MAN

THE KNOWN AND UNKNOWN

By the same Author

A NEW AGE OF FAITH
A SHORT HISTORY OF WOMEN
DANCING CATALANS
MAN AND HIS UNIVERSE
SCIENCE AND COMMON SENSE
INSIDE THE ATOM
HOW WIRELESS CAME
A SHORT HISTORY OF THE FUTURE
BEHIND THE SPANISH BARRICADES
AIR RAID
FINLAND, THE FIRST TOTAL WAR
NERVES VERSUS NAZIS
HOME GUARD WARFARE
HOME GUARD TRAINING MANUAL
HOME GUARD FIELDCRAFT MANUAL
AMERICAN CLOSE UP
LIFE BLOOD
THE BRITISH ACHIEVEMENT IN THE ART OF HEALING
CONQUER FEAR
RUSSIA PUTS THE CLOCK BACK
WESTMINSTER HOSPITAL 1719–1948
GATHERINGS FROM CATALONIA
SEX SIN AND SANCTITY
SEEDS OF LIFE

MAN

THE KNOWN AND UNKNOWN

BY
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CHAPTER ONE

INTRODUCTION: WHAT IS MAN?

YOU HAVE HEARD, no doubt, of the Lost Generation of the 1920's, the one which grew up with the century, its beginning so fitly marked by the death of Queen Victoria and the coming of the Edwardian era. It is the generation to which I belong.

Insofar as we *were* lost and have never yet found ourselves—and I suppose this perpetual state of being lost is true of some of us—it was put down to the spiritual havoc wrought by the First World War. That War rooted up landmarks. It left us marooned without signposts in a featureless desert, covered with broken faiths, abandoned hopes, lost illusions. So the story goes.

Yet we have not had a Lost Generation after the Second World War. Except for a few Angry Young Men, the generation of the 1950's does not consider itself let down by the universe, as some of us may have done now and then.

I do not think these tired decades can be put down solely to wars. After all, there have been peoples simultaneously warlike and intellectually energetic—the Athenians, the Romans, the Napoleonic French. There must have been some other factors, since tiredness is not an inevitable aftermath of war, any more than is world-wide influenza. What sapped our vitality was something more fundamental, and there is no doubt at all what it was.

It was the third hammer-blow of modern science against the dignity of man—a final insult added to previous insults. We were not, of course, individually conscious of this; but it poisoned the spiritual atmosphere and debilitated us as a little unsuspected carbon monoxide may do.

The first hammer-blow had been the new physics, or, to give it a better name, the new celestial mechanics, created by the great men from Galileo to Newton. This had torn us away from

the centre of the universe, and placed us, disinherited machines, on a remote and inconspicuous star. Worse still, their successors showed that the universe itself was running down. No longer was the world a playground invented for our particular delight, or even a training ground where we could qualify for future delight, but a prison in which we, like everything else, lay doomed to destruction by unalterable laws of energy-decay.

Neither Galileo nor Newton, of course, would have accepted this implication of their work. They clung to compensating superstitions, but, as we became more and more enlightened, the superstitions dropped away, leaving us but dust doomed to return to dust, and without hope of resurrection on another day.

Next there had been the new biology, which, for all the brave Victorian effort to saddle the nightmare, Evolution, with the trappings of necessary progress, pulled man down from his throne, a little lower than the angels, and set him on the bare ground, a beast among beasts, the product of a ruthless struggle for existence and doomed to continue the struggle, until the second law of thermo-dynamics in its infinite mercy should release the tired universe from the burden of sustaining any life at all.

And then in our own time came the third hammer-blow: the "new" psychology. Hitherto mankind had been left one illusion. Condemned to annihilation we might be, but at least we could retain our dignity, and remain bloody but unbowed. We had lost our dreams, but we had what was almost divine—our reason. We could hope to learn at long last how to follow the dictates of reason and thereby to keep a good opinion of ourselves. We might be dust on stardust, we might be the product of inevitable jungle-law—so much the more cause for pride had we, that into this dungeon universe, prisoners though we were, we had smuggled a little lamp of our own invention to throw light and disperse shadows.

Then Freud blew out the light.

Our reasons for action were no more than rationalizations thought up afterwards to justify our insatiable longing to play with dirt. The Tree of Knowledge had yielded us bitter fruit, man was a Yahoo playing with dirt till a machine called the Universe ran down and stopped.

To illustrate in precise terms the view of human nature most commonly held at this time, let me quote from the philosopher who had most influence on my generation when it was young—Bertrand Russell:

"That man is the product of causes which had no prevision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and his beliefs, are but the outcome of accidental collocations of atoms; that no fire, no heroism, no intensity of thought and feeling, can preserve individual life beyond the grave; that all the labours of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and that the whole temple of man's achievement must inevitably be buried beneath the debris of a universe in ruins—all these things, if not quite beyond dispute, are yet so nearly certain that no philosophy which rejects them can hope to stand. Only within the scaffolding of these truths, only on the firm foundation of unyielding despair, can the soul's habitation be safely built. . . . Such in outline but even more purposeless, more void of meaning is the world which Science presents for our belief."

Here you have in a paragraph the sum of wisdom as it seemed to the intelligent young man setting out on his individual voyage of discovery in the 1920's. This is all that the achievements of reason throughout the ages had to offer him.

Very soon came the "pay-off." The best educated nation on earth relapsed into mass hysteria out of which came Auschwitz and Belsen and other unspeakable horrors. The most scientific ideology—in the eyes of its professors at least—produced purges, exiles, Lysenko, brain-washing. Britain and the U.S.A. released nuclear power and immediately used it for mass destruction.

Thirty years have gone by since humanity touched bottom in its descent into logically proved despair, and the interval has been spent in reaping the whirlwind. And now on every side there are signs that people are recovering. It is no longer taken as evident that pessimism is the inevitable result of honest thought about man's nature. There is a new look about physics, about biology, about psychology. The Cult of Insignificance and Futility is no longer unchallenged by scientists themselves. Of course this is not all good, since we see old superstitions holding up their heads

again, a new obscurantism seeking to lead back to an Age of Faith which can never return; but also we see that people have begun to believe that just as the Age of Faith gave way before the so-called Age of Reason, so that Age of Reason must give way before a new Age of Sanity.

Let us frankly admit that the Age of Reason has given us no more excuse for optimism about our future or about the future of the Universe than does, in retrospect, the Age of Faith; and then let us see whether all kinds of faith and hope are really as idle as they have often seemed. And perhaps if faith and hope can be rehabilitated, their sister, charity, may be revivified also; and that, after all, is the chief need now that men have thermo-nuclear powers of destruction at their elbows.

What is the distinguishing feature of an Age of Sanity and how will it differ from our present Age of Reason?

Reason is only part of a man, noble, as well as useful, no doubt; but any part that is allowed to usurp more living space within the creature than is its by natural right becomes a tumour. What should have been kept as a weapon against emotional chaos and unbridled desire within and as a tool against the inconveniences of nature without has been allowed to grow chaotically, to become a cancer gnawing away the other parts of human nature. Knowledge no doubt is the province of reason, but wisdom is of the whole man. The Age of Sanity is the Age of the Whole Man in pursuit of wisdom. It is no turning against reason back to a bygone age, but it is the putting of reason in its proper place.

The Age of Reason was a necessary step in man's progress, for superstition had to be struck down and the rules of thought learned, but by letting reason degenerate into a tumour we have bred a new set of superstitions and mis-applied the rules of thought. The Age of Sanity does not bring back what was superstitious in the Age of Faith, but neither does it tolerate what is superstitious in the Age of Reason.

What are the main superstitions about human nature held by educated people who have learned them from the science of perhaps thirty or forty years ago (for by the time science seeps into the intellectual atmosphere breathed by the common man it is always out-of-date, and, be it remembered, every scientist outside his own specialized subject is apt to be as out-of-date as

the common man)? They begin with the nature of dust. Let us *remember that we are but dust and unto dust we return! But* what is dust?

The nature of dust does not belong to biology which is the real province of this book, but since even matured minds have been known to feel depressed at the thought that their bodies, and the bodies of those whom they love, will one day be blown in the wind, let us first consider what physicists have to say about matter, that ugly brute fact as it seems to our common sense, which makes materialism seem so grim a doctrine. It will not detain us long, but as a training for tackling the question What is Man? a glance at What is Matter? will have distinct value.

Next there are superstitions about man as a machine. Just as we are but dust, so we are taught to believe that we are but machines. Even university professors still sometimes believe that mechanism and science are identical. This is because they have not kept up with the times except in their own subject. "What is the sense of talking about a mechanical explanation when you do not know what you mean by mechanics?" asked Professor A. N. Whitehead. What indeed is the point of saying that man is a machine, when celestial mechanics itself has ceased to be what people meant by *mechanistic* fifty years ago?

Of course mechanism has a meaning and a justification, if it is strictly defined as a useful way of studying some sides of human nature, but that is not what out-of-date scientists believe or intend us to believe. To deny that a mechanistic approach can wholly satisfy our desire to understand ourselves is not a return to the Age of Faith but a necessary preliminary to entering the Age of Sanity. As we shall see, the modern scientist does not say Man is a machine, but How far is it useful to study man *as if* he were a Machine? He leaves the larger question to the philosopher, and most philosophers have decided that to call a man a machine does not get us very far.

We can begin our study of human nature by considering our body as dust and as a machine, but to consider the body apart from the mind is of strictly limited value, a fact far more appreciated today than fifty years ago.

It is artificial either to consider the body apart from the mind or the mind apart from the body. However, the abstraction is justifiable as our object is to see that the body which grows and

dies and decays into lifeless forms of matter is a very different thing in the light of modern ideas of matter and mechanics from what it appeared not so long ago—emotionally different, that is, even if the general psychological picture holds good.

Next there are superstitions about Evolution. We must consider ourselves as the product of Evolution, but we must ask whether we are anything else besides. That question amounts to asking if the biological hypothesis of Evolution accounts for everything in human nature or whether there is not also something about human nature on which evolutionary theories throw no light.

To say that philosophically-trained biologists today no longer assess the importance of biological evolution in human destiny as they did two generations ago does not mean that they are no longer evolutionists. The Age of Sanity scraps nothing of the solid gains of the Age of Reason in this field, but it scraps a great deal of the flimsy accretions which uncritical people have added.

Once the misconceptions which have accumulated as a result of the very triumphs of the Age of Reason have been cleared away, we can proceed to the positive side of our inquiry.

In a recent book, Professor Julian Huxley has made an important contribution to thought by facing the fact, as the older evolutionists never did, that the Human Phase of Evolution is not to be considered as a mere continuation of the Animal Phase. If the propositions which proved so useful in elucidating the history of animal life are to be as useful for elucidating the history of human life, they must be revised to allow for new factors. Not only must such ideas as survival of the fittest and struggle for existence be modified, but we must realize that man as a thinking and self-conscious animal has become to a great extent the arbiter of his own destiny, and the controller of his evolutionary path. What then must he do to fit himself to fulfil his task as he would wish, to avoid disaster and to achieve success? Professor Huxley writes as follows:

"One obvious task for the Free world to undertake is the scientific exploration of human possibilities. This has, of course, begun—to take but two examples, in the study of educational methods and of psychological capacities. But it has not yet been

undertaken scientifically and systematically, from the point of view of exploring possibilities in general rather than establishing a number of isolated facts and conclusions. Immense opportunities are open. . . . The greatest opportunities would seem to lie in applying scientific method to the exploration of man's inner life. The experiences of the mystics of all creeds and of the practitioners of Yoga prove what transcendant states of inner peace and unity of spirit the human personality is capable of. The systematic study of those possibilities of spiritual development would hold out the hope of devising techniques for making them more generally attainable."

I shall attempt to summarize what is so far known of these half-revealed possibilities of human nature.

Thus I shall challenge the suppositions of thirty years ago that the sole occupation of our unconscious selves is playing with dirt. The mind of man has many mansions; it is not all drains and damp-rotten cellars. In the 1920's the general educated public used the great new psychological theories chiefly as an excuse to laugh at ideals and to justify immoral behaviour. Even yet the steadily increasing knowledge of the hidden sources of our mental processes is scarcely used to improve educational method, to develop the artist in each of us, to free ourselves for mystical experience, but almost entirely to smooth out the wrinkles caused by our incompetence in dealing with our sexual desires.

In this matter, as in many others, poets have learned wisdom sooner than scientists. Browning long ago wrote lines from which the title of a recent book has been taken:

> There is an inmost centre in us all,
> Where truth abides in fullness
> . . . and to know
> Rather consists in opening out a way
> Whence the imprisoned splendour may escape,
> Than in effecting entry for a light
> Supposed to be without.

Those who read Freud and his followers avidly in the 1920's did not think much of any *imprisoned splendour*. They thought instead of an internal sickness at once the cause of man's baseness and the excuse for despising anything splendid in his conduct.

Yet, at about the same time as Freud popularized the concept of an unconscious mind, a great writer, F. W. H. Myers, explored in two large volumes this very same concept, drawing from it momentous conclusions, not all of which, admittedly, have withstood the criticism of time. Had men as much interest in fully developing their creative capacities as they have in sex, the name of Myers would be as well-known as the name of Freud.

It is astonishing that with all the attention lavished upon psychiatry so little thought has been given to the practical application of our knowledge of the unconscious to the encouragement of the creative side of human nature. We never think of actively calling upon our gigantic unconscious resources for aesthetic enjoyment; we neglect our unconscious altogether unless it gets out of gear. It is, of course, magnificent that we should have a technique for adjusting our love lives to our own and other people's greater safety and convenience; but why should we not enrich ourselves with a greater understanding, a greater sensitivity to music, to painting, to poetry; or release ourselves from inhibitions that stand in the way of our learning mathematics, or philosophy or languages or the humanities. In our inmost centres are locked up almost infinite intellectual energy, energy which is eternal delight, and we have the key. Why do we not turn it in the locked door? In answering the question What is Man? we must not neglect the creative artist captive within every one of us.

