destroyers on the disengaged side of their Battle Fleet and used to attack through the line. [Seymour preferred the British system].

The method which the Admiral adopts to control this number of vessels in battle, is one of considerable difficulty.

. . . the system adopted in the Grand Fleet in the war, was that each Unit was handled separately by its Flag Officer. Units were a Division of Battleships, consisting of from four to five Battleships, a Squadron of Light Cruisers of anything between four and eight . . . a Flotilla of Destroyers numbering about 20, and a Flotilla of Submarines about 6 to 8. The system adopted was that Units were handled independently, as occasion dictated, and Commanders had full power to initiate the movements of their Units, conforming, generally, to the movements of the Commander-in-Chief. [He] controlled simply the Division in which his flagship was stationed, but . . . retained the power to order the movement of the whole Fleet by Executive Signal, should he consider that it was necessary to secure decisive results. . . .

The distribution of gun fire of the Fleet was a matter in which considerable difficulty was experienced . . . a system was evolved whereby the Commander-in-Chief signalled the bearing of his Flagship's target . . . [then] each Unit could calculate the sector in which their targets lay. . . . We now are able effectively to concentrate four ships on one, whereas at the beginning of the war, it is very doubtful whether the fire of two ships on one was very much more effective than single ship to single ship.

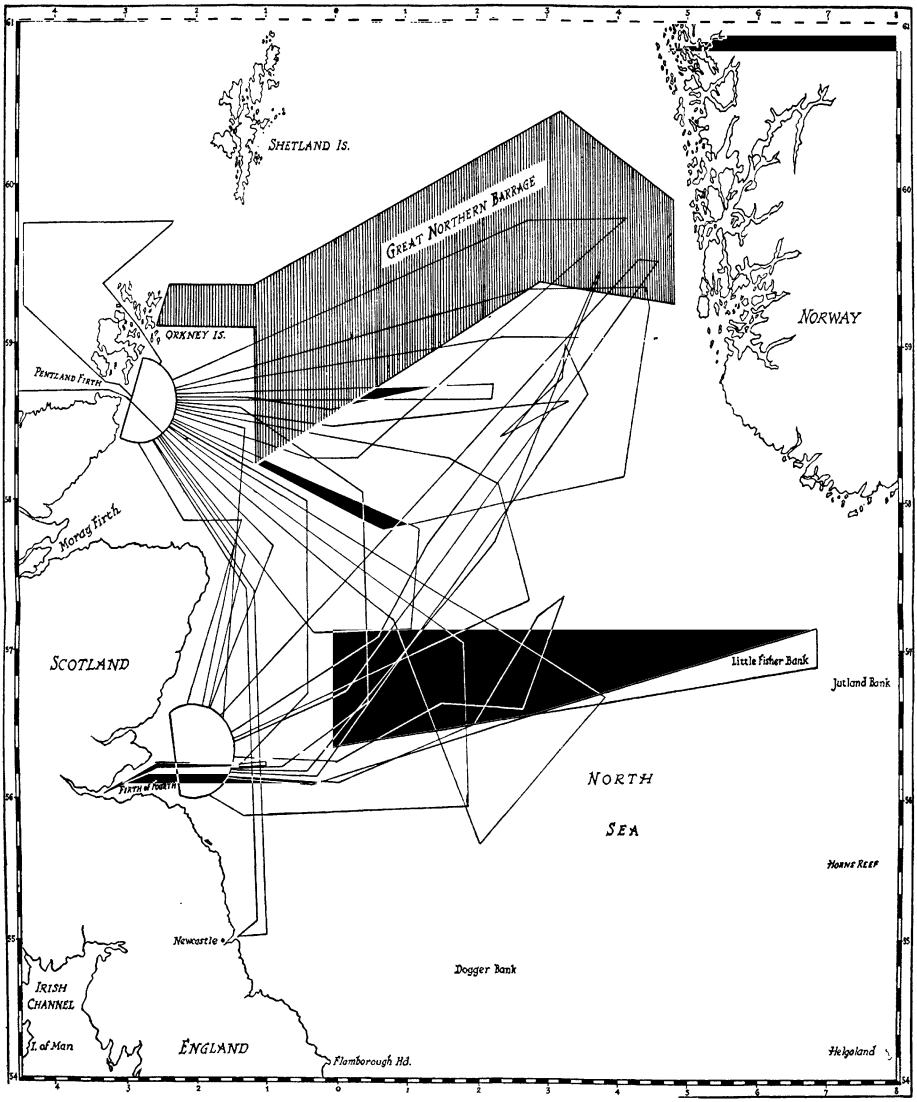
With regard to torpedo attack, each Unit of the Fleet endeavours to effect a

torpedo concentration on that portion of the enemy which is most suitably placed. . . .

We now come to the second portion of Nelson's statement of the problem, namely that of keeping the enemy engaged without separating until the business is decided. . . . The era of steam has not yet produced a solution which has been tested in battle. [All solutions proposed] expose the Fleet to an initial tactical disadvantage. . . . It was decided in the Grand Fleet, after Jutland, that in the event of the enemy trying to escape, the torpedo disadvantage must be accepted, and he must be kept under fire. . . . [Turn towards, not away from torpedoes].

After the main Fleet action . . . we had an organization for re-organizing all ships which still retained their tactical speed, and had sufficient ammunition and torpedoes to take up the pursuit relentlessly. . . .

It is said that the difficulties experienced, and the partial failure of the light forces to reach their assigned battle stations, at Jutland, caused a series of diagrams—sixteen, in all—to be prepared, depicting the station of each unit of the light forces on deployment for every two points of enemy bearing from the course of the Grand Fleet.



The 9th Division, U. S. Atlantic Fleet, under Rear Admiral Hugh Rodman, comprising the *New York* (flag), Captain Charles F. Hughes; *Wyoming*, Captain Henry A. Wiley; *Florida*, Captain Thomas Washington; *Delaware*, Captain Archibald H. Scales; joined the British Grand Fleet commanded by Admiral Sir David Beatty at Scapa Flow in the Orkney Islands, December 7, 1917. The *Texas*, Captain Victor Blue, joined February, 1918; the *Arkansas*, Captain William H. G. Bullard, relieved the *Delaware* July, 1918.

The chart shows North Sea cruises made between December 7, 1917, and the Armistice, November 11, 1918, by the 9th Division (as 6th Battle Squadron, Grand Fleet) separately, and with the fleet. Cruises were for battle exercises, searches for the enemy, convoy and escort duty. Mines in the Great Northern Barrage: 70,263; 56,611 laid by U. S. Mine Force, commanded by Rear Admiral Joseph Strauss; 13,652 laid by the British.—Chart loaned U. S. Naval Museum by Captain A. S. Wotherspoon, U.S.N.

CHAPTER LI

POST-WAR COMMENT AND LESSONS. AIRCRAFT IN WAR

GERMANY's insistence on unrestricted submarine warfare brought the United States into the World War as an associate of the Allied Powers, on April 6th, 1917.

Destroyers, converted yachts, and submarines were despatched to the English and French coasts to assist in patrol and convoy work. A division of five battleships under Rear Admiral Hugh Rodman, *New York* (flag), *Wyoming, Florida, Delaware,* and *Texas* joined the Grand Fleet.

While German surface ships were held practically immobile after the Battle of Jutland, England, and later the United States, concentrated on combating submarines, which in 1917 were destroying merchant ships at a daily rate of from 3,000 to 10,000 tons.

Late in 1917 troops and cargo ships were assembled in convoys of from ten to thirty and guarded by cruisers or destroyers. German submarine instructions, not to fire torpedoes at distances greater than 700 yards and to get within 300 yards, if possible, in order to conserve torpedoes, made convoys safer than might have been the case if longer range firing had been directed or permitted. About 2,000,000 American soldiers were transported to France and England without loss.

The Allies laid nets and mines, to make important water areas on the French and English coasts too dangerous for submarines. Special types of small craft, such as patrol-boats, (P-boats) and—in the United States—submarine-chasers, were built in large numbers, and equipped with under-water listening devices and special guns, to detect, overhaul, and destroy submarines with depth-bombs.

Submarines, themselves, were employed by the United States and the Allies to listen for, and attack enemy submarines.

Directional radio and under-water sound stations were established; the first to plot submarine positions from their radio reports, and the second to plot them from their subsurface noises.

For the effective employment of sub-chasers in the use of their listening equipment, a tactical code was developed. It provided for control of search groups by wireless telephone. Three vessels usually composed

a group. The leader of each group was in constant communication, in both directions, with the other vessels of his command.

Such, however, was the advantage of the invisible initiative of the underwater enemy that even more than twenty patrol and searching craft for each submarine at sea were unable to keep traffic lanes clear, or trap the majority of submarines leaving, or returning to port.

Finally, and mainly by the efforts of the United States, great mine fields were laid, which practically blocked egress from the North Sea

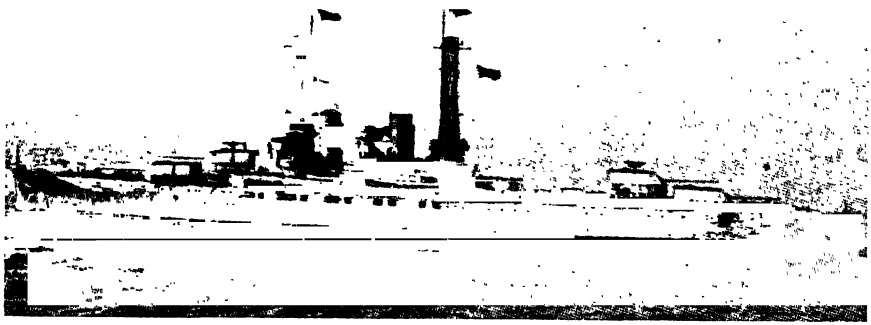


FIG. 132.—U. S. S. *New York.*

to the northward, and nets, mines and nightlighting closed the Straits of Dover. Progress in closing the Adriatic was being made when the war ended.

Submarine listening patrols against submarines were established and proved to be morally as well as materially effective. H. W. Wilson, in his *Battleships in Action,* states that: "the highest number of German boats simultaneously at sea was 61 in June 1917, out of a total effective for the month of 132." He also states that 178 German submarines were lost at sea from all causes. British losses were 44. We have no data at hand on French, Italian, and Austrian losses. Shipping sunk by submarines totaled 6,682,000 tons. 158 submarines were surrendered to the Allies and the United States. Some of these were distributed for examination and experiment among Germany's antagonists and finally broken up.