From the consideration of man's hidden creativeness we turn to the new knowledge, still neglected and denied by out-of-date orthodox scientists, about the so-called para-normal faculties of human nature. Let me say at once that in-so-far as these faculties exist—telepathy, clairvoyance, precognition and other stranger things still—they are not abnormal, supernormal or supernatural. Anything that exists is natural and, until it has been seen to fit into the pattern of nature, it is not safe to think that we understand it—or the rest of nature either. And of course we may find that some pieces of the puzzle, wrongly fitted hitherto, must be differently arranged to make room for the new facts.

Thus there is abundant evidence that information can pass from one mind to another by ways other than those we are in the habit of calling normal. Such evidence, which can only be ignored, not denied, must radically affect our understanding of

human nature; but this and other problems of psychical research, or parapsychology, as it is called in America, must be studied in strict obedience to scientific method. There is no "intuitive" short cut to knowledge about facts, normal or seemingly "paranormal."

However, the general reader must not be overawed by orthodox scientific opinion about psychical research. "If," says Professor Whitehead, "you have had your attention directed to the novelties of thought in your own lifetime, you will have observed that almost all really new ideas have a certain aspect of foolishness when they are first produced." The facts of telepathic precognition, clairvoyance and the rest often look foolish; but it is of no importance how "foolish" a fact may be, the only thing of importance about it to a scientist is that it can be shown really to be a fact; and, when the Age of Reason, having created its own superstitions, refuses to accept certain types of fact simply because they look foolish, it perjures itself.

We shall pass on to even more hotly debated subjects. The study of the problem What is Man? has hitherto been divided between scientists, theologians and philosophers. That division has led to nothing but quarrels and disagreements. And everybody has been guilty of unreason. For instance, there need never have been any conflict between science and religion if each side had exercised wisdom. I say emphatically that there is no kind of religious fact which cannot be studied by some appropriate scientific method. If a religious experience is a fact, then the fact must be studied by scientific methods and a religious man would be wrong to deny it. On the other hand the scientist must devise special methods suitable for investigating the particular experience. It is of no use denying, for example, that prayer has any objective result simply because it cannot be weighed and measured or otherwise quantitatively analysed by methods satisfactory for some other psychological phenomena. The proper method of scientifically testing the efficacy of prayer is not likely to be the same as that used for intelligence testing.

Prayer is an example of the sort of thing which the Age of Reason, reacting against the intellectual dishonesty of the Age of Faith, dismissed as superstitious without facing up to some of the relevant facts. Surely no one would disagree that the question What is Man? involves a study of such things. If prayer is a

delusion we are different beings from what we are if there is "something in it."

The first step is to find out what its advocates mean by prayer. They do not mean the childish demand of a number of misplaced savages in our midst that God should rearrange affairs a little more to their liking, but rather the practice of the presence of God as carried out by mystics of all religions everywhere in the world and in all ages. Moreover, their claim is a scientific one, that is, a verifiable one, namely, that prayer so defined produces verifiable results. If human nature can be influenced by prayer then we must investigate it scientifically, since the subject matter of science includes any theory which produces results; and, even though facts may not fit into any mechanistic picture of the universe, we cannot afford to ignore them.

Finally there is what to many is the supreme problem—the question as to whether man survives death. It is certain that the answer to What is Man? will be radically different according as this problem is settled one way or another; yet it is a problem which it is considered not quite proper to raise. Almost everyone has made up his mind on purely *a priori* principles, that is, on unscientific principles. The man who believes he will survive death because one or other of a number of revealed religions tells him so is no more unscientific than the man who is quite certain that he will be annihilated, simply because he does not believe in revealed religion. The question must be solved, if it can be solved, by the same methods of scientific analysis of evidence as with any other problem.

Without for a moment claiming that the problem can be certainly solved, we shall examine it in the only way that can ever lead to certainty, that is, by scientific methods.

These then are the problems which must be considered before anybody can claim to have a useful opinion as to the nature of man. But before they can be tackled there is a myth, a propaganda picture, which must be exploded. The ordinary man, for whom this book is written, stands lost in admiration, partly deserved, before the figure of Science with a capital S. What Science Does, what Science Is, what Science Is Not and what It can and cannot Do—these are not always the same as its public relations officers would have us believe. Certainly scientific thought is one of the noblest of human occupations but it is not another name—a

respectable name which an enlightened man may use without shame—for a dictatorial God. A scientist should not pose as a priest inspired with special knowledge about politics, morals and man's future, and unfortunately some scientists are guilty of precisely this.

We must pause therefore before asking What is Man? to be sure we can answer another important question, What is Science?

CHAPTER TWO

WHAT IS SCIENCE?

§1. *Is the Scientist the Villain of the Piece?*

SINCE THE COMMAND Know Thyself can only be fully obeyed if we approach ourselves in a scientific spirit, it is reasonable to demand that we think clearly what science is. In this chapter I want to consider why so many of us have a false idea of science. Our false ideas are dangerous because they make a scientific approach to the study of human nature more difficult. The very success with which we have laid bare the secrets of the world around us has made it harder to penetrate the secrets of the world within us.

We pride ourselves, of course, on living in a scientific age, and we very seldom doubt that this means anything less than a sane age; and yet there are a number of people who are beginning to think that it is precisely because this is a scientific age that we are all of us, from China to Peru, in such trouble, in so uneasy, uncertain, insecure a state of mind.

They ask why a scientific age should also be an age of fear and of hate and of world uneasiness on a well-nigh unprecedented scale. Has science nothing to do with human happiness? If not, what is its use?

This attitude, for which there is some excuse, leads people to seek other pathways to wisdom, and, especially, to seek dubious means of exploring human nature. It is therefore dangerous and must be answered, for if, as I shall later emphasize, the worship of Science with a capital S is dangerous, an anti-scientific approach to self-knowledge is fatal.

I begin therefore by defending the scientist from those who blame him for the evil arising out of his conquest of natural forces.

§2. *The Price of Knowledge*

In our time the scientist is the chief gardener who brings us the good and evil fruit of the forbidden tree. When our teeth have been set on edge by a particularly sour apple, we blame the gardener, accuse him of being a demonic force, and talk wildly of dismissing him.

He can easily answer us: "It is not I, but the tree, that grows the fruit. I bring you the crop it bears. But I do not force you to eat everything, and if you insist on eating the sour with the sweet, that is your affair."

The tree has recently borne twin fruits: one is the chance to rest tired muscles, to replenish earth's store of older types of energy—wood, coal, gas, oil—in the labour of making the ground fruitful and peaceful factory wheels turn longer; the other is a hotter avenging fire, a capacity for destruction only to be surpassed by the earth's falling into the sun. We, not the gardeners, have chosen the latter, and, even now, the bomb occupies more of our attention than the nuclear power station. We killed tens of thousands before one man's labour was lightened for him by atomic power. Ordinary citizens through their state organizations, not the scientists, are responsible for the choice.

"Dismiss us," say the gardeners, "if you can. But then you will not have penicillin; you will not reduce infant mortality or increase expectation of life; you will once more, like your ancestors, have to use your muscles for labour instead of the machines we can give you. Your crops of daily bread will grow less; floodwater will drown you instead of irrigating your fields; the mosquito with its lethal passenger will sap your strength."

The gardeners are right, the tree can only produce good if it produces the potentiality of evil. It is for us to choose the good and to fly the evil.

§3. *Who is to Blame for Atomic Bombs?*

Monday, August 6th, 1945, is perhaps the most important date of modern history. On that day, 60,000 Japanese men,

women and children were killed, most of them in an instant; 100,000 were injured; a town of a quarter of a million was gutted by fire and the very earth between the buildings made sterile.

A week later a war that had seemed likely to cost another million lives was over. Yet we have never been really successful in hiding from ourselves the knowledge that an evil thing was done on that day.

But, we said, look at the result. On the one hand a Japanese community had been wiped out, on the other a war had been brought to an end, thereby saving perhaps a million lives, and moreover many of them Japanese lives. We made a particular point, for the first time for some years, of having saved Japanese lives. Japanese, Americans, Russians have been saved in hundreds of thousands, and, largely because of this act, the whole world is at last at peace.

Is it? Was Hiroshima the price of peace? As the months and years have passed, many of us have begun to wonder whether there will ever be peace in our hearts again; or whether there will be always war, cold or atomic, in the world from now on. The threat of the atomic bomb hangs over us. Humanity cannot wipe out the damned spot of Hiroshima.

What do many ordinary people say? "Sack the gardeners who cultivated this fruit. Proclaim a scientific moratorium. Prohibit scientific research, at least until the human mind has learned to eat only the good fruit of the Tree of Knowledge and to reject the bad."

Alas! this is all wishful thinking. The right time to stop eating of the Tree of Knowledge was before the first bite in the Garden of Eden. It is no longer possible and it is no longer advisable.

Can we stop even worse perils from being invented? No, and for the same reason. Within ten years of Hiroshima, we have already learned how to create on earth a heat equal to that which keeps the sun for ever burning. If we have done this in a mere decade, in another twenty years we should be able to turn our earth into an incandescent globe. If we use our knowledge for this purpose, astronomers on a distant star may note the birth of a new star, but our tale will have been told.

§4. *Dangerous Knowledge and Dangerous Ignorance*

However, the future will not be shaped by the atomic bomb or the scientists who made it, but by the mind and conscience of man. Scientists did not create the problem. They simply found out ways of placing ever greater stores of power in human hands. That this greatest of all forms of material power has so far been used chiefly for evil is due to the human race being organized in such a way that hate and fear divide us. So long as we are divided by hate and fear the final destination is obvious.

Perhaps indeed we should be grateful to the scientists who stumbled upon the present terrible situation; for their work has set before us, fair and square, the ultimate question: Which is stronger in the world of men: Love or Hate? If Hate, then life will disappear amid the incandescence of a new star; if Love, then further research will remove from humanity its age-long burdens of toil, poverty, disease and premature death.

The great heresy of our age is not the acceptance of scientific knowledge and its fruits, but the assumption that the scientist, *qua* scientist, can help us to choose the good and eschew the evil, that the maker of our machines can be the keeper of our conscience. To avoid this heresy we need to take another look at science and scientists and particularly at our own attitude towards them.

And this is the vital error which we shall find: We, the human race, especially that part of it living in the Western World, have devoted almost all our capacity for scientific thought to the making of machines and to the wresting from nature of the power to put them to work. We have neglected to use our scientific imagination to a comparable degree for studying the minds of those who will decide what the machines will do. We have neglected to use science to solve the problems of environment, of food, of living space, of health, of nervous equanimity, which must be solved if these minds are to be sane enough to use machines sanely. How can we now escape from this one-sided use of our scientific genius? Not certainly by any scientific moratorium, by refusing to learn more lest someone uses knowledge for evil ends; but by redressing the balance between our knowledge of machines and our ignorance of human nature.

We that acquaint ourselves with every Zone
And pass both Tropics and behold the Poles,
When we come home are to ourselves unknown,
And unacquainted still with our own Souls.

What Sir John Davies expressed three hundred and fifty years ago in these four simple lines is as true today when mankind has made its first artificial moons and is on the verge of planting some partisan flag on the face of the natural one.

This unbalanced condition of our knowledge makes it very dangerous to accord to the working scientist an omniscience which he does not possess. Let us not blame the scientists for the political incapacity of the entire human race but let us not make high priests of them either.

If you look at official statistics you will find that there are hundreds of thousands of scientists, or scientific workers. Taken as a whole these men are no more enlightened intellectually than the run of bank-clerks, shop assistants, civil servants and other "workers with brain," whose ant-like and monotonous pursuits make modern life possible. Indeed, much laboratory work is more monotonous, more destructive of imagination, more dehumanizing than the daily work of those others who at least are in perpetual, though perhaps trivial, contact with other human beings. On advertisements of tooth-paste and other domestic articles we see white-coated "scientists" with microscopes on tables gazing with a faraway look in their eyes into the future. These are the men, in the popular view, who see the future. The whole thing is, of course, nonsense.

Although certain political groups, notably the communists, have tried to cash in on the scientific worker, left alone to himself he is no more likely to have the same politics, philosophy, religious faith, moral standards, aesthetic values, as his fellow scientific worker next him at the bench, than have the bank-clerk, the shop assistant, the civil servant. And he has no more right than they have, simply by virtue of his job, to lay down the law about such things.

When a scientist talks outside his special province he seldom knows what he is talking about, any more than the rest of us; but because this is an age of science we let him talk and let ourselves be influenced by his opinion whatever the topic. Even if we stand against the popular assumption that the scientist is an

authority on all human problems, we are still apt to forget that history shows the scientist *just as fallible* in his judgment of new *scientific* discoveries outside his own ever-narrowing field.

§5. *Science with a Capital S*

"Whenever we are told," wrote Professor C. D. Broad, "that 'Science *proves* so-and-so to be impossible' we must remember that this is merely a rhetorical form of 'Professor X and most of his colleagues *assert* so-and-so to be impossible.' Those of us who have the privilege of meeting Professor X and his colleagues daily, and know from experience what kind of assertions they are capable of making when they leave their own subject, will, I am afraid, remain completely unmoved."

Some scientists have essayed to establish a veritable reign of terror among their non-scientific friends; all ideas which they did not think of first, or which are not expressed by one of their colleagues of whom they approve, are destroyed without inquiry into their plausibility. Moreover, this type of scientist often claims that he and his fellows are the sole repository of political wisdom and that the world will not go well until this is realized: that all phenomena, whether psychological, religious or mystical, which cannot be observed in conformity with his rules, must be ruled out altogether; that Science with a capital S is a body of dogma which alone can solve the world's problems. The latter statement ought perhaps to be true, but will never be so while science is defined as that which is approved by the neural patterns within the contemporary scientist's own skull.

Yes, science is the way to reasonable living, but for heavens' sake let us keep the specialist scientist in his proper place. He is the works manager, not the architect or owner of the palace of wisdom, an excellent servant but a very poor high priest.

What then is science? If we leave out the aberrant uses of the word as Christian Science and others like it, science is above all a thing which should be spelt with a small s. Once it is given a capital S, goodness knows where we may allow it to lead us. Science with a capital S is as often as not the streamlined, modernistic name for the Unknown God. *Science says, Science teaches us*, and so forth—these inevitably lead in due course to

Science orders us to do so-and-so, and once more we find ourselves in the hands of a dictatorial priesthood, the very thing from which science claimed, once upon a time, to have freed us.

Let us suspect anybody who writes of science as if it were a person, a force, a god, even a body of laws which we must obey —indeed the last is perhaps the most foolish, because the most subtly dangerous: there are no laws of science which it is possible to disobey. Do not be misled by the phrase "scientific law."

§6. *Scientific Laws*

It is indeed a most unfortunate phrase, since what is called a scientific law is in many vital respects the exact opposite of man-made or God-made laws. The laws, Thou shalt not drive at more than thirty miles an hour, or Thou shalt not kill, are often broken, and when they are broken, the evil-doer is punished. If the Law of Gravitation or the Law of Inverse Squares were to be broken by some well-observed fact, it would mean that the so-called law was not a law at all, or at least that it did not apply in the case of that fact. This implies something often forgotten: new facts are not bound to obey scientific laws as formulated by scientists in the light of other facts.

One trouble with the use of the words *scientific law* is that scientists have felt sometimes that there is a sort of moral obligation for all facts to obey them; for example, for a material body to obey the Law of Gravitation. This sometimes leads them to propound theories which prove to have no relationship with reality. Thus Newton described gravitation but was puzzled by a most unpleasant consequence of gravitation as he conceived it, namely that it implied action at a distance, something which is mechanically impossible and therefore impossible in a universe imagined as a vast machine. To get over the difficulty he invented a gravitational ether, mechanically linking all material things together, and not until the existence of the ether was disproved by experiment could any progress from Newtonian physics be made. In the history of science we constantly find that a second wrong is imagined in the hope that two wrongs will make a right.

A further difficulty has occupied the attention of scientists for many years now: all the so-called laws of science break down

when the gross data given us by our senses, e.g. a stone, are reduced to their smallest constituent parts. We may go on saying that the stone, in obedience to the laws of gravitation, falls to the ground with a constant acceleration of thirty-two feet per second; but if we look at the separate molecules of which the stone is composed, they are found to be doing nothing of the sort. They are moving at various speeds and in every direction including vertically upwards, and the proximity of the earth seems to have very little effect on them. This leads careful scientists to state that the laws we know are statistical; they are true of all the molecules in the stone, but not necessarily of any one molecule. It is possible that we shall have to wait until we have discovered more non-statistical laws, before we can begin to understand more of human nature.

When people fail to understand the nature of a scientific law, they may easily be deceived into denying a new fact because it does not fit into some law which has hitherto been a law simply because all previous facts *did* fit into it. There are many facts about human nature which are still denied because they are thought to destroy some scientific law.

There are scientists, for example, who deny that telepathy *can* exist. This is how they argue: information cannot pass from one person to another without some sort of energy-exchange: thus, if we tell somebody something, energy has to be used to cause sound waves and neural discharges. In telepathy there is no place for energy exchange as physics knows it, therefore telepathy does not exist and anyone who says it does is either self-deceived or a plain liar. That is an example of arguing from law to fact, as if scientific law could annihilate a single fact. It is not a scientific way of arguing.

The first step in such a case is ruthlessly to examine the facts accumulated by properly trained students of psychical research. If the facts obey certain criteria by which other facts are judged then the facts must be accepted, just as Mercury's behaviour had to be accepted, and, if necessary, the scientific laws about the passing of information must be revised.

The best scientists have always recognized that the idea of law exerts such force on their mental processes as to constitute a real danger, and special steps have to be taken to safeguard

facts which appear to go against laws. This is true both when the law is one that the scientist is himself trying to establish and when it is part of the intellectual atmosphere in which the scientist has lived all his life.

An example of the first is Darwin's well-known remark that whenever he came across a fact which seemed to contravert his theories he was careful to write it down immediately, since otherwise it was apt to fade from his memory. As to the second, let me quote from an address by the Nobel prize physiologist Charles Richet to the Society for Psychical Research. He is describing his state of mind when faced with apparently incontrovertible, but also *absurd*, facts actually observed by him in séances with Eusapia Palladino.

"When I left Milan I was fully convinced that all was true; as also were the eminent *savants* who took part in the sittings . . . . But at this point a remarkable psychological phenomenon made itself felt. . . . Note that we are now dealing with observed facts which are nevertheless *absurd*; which are in contradiction with facts of daily observation; which are denied not by scientists only, but by the whole of humanity. . . . After we have witnessed such facts, everything concurs to make us doubt them.

Now, at the moment when these facts take place they seem to us certain, and we are willing to proclaim them openly, but when we return to ourselves, when we feel the irresistible influence of our environment, when our friends all laugh at our credulity;—then we are almost disarmed, and we begin to doubt. May it not all have been an illusion? I *saw*, no doubt; but did I see aright?

And then, as the moment of the experiment becomes more remote, that experiment which once seemed so conclusive gets to seem more and more uncertain, and we end by letting ourselves be persuaded that we have been the victims of a trick.

Our own conviction—the conviction of men who have seen —ought properly to convince other people—but by a curious inversion of rôles, it is their conviction, the negative conviction of people who have *not* seen, and who ought not, one would think, to speak on the matter, which weakens and ultimately destroys our own conviction. . . .

The real world which surrounds us, with its prejudices, well or ill-founded, its scheme of habitual opinions, holds us

in so strong a grasp that we can scarcely free ourselves completely. *Certainty does not follow on demonstration—it follows on habit.*"

Now many of the facts to be described in the latter half of this book are among those considered absurd by orthodox science today, just as Galileo's facts about sun-spots and Jupiter's moons were considered absurd by the orthodoxy of his day. But the only thing that matters in the long run is whether such facts have been well-observed. If so they will outlive the orthodoxy which tries to kill them.

§7. *The Twin Dangers: Will-to-believe and Will-to-disbelieve*

We must, of course, constantly guard ourselves against false results of our inborn will-to-believe. We have been told this so often that most of us are aware of it. What we have not so often been told is that we have a duty to hold the balance fairly between our inborn will-to-believe and our inborn will-to-disbelieve. All scientific progress has come from people willing to take the risk of making mistakes through an open-minded toleration of apparently absurd facts. *Credo quia absurdum* is not a formula for theologians only.

If we look at the history of science we are astonished at the fools which even great scientists have made of themselves by not coming to terms with their will-to-disbelieve.

We laugh at the priests who refused to look at Galileo's telescope, but were they more foolish than the great Lavoisier, the father of modern chemical science and industry, when he wrote a paper to the French Academy proving that meteoric stones could not fall from the sky because there were no stones in the sky to fall?

In this, Lavoisier was showing precisely the same inability to accept new ideas as had been shown by Baumé, the leading French chemist when Lavoisier announced that he had discovered that air was composed chiefly of two separate gases. Baumé, like everyone else, had been brought up to believe in four basic elements, fire, water, earth and air, and Lavoisier's new theory imperilled this, the foundation of all knowledge.

"It is not to be imagined," wrote Baumé, "that these elements regarded as such for 2,000 years are now to be placed among the number of compound substances, or that the results of experiments to decompose air and water can be looked upon as certain truth, or that reasoning on the subject, to say the least, can be anything but absurd. The recognized properties in the elements are related to all the physical and chemical knowledge we have yet obtained. Thus far they have served as our basis for an infinite number of discoveries and support brilliant theories. Are we now expected to surrender our belief in fire, water, earth and air? Are these no longer to be recognized as elements, that is primary substances?"

To us nothing seems more easy to understand and accept than the circulation of the blood. But it is on record that every doctor who was forty years old when Harvey announced this discovery denied it to the day of his death.

When Edison's phonograph was shown for the first time at the French Academy of Sciences in 1878 a leading member, M. Bouillaud, seized the demonstrator by the collar and cried "Wretch! we are not to be made dupes of by a ventriloquist." He stuck to his opinion, and, six months later, announced that it was impossible to admit that vile metal could perform the work of human phonation. The Phonograph was an acoustic illusion.

When Galvani, the father of electricity, by experimenting with frogs' legs, showed the existence of a new force later called galvanism he was laughed at by almost everyone. In 1792 he wrote, "I am attacked by two opposite parties—the learned and the ignorant. Both laugh at me and call me the frogs' dancing master, but yet I know that I have discovered one of the forces of nature."

Majendie, one of the great medical men of his day, said that anaesthetics were impossible and, when Elliotson and Esdaile performed operations under hypnosis, their patients, who said they felt no pain, were accused of shamming.

Cuvier, the greatest anatomist in the early years of the last century, fought all evidence of mankind's great antiquity and insisted that it was no older than the Bible asserted; this in the face of incontrovertible facts in the form of human fossils from earlier geological epochs. But there is no end to such cases.

In all of them we have highly intelligent men opposing facts because they did not fit into current theories. In most histories of scientific progress we hear much of the reactionary intransigence of priests but the equally reactionary intransigence of scientists is played down. Yet most revolutionary scientific discoveries have met with as bitter opposition from scientific orthodoxy as from religious orthodoxy. Let us clear our minds therefore of any idea that a well-observed fact can ever be ignored simply because the existing formulation of scientific laws can find no place for it.

§8. *Scientific Experiment*

Not only are we, the general public, often ignorant of the methods by which a scientist works, but many scientists are ignorant of the methods employed in other branches of scientific work. There is no "*scientific method*" which fits all sciences. Every problem of knowledge has to be attacked with the weapons suitable to it. If we are to explore human nature we must find out the scientific method appropriate to its exploration and that method may not be the same as is suitable for exploring the inside of an atom or even the inside of a human body.

Moreover, there are some general misconceptions which must be avoided if we are to get a true picture of scientific work.

How does a scientist use his brain to add to knowledge? Most people, including most scientists themselves, imagine that it is a matter of cold calculated reasoning and nothing else. If we examine the history of discovery and invention we realize at once that this is not so.

There must, of course, be a trained, reasoning mind as a tool, but much if not most of the work of creative scientific thought is not done by any part of this conscious mind. The crucial part wells up from some unconscious level. Intellectual creativeness is not a conscious act, whether the result is the invention of a steam engine, the making of a poem or the discovery of the principles called Relativity.

The analogy with a game of skill is very close. By dint of constant practise, eye, arm and racket, together with feet and

half the muscles of the body, are taught to correlate their activities in order to return the ball over the net. By long and laborious training they learn to do exactly the right thing every time; but if the player thinks, uses his reason, at the moment when his stroke has to be performed, ten to one the ball will go into the net.

So with scientific work: the brain must be trained to obey all the techniques required for straight thinking, but the inspiration for a new thought is fabricated in a workshop of the "unconscious."

Anybody who has learned to observe his own mental processes will know this. Occupy yourself with a problem, get as far as you can with it, but if you cannot solve it entirely go off and do something else. When you have done an hour's gardening, or played with your children, or had a drink with a friend, return to your problem and you will find it solved. How? Where? Heaven knows the correct answer to these, but an approximately intelligible answer is: the problem was solved by your unconscious mind. Because you were not conscious of the mental processes involved you may very well say: the problem solved itself.

"We read a book," wrote Eduard von Hartmann, "we reject an opinion, without refuting it. Later we return to it, and the opinion appears correct to us. Our thoughts have ruminated unconsciously, then digested and assimilated."

This creative experience comes to most of us in a small way in our ordinary everyday life, but it is only the experience of perhaps one in ten thousand scientific workers as far as their scientific work is concerned. For in the prevailing myth about science perhaps the most foolish of all pretences is that the hundreds of thousands of technicians, whether garage mechanics, chemical laboratory assistants, pharmaceutical or even atomic workers are called upon for creative efforts of the imagination. A bank clerk who ruminated too much on the theory of the bank-rate would probably make a mistake in his figures, the shop assistant engrossed in the problems of distribution in the modern community would probably give you the wrong change, and the laboratory assistant in a bacterial laboratory speculating on the nature of the universe would probably contaminate the pure cultures for which he was responsible.

The applied scientific work which occupies the lifetime of most scientific workers is largely concerned with such routine labour as maintaining standards, testing samples and minding machinery. For these purposes exactly the same qualities are required as for any inanimate scientific instrument, namely accuracy, routine, uniformity; for scientific research into unknown things, these too are necessary, but also almost antithetical qualities—adventurousness, imagination and above all willingness to entertain ideas which may possibly turn out to be wrong—provided the idea is dropped directly it is no longer stimulating. There must be ability to distinguish between the false and the absurd and the latter must be courteously entertained until it is proved to be also the former.

The beginning of a scientific experiment must always be the asking of a question. Then you set about finding a way of forcing an answer out of nature. But while you are using your existing knowledge and training in this way, you can be sure that the question is echoing in the secret places of your mind and that an ability to listen to some answering voice there is as important to the result as all the hard work you are consciously dedicating to the pursuit.

Indeed the creative scientist is just one kind of creative artist, and as far removed from the routine worker in a laboratory as the poet is removed from the skilled person who deciphers his writing and makes the poem readable on a typewriter.

The trouble with all of us when we try to understand scientific work at secondhand is that in the finished work, the intuitive creative processes have almost always been carefully hidden by the rational superstructure. This obscures the fact that the scientist also is a creative artist.