German and Austrian submarine losses in 1918 resulting from all the means outlined, coupled with reverses on land and sea, and the partial failure of attacks on merchant convoys, at last broke the German will to win.



FIG. 132a.—Rodman and his captains. Left to right: Scales, Wiley, Rodman, Washington, and Hughes.



FIG. 132b.—Assemblage of notables on U. S. S. *New York*. Left to right: Admiral Beatty, Rear Admiral Rodman, King George V, Admiral Sims, and Prince of Wales.

Disaffection and mutiny in her inactive fleet and the practical collapse of Austria were important factors in hastening the final breakdown.

An armistice was concluded November 11, 1918, and the war officially ended with the signing of the Treaty of Versailles, June 28, 1919.

The treaty closely limited the future size of the German Navy, and forbade any submarines. It also included a Covenant for a League of Nations. This failed to meet the approval of the United States, which concluded a separate peace with the Central Powers in August, 1921.

Changing now to technical matters: the last stone shot; spherical iron shot and shell; smooth-bore guns; and muzzle-loaders disappeared from men-of-war before the end of the 19th century.

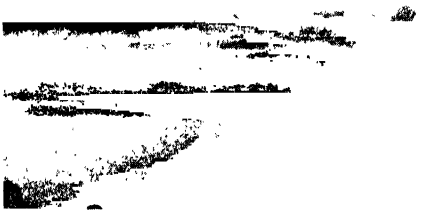


FIG. 132c.—Sixth Battle Squadron.

Rifled guns and adjustable sights replaced them, and these, except in small calibers, had mounts which controlled recoil and automatically returned the gun to battery after firing. Telescopic were replacing open sights. Intense efforts were being made to increase rate of fire, and percentage of hits by all calibers. To this end, observers in elevated positions (spotters) estimated errors in fall of shot, both in range and deflection, and gun-sights were reset accordingly. Horizontal base range finders were invented, which gave accurate range measurements at constantly increasing distances. Smokeless powders were being developed.

Shortly after the turn of the century, hand loaded guns up to six inch caliber, with expert crews, could fire and hit at ranges up to 2,000 yards, at the rate of ten to twelve shots per minute.

In capital ships heavy guns in turrets were the rule, two guns in each turret, turrets installed on the center line of the ship with large arcs of fire on both sides. Such ships, heavily armored, with broadside torpedo defense batteries, were called *Dreadnaughts*.

Systems of fire control (electric) connected turret guns, which permitted all to be fired at once from a master firing key in an elevated armored director station. "Salvo," indicating this type of firing, replaced the old term "broadside."

One of the underlying causes of these changes was the continued increase in effective range of torpedoes. In the main, however, they were the outcome of a keener appreciation in all navies of Farragut's maxim, that a well directed fire from your own guns is at once the best offense and defense. Skill of personnel had not kept pace with material. Rifled guns and stable powder would deliver shot on any target at which they were accurately pointed—that is, if well directed. It was found that a fair number of hits per gun per minute at ranges beyond torpedo range could be made by skilled gun crews.

What writers on tactics considered effective battle ranges, steadily increased during the last decade of the 19th century, and the first decade of the 20th. At the same time ship design to lessen the effects of torpedo hits went steadily forward.

These developments in naval guns and gunnery were common in greater or less degree to all combatants in the World War.

After the war the relative importance of surface vessels and submarines and the value of airplanes in war on and from the sea were discussed in the Naval Institute *Proceedings,* in other service publications, and in the press of the United States and other countries.

Earle's comments on the naval battles of the World War from the viewpoint of gunnery in its relations to tactics, have already been quoted in part.

The late Rear Admiral (then Captain) Earle had been at the head of the United States Bureau of Ordnance during the war, and was himself an authority on ordnance and gunnery. He says of Jutland,

> With enemy zig-zagging, shells striking and detonating, water deluging decks, destroyer attacks, torpedoes, smoke screens and funnel smoke, the conditions of target firing were certainly absent. . . . The gun pointers could see practically nothing . . . the rate of hitting could not have been over one hit per gun per two hours . . . the director method of aiming had to be used.

Despite the extremely small percentage of hits in this battle, he quotes Admiral Jellicoe as saying, before Jutland, ". . . ships of to-day,

open fire at 22,000 yards range, and gun fire begins to be very effective at 18,000 yards. . . ." Earle continues, ". . . and we believe that a 30,000 yard range is not improbable."

He quotes a German author as saying, "Whenever shells struck near the ships, great columns of water were thrown up, which thundered upon and flooded the decks." Earle estimated that the momentary geyser thrown up by a 12-inch shell, striking the water, rises to a height of 120 feet and weighs about 1,600 tons.

He concluded that gunnery conditions at Jutland were no worse than might be expected, and therefore fire control must be such that a target can be designated and quickly opened upon, and course and speed altered at will, without detriment to fire accuracy. He considered that this result was possible by the use of appliances already existing, when operated with the skill produced by intelligent and continuous training.

His faith in the gun, as the primary weapon, was complete. He said,

New ways of using torpedoes, depth charges, and other deadly weapons are continually being devised. But gunnery soon meets each new weapon.

Rear Admiral (then Commander) T. T. Craven contributed to the May, 1917 issue of the Institute's *Proceedings* an article on "Tactics and Gunnery" written with the naval battles of the World War as a background.

Craven reviewed the principles of tactics combined with the principles of gunnery. He discussed the effects of imperfect visibility on navigation, and of visibility as affected by color, similarity in appearance of ships, smoke, etc.

He pointed out the necessity in a fleet, squadron or division of "collective fire control, which governs concentration and distribution of fire." However, experience showed that control of fire in the sense of concentration or spread at will is frequently impracticable.

He touched on the use of torpedoes from all classes of ships, including submarines; on torpedo defense, mines, aircraft, communications, and many other related subjects.

His essay was an interesting and valuable summing up of existing knowledge and—to some extent—opinions on the many factors influencing the result of a naval battle.

Frost, also in 1917, contributed an article on "Night Torpedo Operations."

The Prize Essay of the year by the late Captain (then Commander) Lyman A. Cotten, on "Submarine Warfare" was held confidential by the Navy Department, and therefore not published.

Frost was Prize Essayist in 1919, his subject being "Letters on Naval Tactics," a review.

In 1920, Rear Admiral (then Captain) J. V. Chase disclosed in the *Proceedings* that in 1903, (thus ante-dating both Fiske and Baudry) he had undertaken

> a mathematical investigation to ascertain the value of the advantage accruing to a naval force engaging an adversary, numerically equal, but so placed that a portion of his fire was masked or beyond effective range. The result of this investigation showed that the advantage was measured, not by the ratio of the numbers of ships actually engaged, but by the square of this ratio. . . .

Chase applied this, the so-called "N square law," to superior skill in hitting at long range, a range where an unskilled enemy is in effect masked.

It was expected by many naval officers that air-bombing would be developed to such a degree during the World War, that it would fill an important offensive role, especially against German naval bases, on account of their proximity to the British coast. However, no bombing planes that could carry a useful bombing load were able to fly from Yarmouth to Wilhelmshaven and return. Antwerp, which was captured by the Germans early in the war, and German occupation of the entire Belgian coast for the duration of the struggle, served to protect Wilhelmshaven and the German fleet from bombing expeditions by airplanes. Neither the Allies nor the United States pursued the developments of airships during the war. English and French attempts to retaliate for Zeppelin air raids on London and Paris were made with heavier-than-air craft.

In Vol. II of *Battleships in Action,* H. W. Wilson describes briefly attempts made on German shore defenses by planes from British aircraft carriers.

The first of these was on Christmas Day 1914. Nine seaplanes from aircraft carriers attempted without success to destroy Zeppelin sheds on the German Coast. The carriers were escorted by the Grand Fleet and cruisers and destroyers from Harwich with the hope that the Germans would come out to repel the attack.

Again on March 25, 1916, at attempt by five planes from the carrier *Vindex* was made to burn the Zeppelin sheds on the island of Sylt.

An escort of light destroyers under Admiral Tyrwhitt accompanied the *Vindex.* A snow storm intervened. Three planes were lost; only one dropped any bombs.

On May 4 a third attempt was to have been made, but of nine seaplanes, seven could not take off, one was wrecked, and but one reached the Schleswig coast, where it did little damage. Again the Grand Fleet was out hoping to bring on a battle, but the Germans refused to be drawn.

Finally, late in the war, July 19, 1918, the aircraft carrier *Furious,* heavily escorted, launched seven planes to attack the Zeppelin sheds on Sylt. Two sheds and two airships were burned. Five planes were lost. Planes on aircraft carriers were useful for limited scouting and observation, but were in general not equal to the bombing tasks assigned them.

The *Campania,* a large aircraft carrier, did not go to sea with the fleet for the sweep which resulted in the battle of Jutland.

Earlier in the war, in February and March, 1915, the carrier *Ark Royal* with six seaplanes was attached to the fleet, attacking the Dardanelles defenses. Her planes were of some service for observation.

Wilson records that the first use of a seaplane in naval war was by the Greeks at the Dardanelles just two years before the *Ark Royal* was engaged there. War between Turkey and the Balkan League, of which Greece was a member, began Oct. 17, 1912. Lemnos was seized by the Greeks, and as in the World War, Mudros Bay was the base of operations against the Dardanelles. In February, 1913, a Greek aviator, Mutusis, took off from Mudros Bay in a seaplane to observe and bomb a Turkish squadron inside the entrance to the Dardanelles. With four bombs he failed to make a hit; he came down at sea and was picked up by a Greek destroyer, having covered 112 miles in a two and one half hour flight. Bomb sights, if any, were crude.

After the World War, considerable experimental bombing of ships at sea from airplanes was undertaken. In the United States, tests were made with live bombs on a former German battleship, the *Ostfriesland,* against a new U. S. battleship, the *Washington* (directed to be sunk), and against other craft.