§9. *Picture not Reality. Probable not Certain*

This leads to certain other misconceptions. Many people imagine that whereas the artist deals with fiction, the scientist deals with reality. Reality is an exceedingly dangerous word: "The scientist explains reality," is perhaps the most dangerous sentence that can be made about science. It would take too long to pull to pieces the words "explain" and "reality" and I shall

content myself with a doubtless vague and inaccurate description of what the scientist does, which will, however, certainly be less misleading than to say that he explains reality. The aim of the theoretical scientist is to observe happenings in the world around him and to create a picture or model of the world which shall be a self-consistent pattern into which all the happenings will fit. The applied scientist can more usefully be considered as constructing out of the happenings a map which will enable him and others to move conveniently from here to there.

The relationship between the scientist's picture and "reality" can best be described, following Sir Edmund Whittaker, as *sacramental.* According to the catechism that word means "an outward and visible sign of an inward and spiritual grace, and a means whereby we may know the same, and a pledge to assure us thereof." More simply the scientist creates a meaningful symbol of a reality which can never be known directly.

If we apply this to the question What is Man? we must make up our minds whether we wish to be picture makers or map makers and only the map maker will be content with constructing a blue-print of the human machine and calling it a picture of human nature.

In the restricted field of applied science which concerns itself with machines and the part of human nature which obeys mechanical laws, maps and blue-prints are all that is required, but when you try to understand the universe, the inside of an atom, or the totality of man's being, mechanical laws do not apply and the maps and blue-prints are apt to mislead.

Another dangerous word is certainty. Scientific experiments are seldom designed for the purpose of demonstrating a certainty. Science has usually to be content with the highly probable. It is not, for example, certain that the sun will rise tomorrow morning. The sun, we are told, is in a state of unstable equilibrium, and any time within the next few million years may fall in on itself and become a dwarf star. This may happen tonight, but it is highly probable that it will not. Sunrise tomorrow is at any rate sufficiently probable for it to be advisable that we make our normal arrangements for another day.

In many sciences it is both useful and possible to devise means of estimating the probability of a given result arising from chance. This is done by using a kind of statistical analysis called "signi-

ficance-testing." If the result is one which, according to statistical reasoning, you would only expect as a result of chance, say, once in twenty times, then you assume that the result is not due to chance and that it is probably due to a cause which, if you have been careful in your experimenting, is the one for which you are testing.

How important it is to grasp this can be seen once more by considering telepathy. The orthodox and bigotted scientist who refuses to believe in telepathy usually dismisses any example given him as "mere coincidence." Now telepathy can be experimentally tested and the results statistically analysed in a way that rules out a chance explanation far more impressively than in the case of most scientific facts. The experimental techniques have been elaborated so carefully that there is no likelihood of any sensory leakage and so the experimenter is entitled on scientific grounds to believe that he is dealing with some unknown phenomenon to which he can give the name telepathy or Extra-Sensory Perception (E.S.P.).

Useful as the device of statistical analysis can often be, there lies here a trap for the unwary explorer into human nature. Significance testing can never tell you anything about the thing you are investigating except that it very probably exists. You can devise a test for telepathy the results of which can be statistically analysed; the analysis will perhaps give you the strongest reason to suppose that telepathy does in fact exist; but you are left as far or even farther away from any knowledge of what telepathy *is* or how it comes about.

§10. *Repeatability*

A scientific experiment is designed, then, to test the probability of some fact or theory, and in much scientific work it is further required that the experiment may be repeatable by any competent scientist.

Now here is another trap for the unwary: very many experiments bearing on the question What is Man? cannot, because of the very nature of the subject matter, be repeated.

Let us consider an incident having to do, we may suppose, with the study of human nature. Miss X was so excited by a

detective story that she fainted dead away. This behaviour tells us something about the human nature of Miss X, but unfortunately she was alone when it happened. Dr. Y is writing a thesis on the effect on sensitive maidens of reading detective stories. He quotes the incident. His rival Dr. Z asks if Dr. Y saw it himself. No. Then, says Dr. Z, we must verify the fact by repeating it under experimental conditions.

But how can this be done? Miss X could, of course, read the story a second time under the watchful eyes of the two scientists; but what would be the likelihood of her fainting a second time? It is at least doubtful that any story would have an equally powerful impact at a second reading, and, if Miss X did not faint, it would not disprove her account of the first reading, while, if she did faint, it might well be that she was bored by a second reading, and that she had not fainted at all on the less boring first occasion.

In short, you cannot repeat an experiment if you cannot duplicate the conditions, and in biological problems and especially in that group of them called psychological you can only duplicate the conditions within a limited field (which may of course be adequate for your purpose) because, for one thing, human beings have memories. You cannot *repeat* an experience if memories of the first occasion will radically alter the second.

Bertrand Russell has excellently stated the difficulty as it affects scientific work in general:

"The principle, 'same cause, same effect,' which philosophers imagine to be vital to science, is therefore utterly otiose. As soon as the antecedents have been given sufficiently fully to enable the consequent to be calculated with some exactitude, the antecedents have become so complicated that it is very unlikely they will ever recur. Hence, if this were the principle involved, science would remain utterly sterile."

Now if that is true of all scientific investigation it is doubly so in the investigation of human nature because, as we have said, nothing ever happens to anyone without altering them, so that the same thing can never happen to the same, unaltered person twice.

Strictly speaking, then, the answer to the question What is Man? cannot be studied entirely according to the rules laid down for the physical and chemical sciences, but must sometimes be

studied according to the rules laid down for studying history, that is for studying facts which can only happen once.

We must never forget that science deals with abstractions. It can only study human nature in so far as material suitable for its methods can be abstracted from the sum total of phenomena which we call human nature. The kind of abstraction with which mechanically conceived investigation can deal is material (1) which is repeatable (2) which is measurable. The action of your heart, the response of your brain to stimuli, the effect of your digestion on your mental processes, the response ofyour visual sense to light waves, and of your auditory sense to sound waves —in so far as these can be abstracted from the complete organism, the visible and invisible you—can be studied in accordance with techniques developed for studying inanimate nature. But a good deal is left over!

If you only believed facts which could be repeated under experimental conditions you could not believe that King John lost his crown jewels crossing the Wash, or that Nelson won the battle of Trafalgar. We all know that it is possible to arrive at exact knowledge about such things and, indeed, the probability that Nelson won the battle of Trafalgar may well be higher than the probability that the sun will rise tomorrow morning. The historical techniques for establishing Nelson's victory are the techniques by which we must establish many facts about human nature, blending them where possible with scientific techniques.

Again let me illustrate from the study of telepathy. On November 29th, 1954, I saw in my own kitchen three Spanish girls guess correctly so many cards out of an E.S.P. pack of twenty-five cards that the likelihood of getting such a result by chance alone was astronomically small. They repeated their successful guessing sufficiently often to make the results statistically valid, and the conditions were such that in the opinion of three observers, no normal sensory leakage could account for the result.

In consequence I know that I have seen a fact of the sort that is usually called telepathy or, better perhaps, E.S.P., but how am I to convince X, Y and Z of the fact? By getting the girls to repeat their guessing? That would be ideal, but it is highly doubtful if they would repeat their success. Why? First because we do not know sufficient about the "antecedents," that is, the

variable factors operating in the kitchen at 12 p.m. on November 29th, 1954, to be certain that we can "calculate them with some exactitude"; second, because the presence of X, Y and Z is in itself a new variable very likely to alter the balance of the antecedent variables or, in plain language, because the presence of X, Y and Z may very well put them off; and third, because the girls will certainly not be in an identical mood when being tested by strangers as when amusing themselves with their employers.

Then cannot the fact be believed? It can be, provided there is no evidence that I or anyone else is likely to be cheating. It is a risk that has to be taken whenever a fact of history is to be accepted or rejected. On my word alone the fact stands or falls, and if there were no other facts of a similar nature (not identical or repeated facts, of course) my word would probably not be taken. But when time and again reports from respectable and serious experimenters tell more or less the same story, corroborating the witnessing of a fact which can only be explained by E.S.P., then it becomes foolish for X, Y or Z to refuse to believe it simply because it has not happened in their presence. If they demand that I should repeat my fact in their presence, they are showing an ignorance unworthy of a scientific man, and they can be left in their disbelief while the sum total of knowledge gradually buries them out of sight.

In the course of this book we shall come across many facts about human nature which orthodox scientists refuse to accept for the reasons I have explained. Whatever excuses they make, their real objection is to anything that goes against the climate of opinion in which they have been nurtured. True enough, it is good to accumulate evidence again and again for new facts, it is good to repeat experiments in front of critics, but in the long run the change of attitude can only come by the breaking down of prejudice against novelty.

Nobody has a right to expect new facts to fit into their metaphysical ideas; for example, it is no criticism of a properly observed fact that it does not support a mechanistic conception of the universe. It is, however, essential to show that facts can be fitted into some conception of the universe which shall be self-consistent and free from illogical gaps. *Everything fits*, is an excellent basis for a wholly satisfactory world-picture, and when

facts come to light which show that everything does not fit according to the scheme hitherto accepted, that is nothing against the fact and everything against the scheme. Schemes must give way to facts which do not fit them. Facts never have to give way to schemes.

§11. *The Right of Facts to seem Absurd*

There is a phrase often used by scientists who are ignorant of the philosophy of science, which is dangerous when it is turned against a new, disconcerting, perhaps "absurd" fact. We hear critics talk of the "antecedent improbability" of some fact.

Now, the phrase should never be used except with the greatest caution. I would say "never in any circumstances" were it not that far wiser men than I, like Professor Broad, do in fact use it. One can certainly talk of the antecedent improbability of a *theory*. The theory that the moon is made of green cheese is antecedently improbable; that the moon affects the weather is only less so; but what measure can we have of the antecedent improbability of a fact, and if the fact is a fact what does it matter if it comes as a great surprise?

Some scientists would answer that a fact is antecedently improbable if it does not fit already ascertained facts. But time and again facts are discovered which nobody, from this point of view, could have imagined possible. Let us look at one such fact.

All higher animals which carry oxygen to their tissues make use of a chemical device called a respiratory pigment. This is a large and complicated molecule, built up around a few atoms of some metal, with the special faculty of being able to take up and release again atoms of oxygen. In our case, and in the case of the majority of animals, the metal is iron. Molluscs, insects and crustaceans prefer copper. Both these are common metals and are easily absorbed from the environment of any animal.

Now, around our coasts there are to be found in millions an animal called the sea-squirt. As its name suggests, it spends its entire adult life gargling sea-water. In childhood it is mobile and not unlike a tadpole in general shape. Moreover, in this state it possesses what morphologists regard as a rudimentary type of

backbone. It is in fact the link between the higher world of vertebrates and the lower invertebrates.

One might imagine it as taking pause and, with precognitive insight into what the back-boned creation was going to make of life, resolving against further evolutionary progress. For as it comes to years of discretion it produces phagocytes, like the mobile cells in our own bodies which we use to chase and devour bacteria, and these phagocytes devour the rudimentary backbone. The sea-squirt then settles down to gargle.

The sea-squirt has other peculiarities. It is the only animal in the entire animal kingdom to have a skin-like covering of cellulose, the normal covering of all the vegetable kingdom. And if it meets with unfavourable climatic conditions it literally returns to its youth by growing down, whereas most other animals can only grow up. When things get better, it grows up again.

Finally let us return to the respiratory pigments. The sea-squirt has the most gaudy blood possessed by any animal; there are green, red, orange and yellow blood-cells and the metal it uses as a respiratory pigment is not the common iron or copper but one of the rarest of all elements, an element so rare that its presence in sea-water cannot be shown by ordinary chemical means, but only by spectrophotography. This element is vanadium.

Now what is the antecedent improbability of an animal using vanadium rather than iron or copper for its respiratory pigment? What is the antecedent improbability of an animal having a skin made of cellulose? What is the antecedent improbability of an animal devouring its own rudimentary backbone? And finally what is the antecedent improbability of the animal having all three of these extraordinary idiosyncrasies?

As Hume might have said, since we know that all men are liars, we do well to suppose that a reporter of sea-squirts is a liar rather than believe in sea-squirts.

This is the very argument sometimes used for not accepting well-authenticated facts in new branches of science such as parapsychology.

§12. *Facts and Theories*

We are going through an exciting moment in the history of ideas. Ideas must wait on facts, and the present time is notable for the number of facts, more or less isolated, some of them "absurd," which do not seem to fit into orthodox ideas but which have not yet been able to exert a strong enough pull on scientific opinion to produce a change in accepted theory. Some scientists are opposed to the existence of all these facts on the *a priori* ground that mechanism is the sole metaphysics a scientist can hold.

"Suppose that some extraordinary new phenomenon is reported: should we be narrow-minded or receptive?" writes Dr. George R. Price, and replies: "The test is to attempt to imagine a detailed mechanistic explanation." There in a sentence is expressed the ignorance of the philosophy of science almost universal in an age of scientific specialists.

Not even a physicist, contemplating the intricacies of celestial mechanics, hopes to be able to express his empirical findings in the form of a mechanical model. But there was a time when it was thought possible to design such a model, with pulleys, cogwheels and so forth, to imitate any natural phenomenon, and indeed it was thought that natural phenomena were only understood when their workings had been thus imitated.

So Dr. Price, in 1956, says that he will not believe in Extra-Sensory Perception unless he can have a detailed mechanical explanation. In his article he describes the sort of machinery which he needs before he can believe that something can happen. Unless he has this machinery, the fact did not happen and the man who says it did happen is a liar.

"The way of science," he tells us, "is to build a television system and a radio-controlled robot and have the manipulator cut a pack of cards at the twelfth card down and hold it up to the television camera. The way of magic is to sit in a chair with eyes closed and vaguely wish to know the identity of the twelfth card down in a certain pack 100 miles away; and then the answer pops into one's mind."

Dr. Price, being a mechanist imagines that Dr Soal and other serious students of E.S.P. regard such things as "telepathy" as

supernatural. Now although E.S.P. may be outside whatever particular brand of mechanism Dr. Price embraces, that does not mean that those less old-fashioned in their philosophic knowledge would ever regard it as supernatural, any more than that the sea-squirt is a supernatural monster because it prefers vanadium in building its respiratory pigment to the more easily accessible iron or copper, and cellulose for a skin. Anything that happens is *ipso facto* part of nature and not outside nature. No E.S.P. worker ever called the phenomena he studies supernatural though he may have used the word supernormal to distinguish the perception involved from the usual ways in which we perceive things.

In attacking new facts which do not fit into his scheme of things Dr. Price invokes Hume: "No testimony is sufficient to establish a miracle unless the testimony be of such a kind that its falsehood would be more miraculous than the fact which it endeavours to establish."

Dr. Price adopts this sentence and gives it a meaning which would have surprised Hume exceedingly. By *miracle* Hume does not mean something that goes against the known laws of nature, but something which does not happen frequently enough to make a certain impression on the mind. For Hume denies that the idea of *cause* is anything but the emotional effect on the human mind of noticing that two things follow one another again and again.

Hume expressly states that if nature is opposed to miracles, then any event which happens in the world is natural, i.e. rare causal events are not breaches of natural law, but only seem so, because they are not repeated often enough to produce the emotional effect which gives us the sensation of cause.

The point cannot be better put than it has been by Professor A. J. Ayer, a philosopher who is not, as far as I know, notably sympathetic with E.S.P. "Once we have abandoned," writes Ayer, "this metaphysical conception of natural law in favour of one that is empirically significant, there is no reason why we should draw any distinction between the occurrence of a 'miracle' and the occurrence of any other event that runs counter to some accepted hypothesis. Whether such events as are commonly designated as miracles have ever actually occurred is a question into which there is here no need to enter. For even if they did

occur, their occurrence would prove, not that the operation of the relevant laws could be suspended by a 'higher power,' but simply that we were wrong in supposing them to be universal laws; and then we should be left with the task of trying to find some other laws to put in their place."

Exactly. If Dr. Price uses the word miracle it is because it is a term of abuse to most intelligent people; what he really means is a certain comparatively rare event, and if these facts refute natural laws "we are left with the task of trying to find some other laws to put in their place."

Once more at this moment of history the battle is between the orthodox priests of the law and facts which cannot be gainsaid. The duty of intelligent explorers of facts is to try and get the priests of orthodox science to look through the telescope at Jupiter's satellites.

§13. *A Blindspot in Certain Scientists*

What makes this so difficult is that there is a serious blind spot in many scientists which makes them unaware that their ideas are saturated with unproved metaphysical assumptions. It is most important to stress this, because it has affected the general public and has had very grave consequences for this age.

Consider two different statements about the universe and man:

(*A*) All existing things were created by an eternal spiritual force for the use of man, who contains an eternal spiritual part. This spiritual part is responsible for the growth and health, or ill-health, of the body and can have association with other spirits who may be with or without a body, and may obtain knowledge from them which could not be got from material sources.

(*B*) All existing things are forms of a single substance called matter, out of which they have evolved without the functioning of mind or non-material force. Certain forms of matter such as hormones, enzymes, etc., cause and control what we call mental processes. Impulses (probably electric) in the brain cells manufacture thought, and Beethoven's *Posthumous Quartets*, Kant's *Critique of Pure Reason*, Michelangelo's *Sistine Chapel*, are the result of the "harmonious interplay of the drives of hunger,

love and power." No knowledge of any sort comes from other than material sources.

The set of assumptions contained in (*A*) is what modern science has overthrown, because it did not prove useful for achieving the ends of a scientific civilization. But equally the set of assumptions contained in (*B*) which can no more be proved or disproved than (*A*), have been *accepted* by modern science.

Too many contemporary scientists do not say: "Neither (*A*) nor (*B*), I deal solely with what can be proved," but: "I accept (*B*) in place of (*A*)." In so doing he might be behaving wisely if he did not add: "I accept (*B*) as The Truth and shall ignore or deny any fact which makes (*A*) or any other metaphysical scheme (*C*), (*D*) or (*E*) appear just as plausible." But it is precisely this impermissible sin against science that modern orthodox scientists tend to commit.

Now the coming scientific revolution is not a mere pendulum swing back from (*B*) to (*A*). Far from it, we get nowhere from the sort of argument that might go like this:

A. God made dust.
B. No, dust made God.
A. The soul controls the body.
B. No, the body controls the soul.
A. Souls can exist without bodies.
B. No, bodies exist without souls.
A. I have a universal mind limited by my body.
B. You have no mind except what your body makes.

That sort of argument can go on for ever until A and B both realize that not one statement they make can be either proved or disproved.

If they can both reach that stage good may result, because they can both give up flinging "truths" at one another and indulging in absolutely meaningless differences of opinion.

It is hard for both A and B to reform themselves. A will tend to seize on any retreat from pure materialism on B's part as a proof that he, A, was right all along. Thus we have seen an attempt to reintroduce the orthodox Christian God into the universe by way of Heisenberg's Theory of Indeterminacy. B will be afraid that if he concedes a point the whole force of superstition will rise up again; and in some quarters it probably will.

The first step is for B to realize that to explain everything in terms of matter, on physical grounds, is as arbitrary, as unscientific as to assert dogmatically that everything can be explained in terms of spirit. "We delude ourselves," says Jung, "with the thought that we know much more about matter than about 'metaphysical' mind, and some over-estimate physical causation and believe that it alone affords a true explanation of life. But matter is as inscrutable as mind. As to the ultimate we can know nothing, and only when we admit this do we return to a state of equilibrium." Here, though by no means always in his writings, Jung is expressing the beginning of scientific wisdom.

To sum up: What it amounts to is that the success with which we have built up the mechanical sciences and the wealth that they have brought to us have made us assume that a mechanistic technique and scientific method are identical. By following the techniques which produce a multiplicity of admirable machines we have, of course, been able to understand that which is mechanical in human nature and we have tended to ignore the fact that if we confine ourselves to the principles of mechanical science only a part, and the least interesting part of our experience as human beings can be studied.

This leads to the danger of anti-scientific philosophies, and claims that other paths than science lead to the palace of wisdom. The fault lies in our assuming that there is only one Scientific Method whereas there are as many scientific methods as there are separate sciences. We have not yet discovered all the rules for studying human nature scientifically and our next step will be to sweep away irrelevant rules which, in an excess of humility, we have accepted from the highly successful students of machines. The practical result of not having as yet done this is that we have thermo-nuclear bombs in the hands of human beings not wise enough not to use them.

That is the most urgent problem facing humanity today.

CHAPTER THREE

WHAT IS THE BODY?

A. Dust

§1. *Remember that we are but Dust*

BUT WHAT IS dust? Or, to use a more normal term in scientific language, What is Matter?

Human bodies are composed of precisely the same chemical elements as the ground beneath their feet; as far as the *material* is concerned, there is no difference between a living organism and the sands of the sea-shore and the water of the sea, any more than there is material difference between an animal body five minutes before and five minutes after death.

It used to be believed that some subtle difference existed between the chemical compounds involved in the life processes and similar compounds found in inanimate nature or made by a chemist in the laboratory. Thus in 1827, William Henry, a distinguished English chemist, stated that it was unlikely that the chemist would ever be able to imitate the processes of living nature since "in the functions of a living plant a directing principle appears to be concerned peculiar to animated bodies and superior to and differing from the cause which has been termed chemical affinity."

This was merely a mistake, very soon to be corrected, and it would not have mattered much had not this alleged difference been given a quasi-religious significance. It was thought by many that man with his immortal soul was, as to his body also, subtly different from the dust beneath his feet. Look at the substances which he makes with his body, people said, true they are more or less like the chemicals you meet elsewhere, the elements are the same, but the compounds made out of them by vital pro-

cesses are never found outside a living being. Therefore life is different from dead rocks and sand and clay; man is dust, admittedly, but it is dust-with-a-difference.

§2. *Synthetic Urea*

One day in 1828, the German chemist Wöhler blew sky-high the dust-with-a-difference theory. Working at his laboratory bench, Wöhler became the first man to make urea, an important constituent of urine, without the help, as he put it, of man, dog, or kidney; and, believe it or not, this was regarded, by some people, as a very serious blow to a belief in the existence of God. We will try to see why, and let me preface the story by saying that the fault lay largely with those who backed their belief in God with such supposed facts as that urea could not be made except by a vital organ in a living being.

Although the animal body makes use of nitrogen as a constituent in many compounds the free element must be expelled from the body. In human beings and in many, though by no means all, animals, this is done by the manufacture of a molecule containing two atoms of nitrogen, wrapped up, for safety as it were, with four atoms of hydrogen and one each of carbon and oxygen. This molecule $H_2N.\ CO.\ NH_2$ is called urea, and it is not found outside living bodies. It was regarded therefore as one piece of evidence that living matter was fundamentally different from inanimate matter. Whilst one set of people believed that the *difference* between animate and inanimate was complete, another set believed that the *similarity* between them was complete, and the latter's reaction to Wöhler's invention was to cry: You see, there is another proof that living matter is exactly like non-living matter; and, added some, that is another proof that there is no God.

It was of course nothing of the sort. Strictly speaking, it was *evidence* (which is not the same as proof) that living and non-living matter are the same as far as the organic substance urea is concerned. Of course it might be more or less safely inferred that the same would be found with other organic substances. But even if synthetic urea was a blow to a crude sort of "vitalism," it did not dispose of vitalism altogether and had nothing at all

to do with the bigger problems of whether man is a machine, a living soul, both, neither or something else as well.

What Wöhler showed was that those who wished to prove God's existence from the dust-with-a-difference theory were foolish, but he did not prove that those who wished to disprove God's existence from the nothing-but-ordinary-dust theory were right. This sort of pseudo-religious controversy has bedevilled the whole history of biology, as also has the tendency to imagine that some scientific discovery proves or disproves far more than it actually does.

Sometimes it is the existence or non-existence of God that people try to prove from quite inadequate materials, sometimes it is the existence or non-existence of a mind apart from the brain and body. Since we are dealing with the nature of man and not the nature of God, it is this second problem which will occupy us, and whatever conclusions we come to we must guard ourselves against using the bad arguments too often relied upon by either side in the argument.

We all have beliefs which we would like to see justified, and, unless we discipline our minds, we find that justification in quite inadequate ways. We need not deny this failing for we share it with the best of men. Aristotle, one of the noblest intellects, had it as badly as anyone.

He was convinced, for example, that women were inferior to men, and he justified this belief to his own satisfaction by the fact (as he thought it) that women had a lower temperature than men. Whether the modern phrase "not so hot" derives directly from Aristotle I cannot say, but he most certainly would have agreed with the statement that women were not so hot (in the slang sense) because they were not so hot (in a thermo-dynamic sense).

Thus Wöhler, besides his contributions to chemistry and biochemistry, did a great service to those whose study is the Whole Man. He showed that whatever man was and whatever claims he might have to be a living soul (however you like to define those two words) it was no use founding any theory on a vital difference between the dust of a living being and the dust of inanimate nature. All attempts to demonstrate the dignity of man in this way are doomed to failure. The dignity of man is the dignity of dust itself; and since his day dust has indeed been

exalted above the dry little fragments which Lucretius imagined to be the building bricks of creation.

§3. *The Dignity of Dust*

The story of dust since the last years of the nineteenth century has been one of increasing wonder, that is, of increasing pleasurable surprise at finding life to be more curious than was expected. One could not derive much pleasure from imagining one's body disintegrating into the "solid, massy, hard, impenetrable, movable particles" out of which according to Newton, God made the world. After all, a living organism is above everything a vortex of creative energy; and a solid particle infinitely small is dead. Today the physicist has revealed that the ultimate constituents of matter are as full of creative energy as ourselves, that indeed matter is nothing but a vortex of creative energy with nothing solid, massy, hard or impenetrable about it.

Scientists are often criticized for constantly changing their picture or model of an atom. I have heard the sarcastic suggestion that there should be an Atom of the Month Club. This is because non-scientists do not appreciate what is intended when they have an atom described to them.

Indeed the question: What is Dust? is not really the sort of question which scientists claim to answer. The proper question to ask them is: What are the properties of dust, or matter? All they can give the general public is a description in imaginative pictorial form of the sum total of the known properties. A model of the atom is in no way like a miniature model of a ship or aeroplane or motor car. On the contrary, it is much more like a knot tied in a handkerchief to remind us of something; and since the properties of matter are constantly being more fully understood, the model has to be changed, often not merely in detail but radically.

§4. *The Changing Atom-Model*

For Lucretius or Newton all that was required of the smallest particles of matter was that they should never wear out. They

must be really hard so that no amount of friction involved in the wear and tear of the universe-machine should alter them. For Dalton they had also to be of different sorts to account for the different chemical elements which he was able to show existed. Provided you accepted the existence of many sorts of building bricks instead of one, nothing more had to be added to the original idea of an atom. There were ninety-two kinds of such hard, impenetrable particles and since that explained all known properties of matter it was an accurate enough picture of matter.

But when Sir J. J. Thomson was able to show that the stream of light seen passing along a Crookes Tube consisted in particles of negative electricity, as it were knocked off or out of atoms, a new model had to be created. The atom still remained a hard, impenetrable ball, but, sticking to it, was a minute electron, the ultimate particle of negative electricity.

A generation later, towards the end of the last century, when radium had been discovered, it was an obvious experiment to bombard matter with minute particles spontaneously emitted from the radio-active element. When the atom-target was bombarded by radio-activity it was naturally assumed that the missiles that hit the target would bounce back. They did not; they went right through. In fact they went through so often that the atom-target was revealed as almost entirely empty space, bounded by rotating electrons, and a minute positively charged particle in the centre. It became popular to say that if all the empty space in the atoms of which the earth was made could be squeezed out, the residue of solid matter would occupy little more than the space of a large orange.