In August, 1922, the Institute published a comprehensive article by Captain (then Commander) John P. Jackson, on the "Employment and Tactics of Air Craft in Naval Warfare." His essay took note of the persistent efforts of some aviators and some civil authorities to

develop air craft tactics and uses in war, separately from, and independently of the tactics of the land and naval forces with which they must operate. He said, in part,

> Throughout the Great War and up to the present time, ideas regarding the strategic and tactical employment of air forces in co-operation with land and naval forces, and as to the co-ordination of the many different types of air craft amongst each other, can hardly be said to have crystallized.

He quoted General Pershing, Commander-in-Chief of our armies during the World War, as saying, "A military air force is an essential combat branch and should form an integral part of the army."

General Pershing's opinion applies with equal force to the navy. In accord with this, the United States Government directed that two ships, designed, and partially built, as battle cruisers, the *Saratoga* and *Lexington,* should be completed as airplane carriers. This action was taken about the time that Jackson's article was written. Provision was also made for carrying planes and catapulting them from battleships and large cruisers.

Jackson's essay comprised 101 paragraphs, arranged under the following headings. Capabilities of air craft and: (1) Types of air craft. (2) Methods of employment. (3) Aeroplanes with the Fleet. (4) Auxiliary character of the air force. (5) Air craft regarded as projectiles. (6) Plane carriers as capital ships. (7) Nature and control of the air. (8) Securing command of the air. (9) Scouting, reconnaissance, and patrol. (10) Fire control, observation, and spotting. (11) Protection of the Fleet. (12) Attack on enemy surface and sub-surface craft. (13) Types of bombs. (14) Torpedoes in aeroplanes. (15) Guns on air craft. (16) Escort. (17) Despatch carrying. (18) Transportation. (19) Evacuation of the wounded. (20) Control of operations from the air.

He did not attempt to give in detail the tactics of air craft when operating in any of the ways tabulated above, giving general rules only. Under (9), Scouting, Reconnaissance, and Patrol, he included photography, and in this connection, it has been shown feasible, in battle exercises, to photograph an enemy formation and course from above an intervening smoke screen and deliver the photograph to a commander-in-chief in a very few minutes.

Under (12), Attack, etc., he included: illumination of an enemy and the use of bombs, torpedoes, guns and gas.

Under (20), Control of Operations from the air, he visualized a possible station in a plane for the commander-in-chief in battle between

air craft, air and surface craft, and between surface craft, as affording a more comprehensive view of the progress of the engagement than could be obtained from any other position.

He said, in this connection—referring to battles at sea and on land, "Of course the risks involved in a commander-in-chief leaving his flagship or head-quarters must be fully weighed and he must be in direct and instant communication therewith at every moment of his absence."

At this time the United States made a brief test of a fast auxiliary cruiser as an administrative flagship, but the commander-in-chief's battle station was designed to be on an armored combatant ship.

This ends the review of the development of naval weapons and the evolution of tactical maxims as portrayed in the *Proceedings* of the Naval Institute during its first half century.

Since the founding of the Institute, in 1873, study and assimilation of the tactics of war on the sea have been further aided in the United States by the Office of Naval Intelligence, founded in 1882, and the Naval War College founded in 1884.

Brassey's Annual, published since 1886, and Jane's *The World's Fighting Ships,* published since 1898, are supplied to ships. Other foreign publications, such as the *Revue Maritime* and the *Proceedings of the R.U.S.I.,* are filed in the War College, Naval Academy, and Navy Department libraries.

The Naval War College, except for such of its lectures and essays as are published by the Naval Institute, has no public output. Its influence is felt in the Signal Books, in Cruising and Fighting Instructions (revived, as a result of experience in the World War), and in the points of view of those who have studied at the College.

However, no important tactical maxims have been evolved at the War College that cannot also be found in the pages of the Naval Institute *Proceedings.*

Above all, is the great School of the Fleet.

It seems in many respects a far cry from battle tactics for ships "fit to lie in a line" to those for fleets of the twentieth century. The latter are confronted with unsolved, but not unsolvable problems, some of which will be touched upon in the next chapter.

CHAPTER LII

AUTHOR'S COMMENTS AND CONCLUSIONS

NAVAL HISTORY shows that the most important tactical maxim is—Attack.

Bear in mind that the Permanent and Additional fighting instructions were for one purpose only—to bring about, and fight a battle. There is not a word about evading an attack, or receiving an attack, or awaiting an attack. Their sole theme is how to make an attack.

Let us consider in what respect, if any, the fighting instructions on attack are now applicable.

Being on the same tack and having the wind of an enemy, the Permanent Instructions simply said "If . . . they (the enemy) have stretched themselves into a line of battle, the van of the Admiral's fleet is to steer with the van of the enemy and there engage them." But the Additional Instructions were much more specific. They directed that when the Commander-in-Chief wished to bear up to engage he should hoist a Union flag at the main-top gallant mast head and fire a gun, whereupon every ship should steer for the ship of the enemy which it was her lot to engage; making or shortening sail, so as to preserve the formation in order that all ships should as near as possible come into action at the same time.

The French author Villehuet considered this so important that he advocated coming to the wind during the approach to correct the alignment, and a lasking instead of a head-on approach to prevent being raked before coming to the wind at battle range (point-blank). He visualized an approach from abaft the enemy beam, keeping his bearing constant.

Such an approach, when achieved, ensured all ships coming into action at the same time—a sound tactical maxim. Ward's rule, keep your own ships on a line of bearing at right angles to the bearing of the enemy stated the same principle in different words.

In the days of sailing ships the line of bearing of both fleets was the same—by the wind. Under steam any line of bearing can be taken up regardless of the wind; but the fleet which does not have its line of bearing at right angles to the bearing of the enemy when battle range is reached is at a disadvantage.

The Additional Fighting Instructions went farther and provided definitely for irregularities such as sagging in either line by directing that each ship should steer for her enemy ship "notwithstanding the signal for the line should be kept flying." This disposed of any such specious plea as Hood's that he could not keep the line and also get alongside the enemy. While a captain in the days of sail depended much on the skill of his sailing master and his sail-trimmers, who operated directly under his own eye, at present perhaps he has more minute control through his engine revolutions, but the fighting instructions contemplated keeping station at half cable distance under battle canvas, which shows that skill in speed control by sail-trimming was developed to a high degree.



FIG. 133.—Rear Admiral S. B. Luce, U. S. Navy. (*Courtesy U. S. Naval Academy Museum*)

In a closely associated field, it is said of Admiral Stephen B. Luce that he could trim his ship so as to be able to steer a course without a rudder, by sail-trimming alone.

Prescribing an approach which enables an action to be opened with full fire-power enforces the soundest of all tactical maxims. This, however, did not prevent the sailing ship admirals from prescribing signals for other forms of attack, including concentration on a part of the enemy fleet should lack of skill or the chance of wind or sea deprive him of full fire-power; or if he tried to evade action or fled.

To be sure, Rodney wrote that "attempts to bring to action the enemy ship to ship is contrary to all common sense," but an Admiral as skilful, if not more skilful than himself, prevented him from doing anything else and succeeded to a degree in accomplishing against Rodney what Rodney tried hard to inflict on him.

It may be said that during the time of the Revolutionary War, 1775-1783, the skill of their opponents equaled, if it did not exceed that of British admirals.

The tactical maxims of the days of sailing ships were sound, however far the Admirals may have come from making them effective in the

battles of that age. They could not stabilize wind, sea, and currents.

We have now to consider the validity in this age of Nelson's tactical maxim for a large fleet: "The order of sailing shall be the order of battle."

Nelson could predicate his instructions on the basis that his Admirals and Captains were superior to the enemy's. He would attack the enemy at once, wherever and however found, and spend no time forming a battle line or maneuvering for position during which the enemy might escape.

Jellicoe's order of sailing—his cruising disposition—as drawn by Commander Seymour, was not and could not be an order of battle; nor was it a disposition of force from which in any circumstance an order of battle could most quickly be formed, and at the same time achieve its purpose of preventing surprise.

That it did not prevent at least a partial surprise, even with the aid of other information, is admitted, and that part of the forces were ineffective because of inability or failure to take up their battle stations is also admitted. Further, as the result of this experience Jellicoe after Jutland issued additional charts and instructions for the movements of each unit on the discovery of the enemy on any bearing from the course of the Grand Fleet.

Better solutions of the problem—better dispositions—have been found for a force such as Jellicoe's cruising with or without a train in search of or expecting to meet an enemy; but the order of sailing cannot now be the order of battle.

Jellicoe's agreements with the Admiralty that night battles would be avoided, and that capital ships would turn away from torpedoes, unnecessarily restricted his freedom of action. Events prevented him from avoiding a partial night battle, for which he had no plan, and turning away from torpedoes, while no capital ship was hit, caused him to lose contact with the enemy and he escaped.

We take the stand that the tactical maxim to turn away from a torpedo attack is unsound. Ships can avoid approaching torpedoes better than overtaking ones despite the greater *time* for the latter effort. If the turn is for decreasing the target area the two methods are alike, except for whatever difference on the torpedo's course there may be between a bow wave and a stern wake; but if the torpedo is sighted and a change of course is necessary, every ship is better fitted for seeing ahead and directing her course from observations ahead than astern.

If the torpedo is launched from a point approximately on the

target's beam, target area is reduced by turning either way by the approximate ratio of length to beam—not less than 8 to 1. Torpedoes may be expected to approach from forward of the beam. In such case, turning away requires more than a right angled turn—a partial reversal of course—to minimize the target area.

Jellicoe's tactics of having each alternate ship steer in the wake of its next ahead doubled the decrease of target area.

His statement in regard to the turn away is that at 7:05 a flotilla of destroyers was observed approaching on a bearing S.50 W. from the *Iron Duke,* then on course S.W. by S., that the Fleet's course was then changed to S., and fire opened on destroyers, which turned to port at a range not less than 6,500 yds. The Fleet changed course two points to port at 7:23, then two points more. Turning back, the Fleet reached a S. by W. course by 7:33. He does not state that any torpedoes were seen from the *Iron Duke.* Reports from the ships of the 5th and 6th Divisions stated that they had to maneuver individually to avoid torpedoes after they were seen and Jellicoe complimented the captains on their skill.