This, of course, was almost meaningless, yet not altogether so, for cases can be found in the universe where a good deal of the empty space of atoms has been squeezed out. Thus in the invisible companion star of Sirius, the Dog Star, so much emptiness has been squeezed out by thermic forces that the matter of which it is composed can be estimated to weigh a thousand tons per cubic inch.

We can say, therefore, that by the end of the nineteenth century the material of which our bodies are composed had begun to seem much more complicated than Newton's hard, impenetrable dust. I do not say that it is particularly sensible, but it is certainly human, to feel imaginative pleasure at this new picture

of what we will be, even when we are only dust blown by the wind; but this was only the beginning.

Rutherford and Bohr elaborated the model of the atom as a little solar system to explain the chemically known fact that there were about ninety-two different kinds of matter. Each chemical element had one more electron revolving round the central proton than the last, until with uranium there were ninety-two electrons, or planets, revolving in an astonishingly complicated pattern round the minute but also very complicated central sun. This satisfied all that was then known about the properties of matter, but complicated as it was, it was far too simple to last.

By 1913 there appeared in the atom model a detail which could not be considered mechanistic in Newton's sense of the word; and again the introduction of the new detail had become necessary because new properties of matter and energy had been discovered. In this revised model there were still electrons revolving round a central nucleus, but they could only revolve in certain fixed orbits. They could jump from one orbit to another in no time, or if you prefer it, without going through the intervening space. This idea was introduced by Bohr not for any mystical reason but because it was the only way to describe the behaviour of the light emitted from an atom as revealed by the atomic spectrum.

§5. *The End of Mechanical Models*

We can say then that by 1913 physicists had said goodbye to models of matter which could usefully be described on the analogy of a machine. Directly you talk of particles jumping from one position to another without going through the intervening space, you have left the field of happenings which a mechanical engineer can explain or imitate, and celestial mechanics have ceased to be mechanical in the way which scientists had imagined. But a greater revolution was to come.

By 1925 Schrödinger and Heisenberg had analysed the behaviour of matter more deeply still, and the result of their work was virtually to abolish matter altogether, at least as a subject for scientific speculation. You cannot speculate scientifically

about anything unless you can show its existence in a concrete fashion. Now the only way in which you can be aware of the existence of an atom is when it is revealed by the energy released by an electron jumping from one orbit to another. In other words, you do not know that the atom exists or that the electron exists; all you know is that there is a flash of energy. Whereas we used to think of matter as the basic thing and of energy as its property, we now think of energy as the basic thing and wonder if the nature of what we used to call matter can ever be ascertained.

There is nothing new in this. In 1844 the great Faraday described the theory of Boscovitch who wrote a hundred years earlier that atoms "are mere centres of forces or powers, not particles of matter, in which the powers themselves reside."

"A mind," Faraday continues, "just entering on the subject may consider it difficult to think of the powers of matter independent of a separate something to be called *the matter*, but it is certainly far more difficult, and indeed impossible, to think of or imagine that matter independent of the powers. Now the powers we know and recognize in every phenomenon of creation, the abstract matter in none; why then assume the existence of that of which we are ignorant, which we cannot conceive, and for which there is no philosophical necessity?" and he concludes with two remarkable statements. "The view now stated of the constitution of matter would seem to involve necessarily the conclusion that matter fills all space," and "In that view matter is not merely mutually penetrable, but each atom extends, so to say, throughout the whole of the solar system, yet always retaining its own centre of force."

What seems to have happened therefore is that the mind of man, beginning with a common-sense view rather like Dr Johnson's who refuted Berkeley by kicking a stone, and with an analogy from machinery which has been very useful for the practical purpose of making more machines, has had to reject the idea of particles of matter altogether and to regard atoms as centres of energy stretching out in all directions to the boundaries of the boundless universe. And of such also is the dust of which your body is made: centres of energy locked up and limited in their freedom of action, no doubt, but themselves living and for ever alive, since all energy is a kind of life.

Even this is by no means the whole story. There is another

possibly obscure but certainly revolutionary idea about matter which exercises the imagination of scientists today.

Common sense might sum up the universe thus: In a box a great deal bigger than this room but geometrically exactly like it, called Space, there exists something called Matter which produces Energy in the form of electromagnetic waves and heat. This it has done for an unknown Time in the past and will continue to do for an unknown Time in the future. We would probably add that when we study energy we are studying the properties of matter, and that this matter is the ultimate "real thing."

Now Whitehead expressed the contrary view which physics is forcing on us, thus: The ultimate "real thing" is Space. Matter is merely the thing which enables us to observe some of the properties of space.

I do not suggest that such theories, which can only filter down to those of us who are not mathematical physicists in a very attenuated form, are of practical importance when we come to assessing the human body or its ultimate fate. I think, however, that they may offset the emotional gloom engendered by the dust-unto-dust school of thought.

To sum up, the one thing which to common sense seems most certain, namely substance, has virtually been banished by the physicist from the sphere of scientific investigation. Now this is precisely what philosophers a hundred years and more ago had decided. To them the idea of a self-contained particle of matter, with boundaries and a certain distance between it and the next particle of matter was full of philosophical difficulties. But it was invaluable to the scientist. Just as the scientist cannot get very far without invoking the "meaningless" square root of -1—he can't even wire your house with electricity without using this "meaningless" thing—so the whole science of chemistry is based on what to the philosopher is equally "meaningless," namely an atom, imagined as a minute piece of matter, with a boundary and a space between it and the next piece of matter.

For a long time, therefore, it was not possible for the scientist and the metaphysician to discuss Matter with one another in the Senior Common Room of their College. If the metaphysician told the scientist that his idea of an atom was preposterous, since

it resulted in all sorts of illogical and irrational ideas about space and substance and so forth, the scientist could be both bored and patronizing, bored because he was only interested in the sort of truth which produces results, however false the metaphysician might tell him his "truth" was; and patronizing because by sticking to his truth in spite of anything his colleague might say, he was building up the marvellous structure of modern physico-chemical industry and finding out new useful facts about "matter" every day.

For what the chemists, beginning with Dalton, were doing was to imagine a model of an atom, not so as to describe what matter was, but so as to be able to do useful things with it.

In course of time the chemist and his twin brother, the physicist, came to a stage when the atom they wanted to use could no longer be described by any model at all, and at this point wise non-mathematicians were content to leave the atom alone.

What has made it impossible for the physicist any longer to have a mechanical model of the atom is that you cannot have a model without substance, and substance has, as a result of experimental research, been dismissed from the atom, leaving nothing behind except varying concentrations of energy. If you ask me how you can have energy without having something to be energetic, the answer is that you and I cannot, but apparently the universe can! It may be beyond our human abilities to comprehend energy without substance, just as it is certainly a contradiction of our common-sense experience. But we must accept it and, if we still ask why we are forced to assume something to exist which is illusory, perhaps the answer is that we have built up our senses and our central nervous system to win a battle for survival in conditions where it is necessary to fight *as if* substance really existed, and so we have no faculties which can enable us to imagine energy without substance.

This may be a sad and sobering limitation, but we can take comfort in realizing that we possess also faculties which enable us to go on thinking even when we cannot picture; and *that* is perhaps a hint that we are more than the product and combatant in an all-consuming struggle for existence; that while there is certainly man the evolutionary animal, there is also man outside evolution; man the evolutionary animal accepts the world as

his senses reveal it, but man outside evolution is able to see that the revealed world is a fiction.

The time then seems to be at hand when the Professor of Physics will find himself teaching the same thing about Matter as the Professor of Metaphysics down the corridor; which, from all points of view, will surely be to our advantage.

Meanwhile, those of us who attend the classes of neither, and who are emotional rather than logical, may very well find ourselves, while remembering that "it will be all the same in a hundred years," looking at the dust beneath our feet in a rather different frame of mind. We shall not think, perhaps, so much of life and death, always bound to be a gloomy contrast, but, as we have often been advised by poets and others, of waking and sleeping. For the dust blown in the wind, or apparently inert beneath our feet, is energy asleep, locked up in inactivity. Far from being infinitesimal grit, or any other morbid substance, it is energy waiting its turn to become active; far from being locked away in loneliness and forgetfulness it is a centre of energy stretching outwards to the confines of the universe and enjoying interplay with all other centres of energy.

All this, you may say, makes no difference to the brute fact of inevitable dissolution nor to the fact that the "I" and the "you" will be eternally lonely in our tombs. That, however, is an assumption which rests on other considerations than this insubstantiality of matter, this refreshing knowledge that all is energy, and that all we know of death is that energy in its living form is allowed sometimes to sleep.

Returning to the controversy between the dust school and the dust-with-a-difference school: in the light of what we now know about Matter, how trivial it seems. Let us remember that we are but dust, by all means, but let us remember also what dust is—or as we cannot know what it is, or even if it exists, let us think of it as x, which may have any value including o, but in any case can produce a radiance in the skies, and the germination and pulsation which we call life, and that our bodies, being x, are these things in a slightly different form.

B. Machine

§6. *Bygone Models of the Body*

Judging by the biological theories of backward races today, mankind first thought of the body as a sort of zoo. It was inhabited by a number of animals which controlled its various regions. The parts of the body were like those wheel-cages in which unfortunate white mice used to be kept. Just as the mouse made the wheel go round, so the animals moved our organs. Thus, there were small animals in the ears which caused the ears to hear; and if you became deaf it was because the animals had died.

Even Plato and Aristotle believed in this theory and they were particularly certain that an animal existed within the female sexual organs, causing women to have various desires and to perform various functions, some of them good but most of them bad.

The next step was to suppose that the human body was a cooking stove. You put food into your stomach as you put food into the kitchen oven, and your body cooked it. In the cooking process, as much of the food as was useful was transformed into three nutritive forms, phlegm, blood and semen, each the result of a more prolonged cooking than the last. As the female oven was not, as we saw, so hot as the male, her nutriments were of poorer quality than the male's.

In this theory, which was orthodox from the days of Aristotle for more than a thousand years, the food eaten was regarded as uncooked nutriment and the problem was to explain how the body kept hot so long.

In the course of the middle ages alchemy became more and more popular, and its main objectives were the elixir of life, transmutation of base metals into gold, and perpetual motion. The last objective made men pay great attention to the human body, for here, they thought, was a machine producing perpetual energy. By studying the human body they hoped therefore to find out the secret of making other perpetual motion machines.

This school of thought did not regard food as being so important for the growth of the body. It did not think that the body needed "building up" with fresh supplies of nutriment, because

it did not regard the body as expending its substance in the course of its activities. Food, the alchemists supposed, was needed as machines need oil, for lubricating joints, muscles and moving parts generally.

Now these ideas about the human body were based on the belief that it was a natural and automatic producer of heat, and in those days heat was believed to be a substance, to which was given the name phlogiston. When, in the second half of the eighteenth century, Lavoisier and others were able to prove that there was no such substance as phlogiston, and that the products of combustion equalled in weight the substances concerned in the burning, a new concept of the human body became necessary.

Many of the experiments which destroyed the time-honoured phlogiston theory involved the burning of candles and it is not surprising to find that when people considered the facts about the human body in the light of these candle experiments they decided that the body was itself a sort of candle. Set alight at birth, it burned until it gutted out in death. Once more, since a true biology did not exist, scientific thought explained living bodies in terms of the latest physico-chemical discoveries.

Again, when Helmholtz made his important discoveries in thermo-dynamics, the relationship between the body and food was reconsidered. The body became a combustion engine and the food fuel. You shovel in coal, water boils, steam sets the moving parts of the engine in motion; in the same way you shovel in food, the body burns it, the energy produced moves the limbs and organs. The body, said the school of Helmholtz, is a combustion engine.

You will note that the only difference assumed between one food and another was the difference between one fuel and another. You have different kinds of fuel, wood, coal, oil, gas, but they all burn in the same way and produce heat. So with food; there are different kinds of foods, it is true, but they all burn and produce heat. This view began to be modified when people became scientifically interested in problems of diet, for it was discovered that not all necessary foods produce heat when taken into the body. Fat, sugar, starch, provide heat as a result of chemical reactions when the body breaks them down; but other kinds of

food, notably protein, are not fuels. If not all food is fuel, what is the use of the non-fuel type of food?

This question was answered by representing the body as a combustion engine of a special type, a self-repairing combustion engine. Wear and tear could be taken up and corrected, spare parts made and fitted, from the food which was not fuel. Until recently this picture satisfied almost everyone. Within the last fifteen years, largely thanks to the atom bomb, it has been abandoned.

§7. *Two Vital Words—As If*

Now, before we consider the revolutionary new picture of the human body being built up with the help of radio-active and other isotopes, let us review this kaleidoscopic history of what men of science have thought the human body to be.

(i) It is a zoo;
(ii) it is a perpetual motion machine;
(iii) it is a burning candle;
(iv) it is a combustion engine;
(v) it is a self-repairing combustion engine.

Reading these five statements one after another we get once more the impression that science is a matter of confusion, constant change of opinion and contradictory supposition. There is even less continuity than in the case of atom models. There is no steady advance to be derived from these five models. The scientist and the human body is as absurd as Polonius and the cloud. Do you see yonder cloud that's almost in shape of a camel? By th' mass, and t'is like a camel, indeed. Methinks it is like a weasel. It is backt like a weasel. Or like a whale? Very like a whale.

This confusion is due not so much to changing scientific thought as to the misuse of language. What these sentences imply is very different from what is implied in e.g. "Socrates is a man," or "Man is mortal." Their meaning would be clearer if they contained "like" or "as if." The human body is *as if* it were a combustion engine, or *like* a combustion engine. Better still leave out the word "is" which, along with "because," is probably the most dangerous word in the English language, and say:

The human body can best be studied as if it were . . .