Exhaustive analyses of the battle of Jutland are available in the Naval Institute and other publications. Only one other feature need be touched on here. It relates to the initiative of subordinates in battle. We have already indicated that Fighting Instructions should cover this. Jellicoe's account of the battle indicates the scope of initiative defined by his instructions, and approves what his subordinates did without signal. But in *Battleships in Action,* Wilson states (Vol. II, p. 151):

> Of the Admirals in the Grand Fleet, Sturdee, who had considerable reputation as a tactician, thought it would have been best to deploy on reaching the scene of action, and expected the admirals at van or rear to take the initiative and close with the enemy. He himself was stationed in the center close to Jellicoe, and could not act. [If quoted correctly this indicates that if he had opportunity, he would have substituted his judgment for that of the Commander-in-Chief.]

Sturdee, like Nelson, may have desired a mêlée and determined to bring one about.

In studying and attempting to form opinions on the conduct of this battle, the actual and relative visibility as frequently referred to by both Commanders-in-Chief must be kept in mind. The gunnery officer of the *Iron Duke,* about a year after the end of the war in conversation with the authors said that Admiral Jellicoe in passing asked him how his guns were getting on. He felt they were doing well and said so; but was much let down when the Admiral said: "Are you sure it is not one of our own ships you are firing on?"

Although British losses in the battle of Jutland both in personnel and ships were substantially greater than German losses; proportionately, in battle cruisers they were less, and little out of proportion in other classes. The British were ready to fight another day; but by greater determination that day, they would probably have shortened the war. The Germans were never again ready to encounter the Grand Fleet. All of their efforts to reduce it by attrition failed.

It will be remembered that Hoste believed that squadron commanders should be permitted to go about on their own initiative in order to keep abeam of their opponents in battle, or rather to keep opponents on their beam.

A signal for such a maneuver, but not by squadrons independently, was provided by the French Admiralty in its provisional tactics of 1857. It was not a signal for attack, but a method of continuing or maintaining an attack once launched. When this signal was made, squadron leaders went about simultaneously, followed in succession by the ships of their squadrons.

This signal was in addition to those for reversing course, together or in succession, from the head or rear.

Reversing course by divisions, while less expeditious than a simultaneous turn of all ships, is completed in less time than by head of column turn. At least half of the ships can have their guns bearing at any moment. It is easier to execute than a simultaneous turn, which also involves complete cessation of fire for the time taken to turn and get on again.

As applied to divisions it is the "organized column" advocated by Knox and a good example of "follow the leader" evolution.

Admiral Scheer's triple reversal of course during the battle of Jutland gave him no tactical advantage of position, and during each turn his fire power was zero.

His first turn appears to have been an attempt to escape from a position in which he was capped. The second may have been a brief resolve to charge through. The third was a somewhat disorderly retreat from a superior force.

A battle line should be maneuvered by divisions. Division commanders should lead their divisions; the Commander-in-Chief may lead a division or make his flagship a division of one or a unit in a division. Divisions should consist preferably of 3 and not more than 4 ships.

To ensure maximum fire power there should be such intervals between divisions and such distance between ships in each division as will

ensure that captains and division commanders can with safety to their ships devote more attention to injuring the enemy, than to avoiding injury to each other.

Ships in divisions should take position from their own flag. Division flags should normally take position from the guide, or in lieu of that, from the division flag farthest toward the guide which is visible.

Distance should approximate two ships' lengths of clear water between a ship's stem and the stern of her next ahead.

The normal interval between division flagships should be as many distances as there are ships in a division, plus one half of one distance.

A division flagship should be considered in position in column when she is at any point between one distance and a double distance from the normal position of the rear ship of the division next ahead.

Flexibility of position as above outlined assists fire control by requiring fewer changes in speed.

Something may be said in favor of divisions, or sections of two ships —leader and "matelot de combat."

Divisions have consisted of from four to six ships each; in our navy, usually four.

However, it is believed that a division of three ships can be maneuvered more readily than one of four and practically as easily as leader and mate.

No. 2 of a division of three has her next ahead and astern normally free to make a quick increase and decrease of speed respectively to clear No. 2. The latter is therefore less constrained to be in exact position than either No. 2 or No. 3 of a division of four.

A Commander-in-Chief can conveniently make a lasking or direct approach or withdrawal by simultaneous movements of division flagships, other ships following in their wake. Formations are better maintained by division movements than by simultaneous movements of individual ships, and the fleet leader or guide is always a division commander.

When effective gun ranges became greater than five sea miles, the old maxims of the French and our own that the closer ships are placed in a battle line the stronger it becomes, and that the strongest battle line is the one that carries the most and heaviest guns per mile, lost much of their force.

Nor with such ranges could any definite plans be made to achieve the much desired position of advantage where all of one's fire could be concentrated on a portion of the enemy, while some of his fire was

blanked or delivered at greater ranges. Such position could only be achieved by great superiority of speed, which is a very unlikely condition.

The foregoing considerations caused thought to be concentrated not so much on how to arrive at a position of advantage, because that is dependent on the enemy's formation, but on how to avoid arriving at battle range in a position of disadvantage whatever the enemy's formation might be.

This brought a re-discovery of Ward's maxim and his great generalization of 1859, two years after the French provisory tactics of 1857: "Whatever the course steered may be, the line of bearing is meant to be perpendicular to the direction of an enemy, when one is near . . . from which direction an attack may be apprehended, or in which to make one may be contemplated."

It may be safely said that the two tactical maxims--maneuvering fleets by divisions and maintaining fleet line of bearing at right angles to the bearing of the enemy are now in the fighting instructions of all navies.

We now come to the tactical advantages of superior speed. When "go right at them" was a tactical maxim, the question of speed governing the range did not arise. When the ram dominated tactics, it was recognized that superior speed in an action between two ships enabled its possessor to ram and prevent being rammed.

In 1880 Captain Fremantle said: " . . . we hold high speed essential to tactical efficiency," but did not say why.

In 1888 Meigs referred to speed indirectly, when he wrote:

> . . . if the combatant ships are commanded by skillful officers, one will seek close range, and one will try to avoid it. The ship with skillful gunners will hold off at a range where her guns will penetrate, and where yet it requires some skill to hit.

In 1895 Wainwright considered that if a fleet was superior in numbers and in speed, it would be easy to double on the end or flank ship of an enemy. He thought 4,000 yards the extreme opening range (Admiral Ting off Yalu in 1894 had opened at 5,000), and set battle speed at fifteen knots.

In 1905 Fiske wrote that ". . . it is in attaining positions of strategical and tactical advantage that speed has its crowning value."

In 1906 Rush said that rectangular movements, constant high speed with a reserve of two knots, and standard helm angles were the only correct principles—axioms—on which to base naval tactics.

In 1907, Fiske discussed the advantages of speed, assuming a battle

range of 6,000 yards. In the same year the British prize essayist, Dewar, considered 7,000 yards effective range, and said [lack of] "speed binds the slow fleet down to particular tactics." He thought a superiority of less than two knots too slight to materially affect an action. A superiority of two to four knots gave the fast fleet a great initiative, but he felt advantage of position gained by superior speed could not be permanently maintained against a skillful opponent.

In 1910 Admiral Borreson believed that actions would open at ranges from 8,000 to 11,000 yards; but that, at the end of a decisive battle, they would be much less. (Torpedoes then had a range of from 4,000 to 6,000 yards.)

It is apparent that as battle ranges increased the advantages of speed as well as the advantages of guns per mile decreased, except that superior speed still carried the two important advantages of enabling its possessor to force or avoid an action and to choose the range.

Some battle ranges of the World War were double what was considered extreme range in 1910. Japanese and Russian opening ranges in 1904-5 have been set down.

During World War I, speed was used offensively to force action and set the range; defensively to avoid action; to foil submarine aim by pursuing a zigzag course; to change range abruptly in order to lessen the effect of enemy fire; and to avoid torpedoes.

It hardly need be pointed out that if it were not for the great disparity of speed between surface ships and the submerged speed of submarines the latter would dominate the seas. However, no power plant yet installed or designed can give a submarine a submerged speed of greater than 12 knots, and that for one hour only. Submarine surface speed is not thus limited; but other considerations have kept it to little if any over 20 knots. The British "J" class of steam fleet submarines could cruise with the Grand Fleet at 17 knots.

All navies are alive to the value of speed in action. All consider that standard battle speed should be two or three knots less than the highest sustained speed of the slowest ship. Jellicoe believed in a reserve of three knots.

It may be wise to plan for a battle speed which can be maintained by the full power of the engines of one side of the slowest ship. A battle speed of 18 knots would provide a normal reserve of about 4 knots.

The important generalization of Chase (1902), Fiske (1905), and Baudry (1914) was first published by Fiske. It may be expressed as

follows: The relative fighting power of two fleets is proportional to the square of the fighting power of each.

This illustrates mathematically the great value of making every gun count at the same time, and inferentially, the addition of the torpedo and bomb to the gun.

The *principle* was expressed less forcibly by Darrieus, quoting a maxim of Napoleon's: "When you wish to fight a battle, assemble *all your forces;* do not neglect any; one battalion sometimes decides the fate of a day."

The effort to attain "initial superiority" may *begin* at ranges which, with the ammunition on board, may offer small chance of victory; but the range sought must be one that will ensure a decisive result before the ammunition supply is exhausted.

Can we correlate a torpedo and bomb attack with the gun attack? The answer is, with torpedoes from destroyers—yes. With torpedoes from submarines—rarely, if World War experience is valid. With torpedoes or bombs from planes—not surely, but possibly. A ship receiving gun hits is likely to have her anti-aircraft fire less effective. A ship maneuvering to avoid torpedoes loses her fire power while so doing.

It has not yet been demonstrated that effective fire can be maintained by a rapidly turning ship.

When two fleets, unequal in number, reach battle range, fire distribution is the first problem to be solved. All accept the maxim that no ship within range should be left unmolested, but no definite practical solution for designating targets, or for shifting them, has yet been offered except during good visibility.

It has been said that the weather and other circumstances of the battle of Jutland were only what may be expected, so it seems probable that in most battles, random firing, in the sense that each ship must select its own target, and that there can be no assurance that all ships within range are under fire, will be the rule, rather than the exception.

To the difficulties of visibility, caused by weather and powder haze, may be added the probability—as at Jutland—of the disappearance of targets in smoke screens laid by planes or destroyers.

Too much attention cannot be paid to reaching a better partial solution of this problem than now obtains, though no complete solution except under game-board conditions seems possible.

In 1530 Henry VIII directed making a smoke screen to hide efforts

to get the wind of an enemy. In 1885, Ensign W. I. Chambers suggested, in the Institute, the use of smoke in action, to blind the enemy.

During the World War, smoke screens were used in action, and since then have been tested under many conditions. They can be laid by all classes of ships, and by airplanes. They can be used for covering destroyer attacks, or for blanking—putting out of action ("making numbers")—part of an enemy battle line, or defensively—as by Scheer—for covering a retreat or withdrawal. A faster plane may force a bomber into smoke and destroy its aim.

The successful employment of smoke from surface ships, by either combatant, depends on the direction and force of the wind. When smoke screens are used, distribution of fire becomes further complicated. The smoke screen has its place in battle. No definite rule for counteracting it can be offered.

When shall a fleet change from a cruising to an attack formation? Some attention has already been given to this question; it deserves more. When deployment is signaled, the die is cast.

Admiral Jellicoe knew that his battleships could deploy from line of divisions to column on the same course in less than half an hour; but he did not have thirty minutes' notice of the distance, bearing, and formation of the enemy; nor does it appear that his light forces could reach battle from cruising stations in the time taken by the battleships to deploy. In any case, the rear of his battle line was under fire before deployment was completed, and not all of his light forces reached their battle stations from which a torpedo attack on the enemy could be launched, and enemy attacks opposed. Had the British light forces assigned to Jellicoe's starboard quarter reached their stations, it is possible, despite the turn away, that contact with the German fleet would not have been lost. The German flotilla which changed course to port after delivering its fire would have been intercepted by the British light forces. The latter could themselves have attacked.

On the other hand, Scheer had less information than Jellicoe and was completely capped by the enemy on the bearing on which he discovered it. He would have been exposed to torpedo attacks on both bows, had his enemy been formed according to plan.

A satisfactory screening disposition would be one that in ordinary weather a commander-in-chief will have an hour's notice before the enemy's main body can come within battle range. The disposition of ships in a cruising formation should be such that the time to deploy on

any course for the unit having the greatest distance to steam should not exceed thirty minutes. This would leave a wide margin for unforeseeable conditions and enable a fleet while awaiting contact to cruise with a maximum of comfort for the personnel. As already indicated the British recast their cruising formation to prevent the confusion that occurred at Jutland.

Thick weather, gales, and darkness affect both fleets. They favor in general a fleet desiring or trying to avoid action. Deployment in fog or darkness (ships without lights) is impracticable, but there are many nights when partial visibility exists and deployment is possible, at least for small fleets; and, with the aid of star and tracer shell, the more skillful of two antagonists may improve a favorable position or lessen the disadvantage of an unfavorable one at night. Jellicoe did not have at his command, nor did von Scheer, means of illuminating an enemy except by searchlights which would betray his own position.

Nevertheless, while the tactics for night actions cannot be laid down in detail, since one cannot always be avoided as proved to be the case at Jutland, plans to meet varying night contingencies are necessary.

CHAPTER LIII

SUPPLEMENTARY: NAVAL WEAPONS, 1918-1940

Our intention in 1933 was to close the history of naval tactics as of 1930, but press of other matters delayed the final draft. Now, in 1940, we find ourselves in the midst of another war, the extent and outcome of which cannot be foreseen. It is not wise to follow the example of the writer on naval ordnance in 1859, who made no mention of rifled guns, nor of the U. S. Naval Signal Book of 1864, which ignored the ram. Therefore, a supplementary chapter is in order on the principal naval weapons of the present war as they appear at the end of 1940, and as compared with those at the end of the first World War in 1918.

The order of treatment will be: Submarines, Mines, Planes, Surface Ships, and Communications—that is, means of co-ordination and control. We believe that the tactics of their use will change little but the weapons will be more effective.

Submarines

Mr. H. W. Wilson in Volume II of his *Battleships in Action,* tabulated losses of German and British submarines and their causes during the World War, 1914-1918, as follows:

Submarines Lost By	*Germans*	*British*
1. Mines	41	4
2. Depth Charges	34	?
3. Ramming	23	?
4. Gunfire	20	3
5. Submarines	19	4
6. Decoy Ships	13	?
7. Nets	6	?
8. Air Craft Bombs	4	?
9. Accident	9	12
10. Doubtful	9	21
Totals	178	44

German loss by direct attack was 113, by mines and nets, 47. Direct attack by surface ships, submarines, and planes accounted for nearly three times as many submarines as were destroyed by passive means—mines and nets—although both mines and nets had important effects on submarine operations.

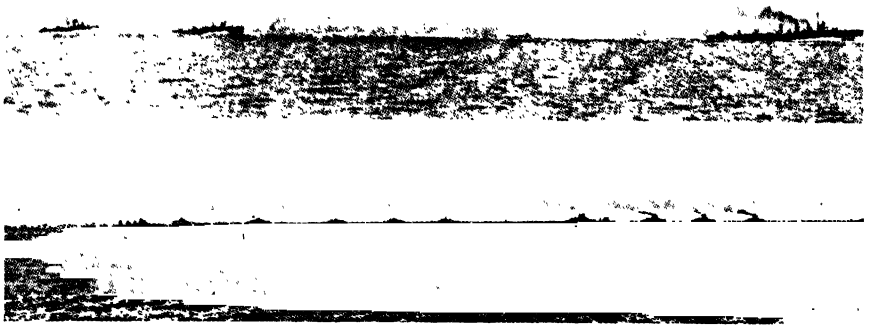


FIG. 134.—Hun Hunting.

All direct means of attack except by decoy ships, are now employed. The extent to which submerged listening devices are in use, and their effectiveness in plotting submarine positions to direct the attackers, is not public; but it may be assumed that these are more accurate, and that plotting of positions by radio bearings is also more accurate than at the end of the last war. Radio-silence can be observed by submarines, but their water noises are always present and their hulls will reflect sound waves. Thus submarine detection by direct and reflected sound is always possible.

The actual or probable presence of mines in any area is an important deterrent to submarine movements. Towards the end of the last war, the extensive mine fields referred to in Chapter L, and the closing of Norwegian territorial waters hemmed Germany in. In the present war, Germany, having secured the coast of Norway and France, cannot be thus hemmed in. The British can make use of local mine fields only—offensive off German controlled ports and areas—defensive off her own coasts and ports. German submarines can get to sea, and their bases are closer to the enemy than during the last war.

Wilson says that in 1918, the hull of a German submarine could withstand the explosion of 300-pound depth charges if more than 14 feet from the hull, although an explosion "at 28 feet might damage her enough to force her to the surface." Nevertheless, depth charges will continue to be an important means of attack.

The size of maneuverable submarines is definitely limited. This limit was reached during the last war. The depth of safe submergence was about 200 feet. This may have been considerably increased with a correspondingly greater chance of the fuse settings on depth charges being in error. Submarines carry the smallest torpedoes that are considered to be effective, in order that the largest possible number may be stowed.

Men-of-war are now less vulnerable than in 1918, but merchant ships on the whole are now as vulnerable as then. Against merchant ships, torpedoes no larger and carrying no heavier charges than in 1918 can be effectively employed, using the same tactics of approach and firing as were developed in the last war, with probably some increase in firing range, without decrease in hits per torpedo fired. Wilson says that, "Towards the close of the war, however, torpedoes of extraordinary power were constructed by the Germans (though they were not used) with a caliber of 24″, a speed of 25½ knots, at a range of 16,500 yards, and with an exploding charge of 550 pounds

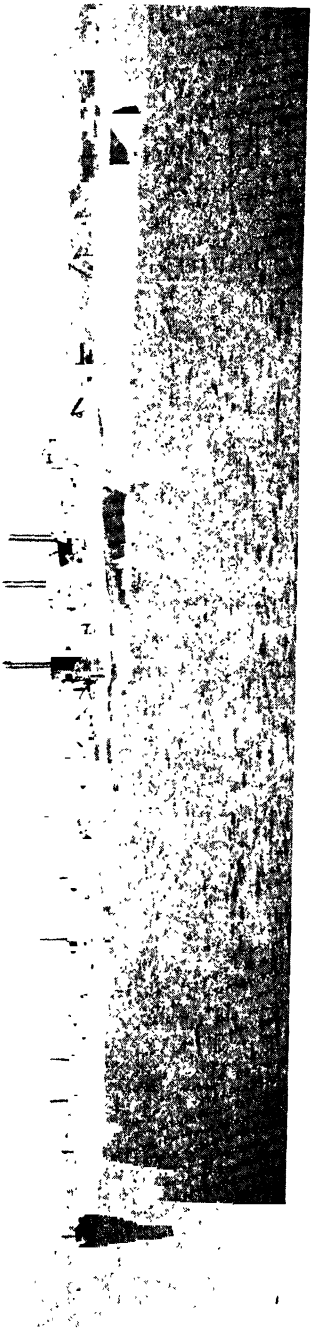


FIG. 134a.—Surrendered German Submarines.

with thrice the power of gun cotton." Whether any submarines now carry such torpedoes is not known.

Austrian submarines were a small factor in the last war against allied shipping (British, French, and Italian). Italy's efforts are now added to German efforts against British men-of-war and merchant shipping. Some French submarines are in British hands, others are inactive.

The German field for submarine attack on British men-of-war and merchant ships is wide. The British field in these respects is narrow because the amount of active German and Italian merchant shipping is small and their men-of-war fewer than the British, but the British have important duty for every submarine they possess or can obtain, in foiling every German attempt to bring troops and supplies to British shores.

The accompanying table shows the submarines possessed by the Allies shortly after the end of the last war and the numbers possessd in 1939 by the same countries:

Compiled from Jane	*1919*	*1939*
France	40	78
England	127	57
Italy	51	104
Japan	20 plus	59
U.S.A.	166 ?	87
Germany	none	65?
Totals	404	450

Totals are not markedly different, but the submarines of 1939 should be, and on the whole are, better than those of 1919. Distribution among the powers in 1939 is markedly different from that in 1919. England, which tried to have submarines abolished, shows the greatest decrease. All other countries except the United States show large increases, but in none of these has England now an ally.