That and that alone, is what these sentences ought to mean and unfortunately this has very often been forgotten by scientists themselves.

§8. *The Body a Machine*

And now let us look at the most important of all assertions of this sort which has been made about the human body by scientists. How useful is it to consider the human body as a machine? How much does it explain? How much does it tend to hide important truth?

There are many ways in which the definition of a machine will have to be broadened if man is to be included. For example, all the machines we know are made by a man, or if they are made by another machine then the other machine was made by a man. If man is a machine we must suppose that he was made, or at least that the first man or the first living thing, was made by something outside itself. In fact, the Mechanist, however little he may like it, must believe in a God or some sort of non-mechanical force or power which made the original machine.

It is an odd fact that the strongest conviction of the anti-religious thinker, that man is a machine, is precisely the argument used by the theologian to prove the existence of God. The reader must at some time in his early life have had the argument put to him, probably in this form: If you found a watch lying on the ground, you would know that it was made by somebody, wouldn't you? Well, the Universe is far more wonderful than a watch, surely some intelligence must have made it?

There are, of course, other possible replies to this argument, but this is not the place to go into them. But the point I wish to make is that all this pseudo-religious warfare for which the scientist must accept equal guilt with his theologian opponent could be avoided if people would be prepared to say:

Man can best be studied as if he were a machine in some ways but perhaps not in others.

§9. *To forget "as if" is dangerous*

Now this is very important because it illustrates one of the ways in which science has gradually grown up. Aristotle knew nothing of "as if." He did not think that the behaviour of women was "as if" they had an animal of a particularly lustful sort within them; he did not think that women could be understood best or studied best on this assumption. He thought that women *had* this fierce animal within them.

Now such beliefs of Aristotle and the generations which followed him, accepting him as the fountain-head of irrefutable wisdom, had a most serious result, far more serious than the most obvious one that gynaecology was held up by false beliefs about female physiology. From the point of view of human social development the vital point was that the female was regarded as a scientifically proved inferior being dangerous to the male.

We cannot here consider the question whether Aristotle's opinions about feminine physiology were a mere rationalization of his pre-existing prejudice against women, or whether it was the opinions which led to the prejudice. What is important to our argument is that the forgetting of the "as if" qualification can very often turn a useful scientific dodge into a dangerous anti-scientific dogma. This has certainly happened with the "man-is-a-machine" dodge.

There is no question at all that a very great deal of research into man's nature is helped by approaching the question as if man were a machine, nay further, unless he is so treated, dangerous, methodological errors may creep in, but the crude mechanism which forgets "as if" is apt to make two deadly mistakes. The first is exemplified by Dr George Price who says he will not accept a new fact *unless it can be illustrated by a mechanical model.*

The second is more subtle and perhaps therefore even more dangerous. It consists in trying to reduce everything in human nature to physico-chemical factors, *claiming that nothing has been lost in the process.*

The reasons why mechanism as a philosophy is unsatisfactory do not concern us here. What we must be careful to avoid is a point of view which puts methodological difficulties in the way

of our discovering and understanding new facts about human nature.

If we ignore or deny proven facts because they do not fit into a mechanistic model of the universe we offend against science. Moreover, if we are wedded to any insufficient metaphysical theory, mechanistic or otherwise, we are apt to close the doors on our ability to perceive facts which do not fit into it.

§10. *The Limits of the Man-Machine Idea*

Now as to man being considered as if he were a machine, we must get quite clear in our minds the occasions when this idea is helpful and when it is dangerous.

It is helpful as a method of inquiry. Whatever the facet of human nature we wish to investigate, we should begin by seeing how far it obeys the laws of physics and chemistry. We can also usefully consider how far facts of human nature can be described in terms of a mechanical model. We should, however, remember that not even the physicist today believes that a mechanical model can adequately describe the behaviour of an atom of matter, a quantum of energy, a wave of light.

Physical laws are clearly the key to much. Thus the human body is as much a slave of gravitation as a stone and so the behaviour of the heart pumping blood up and down the body can be usefully described in physical formulae involving the gravitational constant. This will not describe the incessant and long-continued action of the heart muscle in its regular contractions, but chemical laws will no doubt be sufficient here. So too chemical explanations will cover the physical expression of emotional experiences, fear, anger, sorrow, joy, and all the rest, and there is no need to introduce good and bad angels to explain them. Whether such things as consciousness, conscience, will, memory, imagination can be adequately described in physico-chemical terms is another matter, but one which we do not need to discuss.

All that concerns us is to defend facts against the tyranny of theories. If facts about human nature which certainly do not fit in easily with mechanistic metaphysics, can be authenticated, so

much the worse for mechanistic metaphysics; and there are certainly such authenticated facts in plenty.

Does this mean that there are some things which can be scientifically investigated and others that can only be investigated non-scientifically? Certainly not. There is only one way in which anything, from virus to God, from sexual desire to love of aesthetic objects, from hysteria to mystical ecstasy, can be studied, and that is by the right use of reason for a just appraisal of factual evidence; and this is scientific method. It is only because a travesty of scientific method has tried to reduce mystical ecstasy to hysteria, love of beauty to sexual desire and religious belief to animal wishful thinking, that a prejudice has set in against the use of scientific method in such matters. But to say that a certain kind of knowledge involving "values" is outside the field of science is to play into the hands of the crude mechanist. All that need be said of "values" as such is contained in the eternal commonplace *de gustibus non est disputandum.* If a person says he prefers hysteria to mystical experience, or unrestricted sexual activity to going to the National Gallery, there is no point in arguing with him. His preference is a brute fact and brute facts have to be accepted. But if he says that all mystical experience *is* hysteria or that every visit to the National Gallery *is* sexual indulgence, he is offending against a biological principle.

And yet, as F. W. H. Myers pointed out long ago, there is a connection, for example, between hysteria and mystical experience, and the mistake lies in equating the two out of a mere dislike of mystical experience. To say that two things are connected is not to say that they are the same. The manure in the border and the rose which grows in the border are connected, but they are not the same.

Whereas the chemist can frequently make such statements as that water consists of hydrogen and oxygen, it is far more difficult for the biologist to break down the highly complicated phenomena of human nature into simpler elements and it is almost always wrong to assume that a psychological trait can be explained by tracing it to its alleged origin.

Those who are aware of the degree to which orthodox science is adulterated by pseudo-scientific metaphysics, such as mechanism, can best safeguard a truly scientific attitude by agreeing

that God's existence, survival of death, the efficacy of prayer, the objectivity of mystical experience, the usefulness of ascetic observance must all be submitted to scientific investigation if the truth about them is to be acceptable as public knowledge.

We will certainly not be able to investigate such subjects scientifically if we blind ourselves with false *a priori* theories. We must maintain an open mind; and this means that we must be prepared to find that it is as foolish for a man as for a motor-car to worship in a cathedral; but we must not short-circuit the argument by stating *a priori* that it is as foolish, *because man, like a motor-car, is a machine.*

§11. *The New Picture of the Body*

During the past twenty years a revolution has been taking place in our knowledge of the body. The most recently discovered facts suggest an analogy very different from an internal combustion engine.

On the leeward side of the volcanic island Pico in the Azores there is to be seen for long periods of time an apparently stationary cloud. It is very like a whale, so much so that seafarers call it the Baleia.

As you approach the island you are astonished not merely at its similarity to a whale, but its unchanging shape and position. Here, one feels, where least they are to be expected, are permanence and stability. It is impossible as you look at the Baleia to believe the truth, which is that a gale of wind, perhaps of sixty miles an hour velocity, is blowing through that simulation of calmness; that indeed though the whole cloud remains, none of its constituent atoms of air and water vapour remain the same for more than a few brief minutes. Its substance comes in from the clear skies, condenses at one surface into drops of water, and races out on the other, where, at the visible boundary, the water-drops vapourize and rush on without staining the surrounding blue.

The cloud is a shape, a pattern, permanent and clear-cut, but all its substance changes from moment to moment.

In the wind-shadow of Mount Etna there is frequently to be seen a cloud, so well-known, so permanent a part of their lives

that the local inhabitants call it the Contessa del Vento, the Lady of the Wind. Here too, there is, seemingly, stability; in fact nothing is stable but its shape, a disc of white wood turned on a lathe; within are whirlwinds with incessant mixing and changing of every particle of air.

"The wind," Sir Napier Shaw tells us, "actually blows through these lenticular clouds. It does not carry them away. The locality of the cloud remains the same but the material of the cloud is always changing. The air goes through the cloud with drops forming as it enters and dissolving as it leaves. The peaceful-looking cloud that caps a mountain practises the like deception. Let no one expect to find calm at the top where it is capped—quite otherwise—it is a place of bitter wind."

This, too, is the condition of the human body. Lover, father, brother, if your affections are fixed upon the *material* of which your beloved, your child, your sister, is made and you go on a six month's journey, look well on her before you go, for you will never see any of her substance again. The substance will have passed away like the air of which Baleia is at this moment made. But the loss will be no great thing, since the pattern, the form will remain.

§12. *The Ever-Flowing Body Substance*

It has long been assumed that parts of the body wore out and had to be replaced, and it was common gossip that the cells of the body had all to be renewed within seven years. So the matter would have remained indefinitely, but for a discovery in chemistry which hardly seemed likely at first to throw any light on what happened within the human body.

In 1932 the American chemist Urey discovered what soon came to be known as Heavy Water. All the molecules of H_2O were not alike because one in five thousand hydrogen atoms is heavier than the other 4,999 hydrogen atoms. (Incidentally the weight of a molecule of water is far more complicated than that because the oxygen atoms may be one of three different weights also; but that does not concern us.)

Several physiologists, notably R. Schoenheimer, found ways of introducing heavy water, or deuterium, into molecules of

fat which they then fed to rats. The living body recognizes no difference between one isotope and another, and it is possible to recover these "labelled" molecules of fat from the body cells later, thus obtaining information on the fate of food within the body. If you eat deuterium-labelled fat on Monday you can find out whether it is still in the body on Saturday and, if so, where.

Now it had always been supposed that the fat under the skin, between the muscles and around internal organs, was a deposit of stored fat held in reserve perhaps year after year and only called upon for use as and when mild or serious starvation had to be faced. People reduced weight by reducing input of food, thereby causing the body to reduce its reserves of fats. Otherwise the fat remained unchanged year after year, just as tins of food in the reserve store-cupboard remain unchanged until the housewife has a special call for them. The truth turns out to be very different. When normal adult rats were fed with fat 2 per cent of which was "tagged" or "labelled" with deuterium, 44 per cent, that is nearly half, the fat eaten by the rats was found to have been deposited in the stores of body fat at the end of only four days. As the rats were no fatter this meant that an equivalent quantity of stored-up fat had disappeared and been replaced within that time. Far from the body keeping its fat in store cupboards, the fat is on a quick-service counter which constantly has to be replenished as customers take it away.

This suggests a very different picture of the human, or any other body, from what had been assumed hitherto. Evidently the cells of which the body is made are in an eternal state of flux, breaking up, reforming, disappearing, almost overnight.

The reality is indeed far more complicated; for whereas we think of fats as butter, lard, oil, cream and so forth, the biochemist thinks of them as hundreds of different chemical substances according to the number and arrangements of the atoms which make up the fat molecules. What the labelling of fat molecules with deuterium revealed was an incessant and bewildering exchange of atoms between every sort of chemical fat throughout the body. A deuterium atom which entered the body in a molecule of palmitic acid was soon after found in a molecule of stearic acid and vice versa. In a very few hours a tenth of all the stearic acid in the body was found to contain atoms which had originally entered the body as palmitic acid.

Now the great wonder is this: not only can the body incessantly shuffle the atoms which make up its cells from one molecule to another, but this is done in a way which never appreciably alters the total quantity of fat nor even the relative amounts of the hundreds of different fats. When palmitic acid molecules deliver up some of their atoms to stearic acid molecules, somewhere else the stearic acid molecules are making over some of their atoms to palmitic acid, and so with many other kinds of fats.

The same sort of result was found when labelled molecules of protein were traced through the body. It is a complicated story, but for our purposes two findings will suffice. The body has to get rid of the free nitrogen accumulated as a result of the break down of the amino-acids which constitute protein molecules, when these acids are not needed for building up tissue. This nitrogen is passed out of the body in the form of urea. The rest remains in the tissues of the body and replaces the nitrogen of worn-out cells which is also excreted as urea. If the urine was derived mainly from food eaten we would expect to find most of the labelled nitrogen excreted in the urine, but after three days almost as much labelled nitrogen is found in the body's tissues as is found excreted from the body in urea molecules. In short, the exchange between food protein-molecules and tissue protein-molecules is so rapid that, as with fats, none of the protein in our limbs and organs remains the same for more than a few days.

Thus though not one molecule that we have in our body cells is likely to contain all the same atoms as it had a week ago, nevertheless the pattern remains; there is continuity: each tissue, each organ, the whole body, remains, though the parts of which they are made are as fleeting as the air blowing through the Baleia or the Contessa del Vento.

An odd sort of internal combustion engine this! "The simile," Schoenheimer wrote, "of the combustion engine pictured steady flow of fuel into a fixed system, and the conversion of this fuel into waste products. The new results imply that not only the fuel but the structural materials are in a steady state of flux. The classical picture must be replaced by one which takes account of the dynamic state of body structure. . . . The question as to the forces responsible for the arrangement of atoms in bio-

chemical molecules in living organisms is as yet beyond the scope of laboratory experimentation."

At this point we find ourselves faced with a new question mark. Our admiration for the brilliant researches of men like Schoenheimer must not blind us to a doubtful supposition lurking in this last sentence, a supposition which may mask a false hope. Does the writer mean that when we know more of the body's dynamic state we shall understand more of how such a complicated process came into existence? Of what threw inert matter into such violent but well-balanced convulsions? Some scientists expect an answer to such questions as soon as they have passed a few more turnings in the winding road of physiological inquiry. I do not think they are right.