The success of submarine and air attacks depends—much more than attacks by surface ships—on the personal skill of the captains and pilots. There is no reason to believe that their skill in this war will not be equal to that displayed in the last war, or that their courage and determination will be less.

In these respects, Wilson gives some particulars about British submarine officers. In October, 1914,

the British Admiralty decided to send three British submarines into the Baltic, as there were reports that the High Seas Fleet was exercising there. The boats selected were *E-1* (Lieut. Commander W. F. Lawrence), *E-9* (Lieut. Commander M. K. Horton), and *E-11* (Lieut. Commander N. E. Nasmith), with orders to pass the Sound at night, attack the German fleet if possible, and when their fuel was exhausted, retire to Libau. *E-1* and *E-9* both got through safely on October 17 and 18. *E-11* was not able to effect her passage; however, Nasmith fired two torpedoes at a Danish submarine, mistaking her for a German.

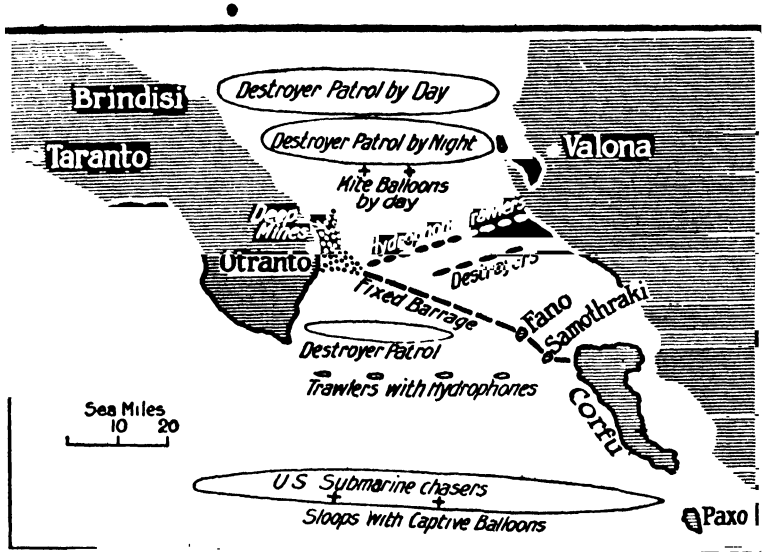


FIG. 135.—The Otranto Barrage in 1918. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Owing to the severe weather that autumn in the Baltic, the British submarines did not effect much, though they were a constant menace to the Germans; and Prince Henry, in an order which he issued, stated that he would regard the destruction of a British submarine as equivalent to that of a Russian armored cruiser.

Submarines were also sent against the Turks in the narrow waters of the Dardanelles and Bosphorus in 1915. Here Nasmith of the *E-11* especially distinguished himself. After getting through the mine fields and sinking several small craft, he torpedoed a gunboat, and later—August 8—he sank the old Turkish battleship *Barbarossa* and badly damaged a transport, which was destroyed a few days later by a torpedo

launched from a seaplane by Flight Commander C. H. K. Edwards—"the first use of a new weapon." Repeated passing through mine fields and operating in the midst of Turkish men-of-war, are feats of skill and daring seldom equalled.

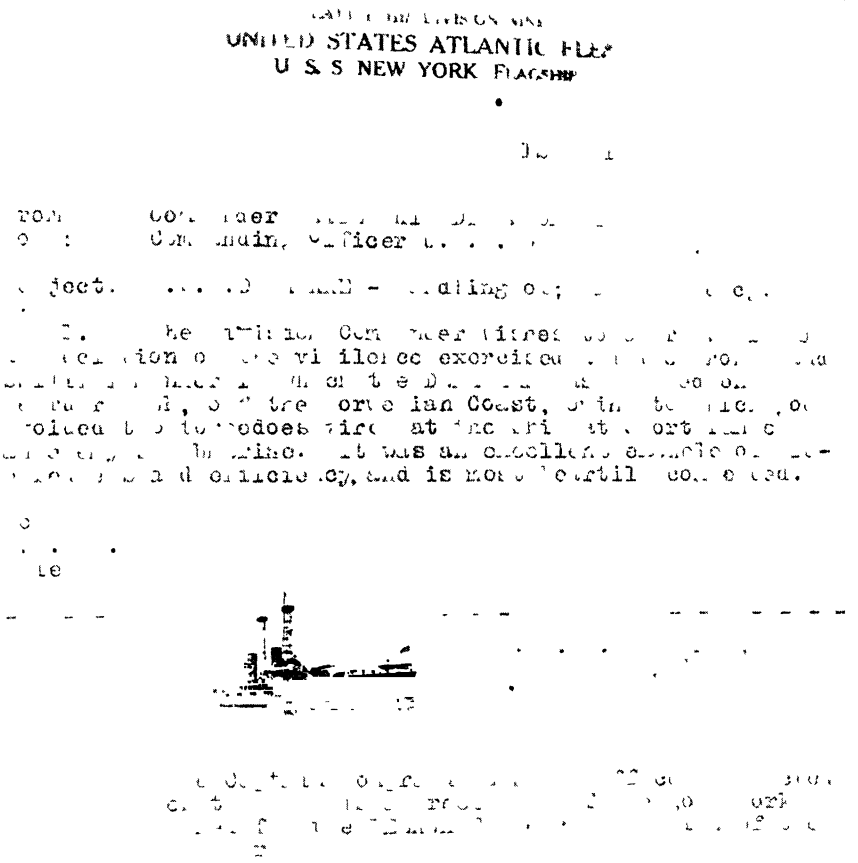


FIG 136

During the last war, German submarines were never able to penetrate the defenses of Scapa Flow—the Grand Fleet's principal anchorage—but early in the present war a submarine entered, torpedoed and sank a battleship, and escaped without injury. However, other sinkings

of men-of-war by submarines have been on about the same plane as in the last war, and sinkings of merchant ships appear to be about on the same plane as in the last war, after the convoy system was established. In this war, submarines are sometimes aided in locating a victim by information from planes; and merchant ships are now attacked by bombers—an additional hazard. Endurance of submarines in fuel, food, and habitability was amply demonstrated in the last war. Their average surface speed is now somewhat greater. Their under-water maximum speed, for one hour, and their under-water endurance differ little from those of 1918. The advantage of numbers may bring a return to small submarines for coastal and North Sea offensive. A criterion of what is happening in this war and what may be expected, can be found in the record of British merchant ship losses in the last war.

At the outbreak of war in 1914, Germany had 20 submarines. Up to the end of 1915, she had built 63 and lost 25. In 1916, she built 108 (some of these were mine-layers) and lost 22. From August, 1914, to the end of 1916, British losses in merchant ship tonnage were 2,400,000 tons—an average of approximately 140,000 tons per month. By October, 1916, losses were over 300,000 tons per month. Losses of nearly 350,000 tons per month continued for a year, reaching a maximum in April, 1917, of 545,000 tons. The last quarter of 1917 showed a decrease to 230,000 tons per month, and during 1918, a gradual decrease until the end of the war. Wilson tabulates losses by months and gives some information on the average number of submarines at sea. His tables show a steady decrease after the convoy system was established and improved.

Total British merchant tonnage at the outbreak of the present war was less, but on the whole, faster than in the last war. Ships are better fitted for loading and discharging—that is, for a quick turn-around. Each ton is more efficient. The number of bottoms now is less, but the average tonnage per ship probably greater—each ship is a larger proportion of the whole.

Large accessions have fallen into British hands from the merchant fleets of Norway, Denmark, Belgium, Holland, Germany, and to a small extent from France. Losses, at first small, are now comparable to those during the early months of the convoy period, and now, as then, the submarine is a major threat to British food and munition supplies. The average number of submarines at sea is not known. Whether convoy tactics are as effective as in the last war is to be determined. Wilson

suggested that the grouping of ships in convoys might cause the grouping of submarines for attack. Some evidence of such tactics has appeared. Scouting planes can inform submarines of location and course of convoys.

Have the attack and defensive tactics of single and convoyed merchant ships been improved? Apparently not. The subject is, no doubt, being intensively studied.

Armed guard crews were put on board our merchant ships soon after our entry into the war in 1917, to prevent capture or sinking by sub-

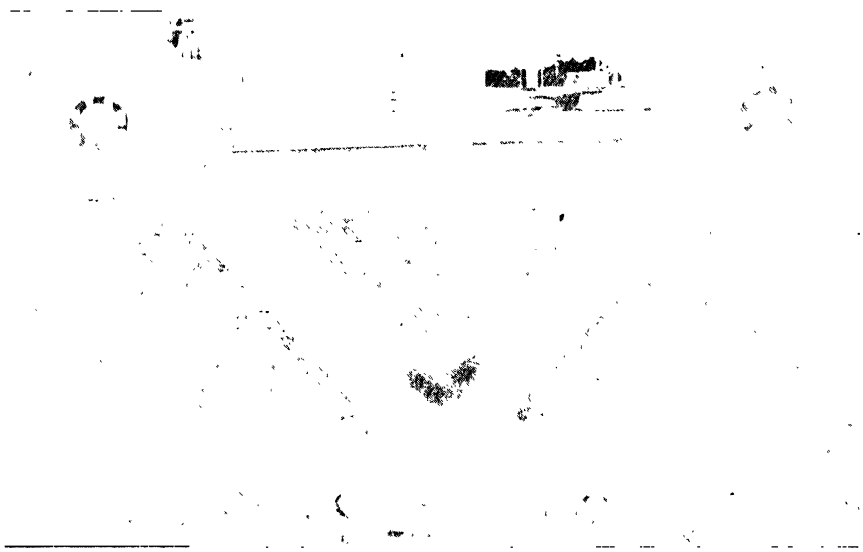


FIG. 137.—Depth Charge and Y-gun. (*Courtesy U. S. Naval Academy Museum*)

marine gun-fire. This became a British practice earlier in the war, after Germany resorted to indiscriminate attacks on allied ships without making any provision for the lives of personnel on ships sunk by torpedo or gunfire.

No surface attacks on ships in convoy were made and no guns were needed, but now that air attacks are possible and probable, anti-aircraft guns and crews are means of counter attack which should be on every merchant ship.

Since submarines can often be seen from the air above, where invisible from ships' decks, catapults and planes on one or more ships of

each convoy, will be of valuable assistance to the convoying men-of-war, in counter or direct attack on submarines and attacking planes.

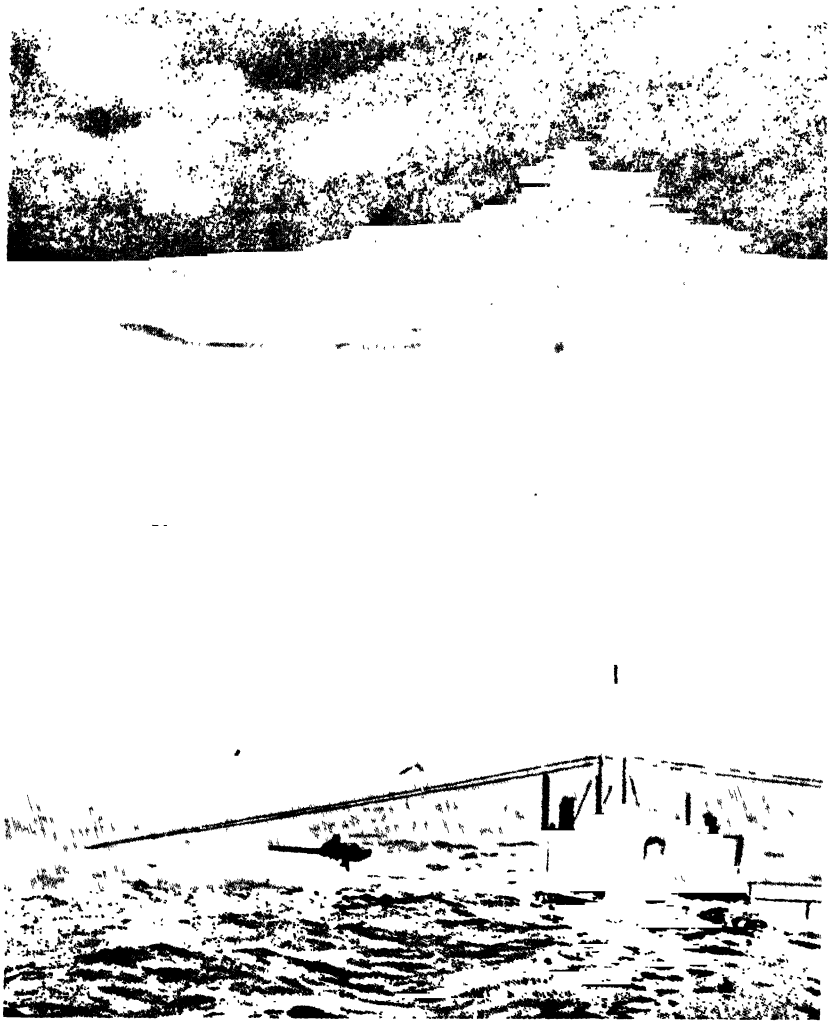


FIG. 138.—H. M. S. *K-6*. A German Submarine Diving to Attack an Allied Convoy. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Convoys can be made more dangerous to approach than in the last war.

The number of German submarines available at the beginning of the

present war is not definitely known. Sixty-five are believed to have been afloat, but crews were not all well trained.

Disregarding completely the terms of the Versailles treaty which limited German naval tonnage and did not permit any submarines, England, in 1935, ignoring her allies, made a treaty with Germany to the effect that in all classes of ships, including submarines, the German



FIG. 139.—A paravane being hoisted out. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

Navy could be one-third of the British Navy. A clause in the treaty permitted Germany, under circumstances of which she was practically to be the judge, to possess submarine tonnage equal to that of the British. Germany took advantage of this clause in 1938 and has steadily enlarged her submarine force, despite large losses, since the present war began.

England also permitted Germany to occupy and fortify Helgoland and surrendered the right to base her fleets on Irish harbors in the event of war. It is apparent that England's naval strategy during a number of years preceding the present war, was seriously—almost fatally—faulty, and that she is heavily handicapped by reason of her own shortsightedness.

Mines

Turning now to mines. In destructive power they exceed those of the last war, but the early successes of the magnetic mine and the laying of mines by planes in rivers and harbor mouths, have been, to an extent, overcome by more efficient lookouts, patrols, and mine sweeping and by minimizing or neutralizing the magnetic effect. At the end of 1940, mines may be said to have relatively the same importance as in the last war, after ships were supplied with paravanes, and before the United States entered the war and began the extensive mine-laying already described.

Planes

The greatest change in land and naval war, since 1918, has resulted from the steady increase in the speed, endurance, and offensive powers of land and seaplanes.

Planes intent on bombing may now be encountered by surface ships almost anywhere at sea. Anti-aircraft guns to attack bombers within gun range and pursuit planes to attack them, whether within or beyond gun range, are carried on all major ships. Aircraft carriers—a product of the last war, mounting guns for their own defense and carrying bombers, as well as fighters—are now units in all major navies. Their planes effectively attack the enemy on land as well as at sea. The ineffectiveness of planes from carriers, in both land and sea attacks, during the last war, has been referred to in Chapter L. In this war the plane is a major weapon.



Fig. 140.—Air bomb. (*Courtesy U. S. Naval Academy Museum*)

Surface Ships

What shall be said of surface ships now as compared with those of the last war?

As a result of the attempts to limit naval armament through treaties the numbers of capital ships has markedly decreased. The following table compiled from Jane—1919 and 1939—includes, under capital

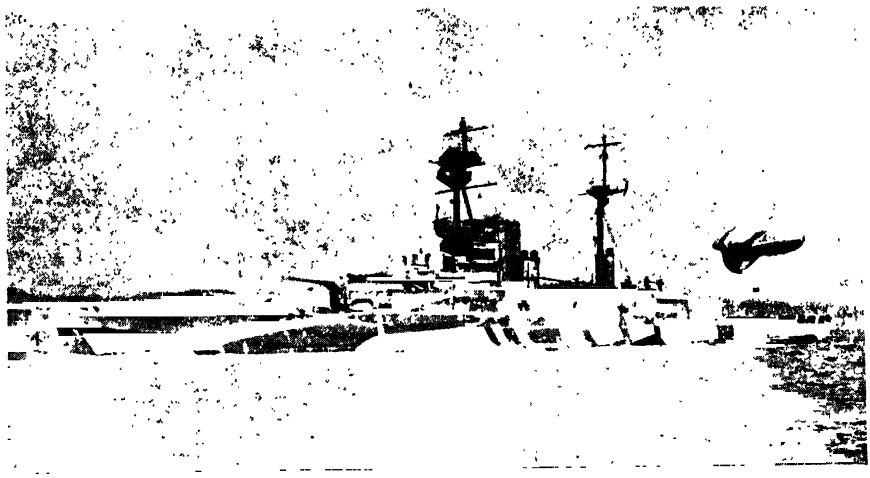


Fig. 141.—H. M. S. *Revenge* and Captive Balloon.

ships, dreadnaughts, battle cruisers, and serviceable battleships less powerful than dreadnaughts.

Capital Ships	*1919*	*1939*
France	15	7
England	43	15
Italy	11	4
Japan	18	9
U.S.A.	41	15
Germany	0	5
Totals	128	55

Germany, Italy, England, Japan, and the United States are building all classes of ships—battleships, cruisers, destroyers, submarines, and auxiliaries. The ratios in capital ships as of 1939 will change rapidly. At that time, in capital ships, Germany, Italy, and Japan combined, slightly exceeded England; but the latter had not only unity of com-

CHART VII

		United States		England		France		Italy		Japan		Germany	
		No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
Battleships	Built	15	464,000	15	475,000	7	164,000	5	104,000	10	301,000	7	108,000
	Building or appropriated for	8	300,000	9	335,000	4	140,000	4	140,000	3	121,000	4	150,000
Cruisers	Built	35	310,000	63	460,000	18	150,000	21	151,000	40	286,000	8	56,000
	Building or appropriated for	8	60,000	23	127,000	3	24,000	14	56,000	5	44,000	7	58,000
Aircraft Carriers	Built	5	120,000	9	149,000	2	32,000	0	0	11	147,000	0	0
	Building or appropriated for	2	35,000	7	138,000	2	36,000	0	0	2	25,000	2	39,000
Destroyers	Built	222	275,000	184	244,000	71	121,000	130	133,000	111	142,000	45	53,000
	Building or appropriated for	42	66,000	33	60,000	30	47,000	12	15,000	9	15,000	9	16,000
Submarines	Built	95	92,000	59	62,000	76	73,000	105	80,000	59	77,000	58	25,000
	Building or appropriated for	19	27,000	14	11,000	26	24,000	28	31,000	3	6,000	43	9,000
Total tonnage			1,749,000		2,061,000		811,000		710,000		1,164,000		514,000

Tables give numbers and approximate tonnage as of Oct. 1, 1939 of each of the principal classes of combatant ships built, building, and authorized for the leading maritime powers.
Of the 222 United States destroyers, 8 were light mine layers, 2 mobile targets, 1 experimental.
Japan, in addition to destroyers listed, had built or building 20 torpedo-boats of about 600 tons each.
Germany, in addition to destroyers listed, had built or building, 30 torpedo-boats of about 600 tons each.
The treaty of Versailles prohibited submarines in the German Navy and limited her total tonnage of combatant ships to 100,000. In 1935, by agreement with England, Germany began to exceed Versailles treaty tonnage limits, and also began to build submarines.

mand, but could have actual unity of ships, while the ships of her enemies were divided between the Atlantic, the Mediterranean, and Asiatic waters, with no real possibility of uniting them.

At the end of 1940 the approximate numbers of ships of each class available to the combatants and to Japan, their potential ally, and to the United States, are shown here.

England exceeds all three of her enemies combined, in cruisers and destroyers, but a large percentage of both are employed in convoying her food and munition ships, and many cruisers are on blockade duty to cut off German and Italian sea commerce. The offensive against submarines—searching for and destroying—carried on by destroyers, patrol craft, large and small, has now a strong addition in the plane.

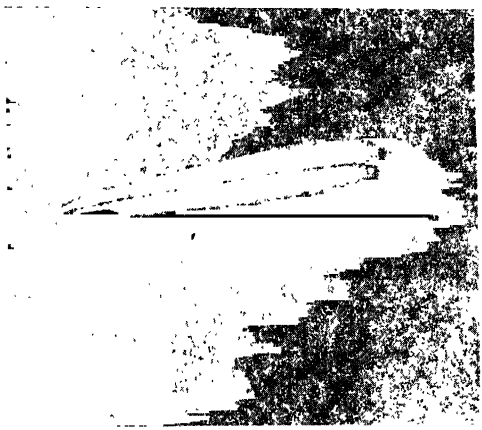


FIG. 141a.—Blimp.

As in the last war, except when surprised at Jutland, Germany's war at sea is one of attrition. In this, the bombing plane is now an important addition to the submarine; but both above and under water, capital ships and cruisers can now withstand more hits without being sunk. The greater menace is to merchant ships. It may be fairly assumed that no major fleet action, such as Jutland, will occur in this war, but every tactical maxim evolved for fleet actions as set forth in this work is applicable to minor as well as major battles.

Camouflage, as a means of deception against submarine attack, proved ineffective during the last war, and will not be of any particular value in this war.

The submarine cannot be deprived of its initiative because of its invisibility, nor the plane of its initiative against surface ships on account of the extreme rapidity of approach and withdrawal. Then how shall surface ships carry out our principal tactical maxim—attack—against these elusive craft?

The means of attack—guns and planes—must be in instant readiness; the first to fire, the latter to take off. The sector method of lookout

was developed to a high degree of efficiency on many ships during the last war. It must be kept efficient on all ships. Deep draught ships must turn away from the vicinity of a submerged submarine.

No limitations on the size of planes and their armaments were included in any of the limitation of armament treaties. These treaties affected, to some degree, the size and batteries of cruisers, destroyers,

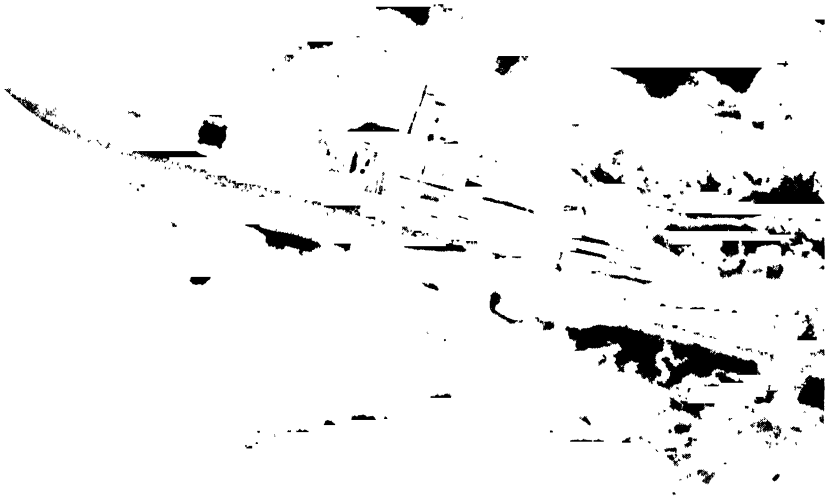


FIG. 142.—A British Coastal Motor Boat at High Speed. (*From Wilson's "Battleships in Action," published by Sampson Low, Marston & Co., Ltd., London*)

and battleships. Their tendency was to freeze existing types and to halt advances in design of hulls and armament.

Germany was not a party to any of these agreements—all of which lapsed at the outbreak of war in 1939. Freed from treaty restrictions, designers may find means of increasing both offensive and defensive power on the same tonnage, and particularly of making such changes as will conduce to more rapid building.

No gas attacks have been made during this war, although its use was spreading rapidly in the last war. It is believed that all combatants have lethal or disabling gases on hand, or the means of rapidly producing them in readiness. Ships' guns can fire gas shell, and planes can gas ships. The accepted means of defense—gas masks—have been distributed to civilian, as well as military and naval personnel. But gas as

a weapon has not been employed, possibly for fear of reprisals. Summing up, surface ships differ in degree only, not in kind, from those of the last war. Their speed and endurance is, on the whole, greater; their vulnerability, less. Their guns do, or should, make hits at greater ranges. Their batteries include double-purpose guns for attacking planes and destroyers. Capital ships, as in the U. S. Civil War, have attacked and resisted fire from shore batteries and heavy guns. The qualities and purpose of the submarine chasers built by the United States in the last war, and the improvements incorporated in the Eagle Boats, are continued in craft built under the general title of patrol boats.

Communications

So much for the carriers of destruction—surface ships, submarines, planes, and mines. Have the means of communication been improved since the last war? Can commanders direct and control their forces at will?

Mechanical means of signaling—flags, lights, and sound—are practically the same as in the last war for close and (limited) distant communication. Radio signaling has substantially improved. Although it was usually effective over small, medium, and sometimes great distances, during the last war, failures occurred at critical times, perhaps as much from faulty or deficient fighting instructions as from defects of material.

Radio's field of usefulness, strategically as well as tactically, is as wide as the sphere of operations. In its most effective employment, tactics and strategy merge.

To be brief and at the same time clear in comparing its present possibilities with those in the last war, we resort to a form of tabulation:

The principal theater of naval operations in the last war was centered in the North Sea and waters adjacent to England and Ireland. Major allied operations were those of:

(a) The British Grand Fleet based on British North Sea ports against the German High Sea Fleet in the North Sea.

(b) Protection of troop and merchant ship convoys with surface ship escorts against attack by German submarines and surface raiders.

(c) Anti-submarine patrols by submarine and surface vessels mostly in the Northeastern Atlantic.

(d) Special service squadrons for operations against German surface raiders.

(e) Joint Army and Navy landing operations at Gallipoli.

(f) Limited short distance aerial observation patrols.

The operations conducted by the various types of forces listed above were comparatively slow moving and except at Gallipoli required little co-ordination, involving radio communications, between air, surface ships, submarine, and land forces. Information to commanders of forces under way flowed principally from the British Admiralty, either direct or through the Commander-in-Chief of the Grand Fleet.

Radio transmitting ranges of ships and planes were approximately as follows:

	Normal Transmitting Ranges	
	Day	*Night*
Submarines and surface vessels of corresponding size	50-100 miles	100-200 miles
Large vessels	500-1000 miles	1000-2000 miles
Planes	Little if any radio	

The high power radio stations on shore could transmit to ships at sea over distances of a few hundred miles under unfavorable weather conditions and over several thousand miles under the most favorable weather conditions.

Due to the very limited number of frequencies available with the then existing spark transmitters, comparatively slow visual communications were the primary means of intra-fleet communications.

Radio and sub-surface (sound) direction finders were in the early stages of development, but much valuable information was obtained from these by the British, particularly in the North Sea area.

The political alignment in the present war is almost the reverse of the last war. Since the fall of France, the British Empire has no belligerent allies, except Greece.

While the North Sea and the vicinity of the British Isles are still the principal theater of naval operations as regards threatened invasion and protection of merchant convoys, the actual or potential Axis powers, Germany, Italy, Japan, and France extend the theater of naval operations over most navigable waters from the Mid-Atlantic eastward to the Mid-Pacific.

British naval operations during the present war may be classified as follows:

(a) Defensive operations in the North Sea to guard against German invasion, and offensive operations mostly by air forces to inflict

damage on German invasion bases and industrial areas. These operations involve planes, surface vessels, submarines, and land forces requiring close and instantaneous co-ordination.

(b) Offensive operations in the Mediterranean against Italian naval forces and bases.

(c) Protection of troop and merchant convoys with surface ship and plane convoys against attack by enemy submarines, surface raiders, and bombing planes.

(d) Anti-submarine patrols by submarines, surface ships, and planes.

(e) Special service squadron operations against German surface raiders.

(f) Joint Army-Navy landing and debarkation operations involving all elements of Army and Navy forces including naval support of land and landing operations.

(g) Extensive aerial operations both offensive and defensive.

The operations conducted by surface vessels and submarines have not increased materially in speed. However, since these operations are now almost invariably associated with plane operations, the communication problem assumes the speed of the fastest element, and, therefore, may be described as 300-knot communication as compared with 10-knot communication in the last war.

The development of radio during the period between the two wars parallels in degree, the development of planes. High frequency radio equipment in all types of vessels and planes permits instantaneous day and night communication with all elements of the naval forces at distances greater than their cruising radius. Super high-frequencies with their associated short ranges, provide unlimited frequencies for intra-fleet or intra-unit communications.

Radio direction finders have been developed to obtain bearings on all signals which can be heard. This brings about "radio silence" for some operations. But sub-surface listening on moving (ships) and fixed stations, cancel, to a degree, the concealment afforded by radio silence.

It might be assumed at first glance that the communication requirements of the present war can be easily accomplished. The reply is—outside of the North Sea and English Channel waters—yes! But in these waters, density of operations in the water and in the air, in the case of an attempted invasion in either direction, may result in mêlées at some points. Nevertheless, the best co-ordinated force enters the mêlée with an advantage which only superior training in all forms of communication can give it. Baudry's expression "making numbers,"

still applies. In other words, be superior at the place of contact. Full use of the means of communications which exist, carrying terse, clear, and (most important) *timely* orders, spells success in *attack*.

Little is known and less can be divulged at the present time, of communication failures. The high speed of planes and joint operations involving all elements of land, air, and sea forces, add a co-ordination feature to the communication problem which was not present in the last war.

The first unopposed German operation on the Norwegian coast, the sinking of the *Rawal Pindi* by a German pocket-battleship, without assistance from nearby aviation units in Scotland; the passage of French naval units through the Straits of Gibraltar in the vicinity of superior British naval force, indicate that failures of communications may, as in all previous wars, occupy a prominent part in the history of the present war, despite the means of observation and communications available to commanders-in-chief and admiralties. Some authorities claim the failures of communications, as illustrated in the Battle of Jutland and during landing operations at Gallipoli, prolonged the war and resulted in much unnecessary loss of life.

Naval tactics are never static. We know that new tactical maxims are in the making although we cannot foresee what they will be. We end, as we began, with this maxim—the value of ships and weapons is comparative only, not absolute. New tactical maxims are evolved to meet changes in both. These are based on attack.

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