We can, of course, "explain" how these processes can be kept going and why, in every individual, they eventually stop. We know that all work done requires energy and we know that the whole cycle, or cycle of cycles, of chemical change involved in this fantastic bio-chemical whirlwind is kept going by energy derived from oxidative processes. "After death," says Schoenheimer, "when the oxidative systems disappear, the synthetic processes also cease, and the imbalanced degradative reactions lead to the collapse of the thermo-dynamically unstable structural elements."

Yes, quite true; but thousands of years ago mankind knew that when you stopped breathing you died—which is a simpler way of saying precisely the same thing. How much more then do we know about human nature than was known a thousand years ago?

§13. *Are we any the wiser?*

Here is something we must face. We must consider what, if anything, is the difference between the information summarized in that sentence by Schoenheimer and the simpler statement that when breathing ceases life ceases.

The work begun with "labelled" atoms of heavy water and isotopes of carbon has been enormously extended since by the use of the radio-active isotopes which, as by-products of the production of atomic bombs, can now be supplied in unlimited

quantity. Introduce a number of such radio-active atoms into the human body and run a Geiger counter over it and you can find where the atoms have gone; analyse the tissues and excreta of a living animal or plant and you can learn still more. And very valuable this knowledge has already proved to be. But it is essential to realize its limitations.

We can put the problem thus: Let us imagine an index in which every number imaginable stands for a piece of knowledge. Between 1 and 2 there are an infinite number of numbers, between any two of them you can put another number, thus between 2.01 and 2.02 you can put 2.015, and so *ad infinitum*. Thus you accumulate more and more items of information, but so long as you keep between 1 and 2, though you can never get to the end of what can be found out, you never get to 3.

That is what inevitably happens with a science like physiology. All new knowledge is a complication of detail between strict limits. Certainly we know more and more about the human body, and very useful that knowledge will be, but we do not go beyond the limits represented in our analogy by 1 and 2. Sometimes scientists have thought otherwise; they have thought that besides putting fractions between every existing fraction from 1 to 2 they were also pushing beyond the barriers and approaching 3. This is an illusion.

Take neurology: the advance of neurology as far as detail is concerned has in the last few years been enormous, but it stops at 2. In this case we can ask questions about what exists beyond 2 in the direction of 3, but we cannot even imagine the answers. The dilemma here has been put in plain English by one of the greatest neurologists, Professor Adrian: "The whole problem," he writes, "of the connection between the brain and the mind is as puzzling to the physiologist as it is to the philosopher. Perhaps some day drastic revision of our systems of knowledge will explain how a pattern of nervous impulses can cause a thought or show that the two events are really the same thing looked at from a different point of view. If such a revision is made I can only hope that I may be able to understand it." In short, the man who knows as much as anyone about all the fractions between 1 and 2 reminds us that there is an impassable barrier between 2 and the next minutest fraction beyond it.

§14. *Indian rope trick?*

To drive the matter home let us glance at one fragment of the vast accumulation of detailed knowledge about the body contributed by modern neurologists. It illustrates both the wealth of detail about bodily processes now known (which will be Greek or worse to most of my readers, as it is to me) and the great difficulties into which neurologists are led if they imagine their detailed knowledge stretches beyond certain limits set by the very nature of physiology.

I quote a letter which appeared in the *Lancet*:

> The traces left after neurone activity are a breakdown of glucophosphate complexes (with a charge of adsorbed potassium to the ionic form); a lowering of the tissue pH; and a local redistribution of organic substances (such as acetylcholine, originally confined to the neurone itself) and of inorganic ions. The acidity and ionic changes cause local swelling of the tissues with displacement of the gyri (for which the arachnoid-dura structures are particularly well adapted). This stretches neighbouring vascular networks, causing constriction of some with local ischaemia (thus conserving the lost potassium etc. for use in repair). Subsidence of the swelling occurs with access of adrenaline, and a reactive hyperaemia sets in to remove instabolites, restore ionic equilibrium, provide oxygen and glucose for restoration of the nervous injury, and increase the pH of the tissues—thus restoring a threshold of stimulation appropriate to renewed activity.
>
> An important permanent effect of this repair is universally neglected, namely, the local growth of capillaries during the hyperaemic process. . . . Memory traces are thus to be interpreted as a growth of capillaries amongst the neurones. . . . There is no need to assume that memory traces are either changed states of neurones, or incorporeal and not in the brain.

To the layman it will be not a little surprising to hear that "memory traces are . . . a growth of capillaries amongst the neurones." Surely capillaries weigh something. Is it then possible to measure the increased weight of a man's brain and the additional blood supply involved after he has been remembering all sorts of things, for, say, twenty-five years? When he forgets does he lose a capillary?

The writer states that in a previous publication he has "shown how the pattern of capillary flow amongst synapses mechanizes, and gives an intelligible pictorial representation of the mental counterpart of brain activity." This must surely mean that whereas the brain is the sum total of the nervous structures of the central nervous system, the mind is the sum total of the blood vessels permeating them!

Now one thing is certain: if all these things happen every time any kind of sensation enters our brain, we remain profoundly unconscious of them; but the notable quality of a memory is that we are conscious of it. The problem is to find the bridge over from the physiological, which we now know in ever-increasing detail, to the mental.

Unless a thought has spatial extension how does the pattern of capillaries affect it? As Professor Adrian said in the essay from which we have already quoted: "There is a relation between nervous impulses and sensation, and we can discuss this without attempting to decide how, or whether, the one can "cause" the other. This confession of defeat is not altered at all even if a proliferation of capillaries with increased permeability of the brain matter takes place at the same time as the mental phenomenon called memory. It happens, let us believe, at the same time, but what possible meaning can there be in the statement that a memory is caused by an increase in the number of blood capillaries in some part of the brain structure? But let me go one step further.

If a physiological change such as the increase of capillaries is the "cause" of memory, we must assume that each memory has its special place in the brain, that the brain is among other things a storehouse with memory-traces packed away in it. For example, a particular memory-trace would be found, with suitable instruments, at a point four inches from the left ear and three from the top of the skull. It will be apparent to scientific instruments as an increased number of capillaries.

Yet Professor Adrian, a quarter of a century after this earlier confession of ignorance, reviewing in 1947 Lashley's work on memory in rats says: "Lashley has investigated the learning and retention of various habits in the rat and finds that, as far as simple associations are concerned, at least half the cerebral cortex can be destroyed without effect, and that half may be in

any part of the cortex. . . . We are forced to conclude that no one part is essential. And yet some part is essential, for the rat cannot solve anything if the whole cortex is destroyed."

Now if any part can be destroyed without impairing a specific memory, it is clear that any group of new capillaries can be destroyed, without impairing the rat's memory of some given piece of education. And so, if Lashley's observations are correct, the capillary theory and all other similar physiological theories go by the board. It has been suggested as ways out of the impasse, either that memory-traces are a sort of resonance phenomenon of the entire brain or that they are not in the brain at all. If the first, we are left with a mere phrase whose meaning has never been defined and if the latter—what then?

We must accept therefore the inescapable truth that the study of the human body by physico-chemical means or by techniques imitated from those sciences, though it can produce a mass of fascinating and valuable detail, cannot step over a certain limit. The gap between a nervous impulse and a thought has not been reduced at all. We can trace the millions of processes, chemical or electrical between the central nervous system and the hand which is raised or lowered, but we cannot even suggest by physiological reasoning how or where the central nervous system received its order. We can weave a fascinating rope of cause and effect, all neatly dovetailed together by known electro-chemical forces, but once we have made the rope all we can do with it is perform the Indian rope-trick. There is nothing to which we can attach the top end.

To illustrate the difference between increased knowledge of detail about the human body and widening the field of knowledge, I have chosen neurology. I could just as well have chosen genetics or the study of digestion or of respiration or any other special branch of physiology. However, neurology was chosen because the most popular current misunderstanding of human nature is associated with it.

Certain specialists in cybernetics have persuaded themselves and try to persuade us that the human brain is an electronic calculating machine and, compared with the machines they propose to make, rather a poor one at that. It is merely the latest example of how people in their ignorance of human nature take

comfort in analogies from the latest scientific enthusiasm. Today everything is electronics, though the little we know through the encephalogram about the electronic behaviour of the brain does not justify any close analogy with electronic machines.

In the nineteenth century the mechanist dealt with the problem of brain and mind in the simplest possible manner. The brain was all that was required to explain our mental functions; it secreted thought as the liver secretes bile.

Professor Adrian very succintly criticizes this sort of materialist view: "The main point is that we can collect the bile from the liver and put it in a bottle, whereas we cannot do this with the thought." And he concludes the matter by saying that there is obviously some connection between the nervous impulses which the physiologist can study, on the one hand, and sensation and thought, on the other, and "it does not matter very much whether we regard the relation of matter to mind as inexplicable or as needing no explanation."

It is surely certain that human curiosity will not be content to rest here for long, but it is possible that further advance is being held up because we have not sufficiently studied the functions of the human mind. Even though we no longer make the error of assuming that those functions are confined to that of which we are conscious, there is much more to be explored.

CHAPTER IV

MAN IN EVOLUTION AND OUTSIDE

§1. *What is meant by the Darwinian Hypothesis?*

MAN, AS MUCH as any other animal, is the product of evolution; his mind and his body sharpened and shaped by the struggle for existence. Is he anything more than this? In biology we study man in evolution; but is there perhaps a study of man outside evolution required to complete our picture of human nature?

The biological ideas intended by the word evolution are of the simplest.

There are a multiplicity of living forms. The alternatives are:

(*a*) that these were all made separately, as they remain today, by a creating god or some sort of creative force, or (*b*) that they evolved from one another, all the forms existing today being derived from common ancestors.

If (*a*), then there is nothing more to be said. The hypothesis can neither be proved nor disproved. It can be supported by appeal to various legends handed down by men from early times, and it can be supported or taken as a matter of fact by anyone who believes in the verbal inspiration, for example, of the Hebrew-Christian Bible. It can, of course, be shown that variations can actually be seen coming into existence without the visible hand of God guiding them but simply as a result of natural selection or of artificial manipulation by scientists or breeders; but this would prevent no one from believing in special creation as a general rule. For there is nothing to stop their kind of God altering his methods from time to time.

If (*b*) then how can today's complicated forms be derived from very simple ancestral forms, perhaps from one ancestral amoeba-like form?

Either (*b* 1) by accumulating new forms, qualities, abilities from outside sources and handing the new possessions on from generation to generation.

Example: the giraffe's neck. Originally it was short, but it got stretched because in times of food scarcity giraffes had to reach to eat the highest leaves on the trees. The longer neck, acquired as a result of this stretching, was inherited by each generation of giraffes, who stretched a little more in their turn. So, in due course, was established the present giraffe's long neck. This is the Lamarckian theory of evolution through the inheritance of acquired characteristics.

Or (*b* 2) by each generation developing, as a result of external pressure, that which was already latent within its parents.

Example: the giraffe's neck. The ancestral giraffes, like all other beings, possessed the capacity for reproducing their kind according to the general plan of their bodies, but with haphazard variations. Thus, among other things, the length of the neck was variable, some necks being an inch or so longer than others. Also, more giraffes were born than there was food for. So the longer-necked survived because they could reach the higher branches. (Alternatively perhaps, the longer-necked survived because with their periscopes they could see farther over the horizon and move off quicker on the approach of an enemy.) Hence, they survived to have offspring who, on the average, were longer-necked like themselves, and so on, generation after generation. This is the Darwinian theory of evolution by means of "natural selection" and the survival of the fittest to survive.

As between (*b* 1) and (*b* 2) the evidence is that acquired characteristics are not inheritable, and so we are logically forced to accept (*b* 2). Everything in the more-developed forms of life was inherent in the simpler forms in the sense that it was in the very nature of those forms to vary in response to outside pressure. The outside pressure that determined which individuals survived was called by Darwin Natural Selection, a term which occurred to him after considering the artificial methods of selection whereby human beings improved their flocks and crops.

We note at once, however, that the analogy breaks down in two important points: artificial selection is purposeful, natural selection is blind. So at least thought Darwin, and his opponents at once set to work to try and put purpose into natural selection,

often with very unsatisfactory results. Furthermore natural selection is the very antithesis of artificial selection in that the latter implies an outside selector, while the former is above all an attempt to do away with the need for assuming any outside selector at all.

The simplicity of the hypothesis has been well emphasized by Julian Huxley. Darwin, he says, used three observable facts of nature and two deductions from them. Thus:

First fact: All living creatures have more offspring than the one or two parents required to reproduce the species.

Second fact: The number of individuals in most species keeps fairly steady from one generation to another.

First deduction: There must be a struggle for existence in which some individuals win and survive, while the rest perish.

Third fact: All living creatures vary more or less from their parents and one another.

Second deduction: Those variations which are useful will have survival value and will therefore survive, and this is the explanation of the multiplicity of forms among living creatures.

This, of course, is our hypothesis (*b* 2) which has completely supplanted (except in Russia) the Lamarckian (*b* 1).

It is important to realize that the alternatives (*a*) and (*b*) and (*b* 1) and (*b* 2) are of rather different orders from the standpoint of logic. If we choose (*b*) rather than (*a*) we are making a choice which cannot be justified by facts. Whatever reasons we produce to justify our choosing (*b*), (*a*) may still be right. Thus an outside creator may have settled down to create a turtle, a bat and a toad just as they are today, and have also created fossils. But once we have made that choice and have to choose in turn between (*b* 1) and (*b* 2), the choice must be made solely on the strength of the evidence. Thus we can be far more certain that (*b* 2) is right and (*b* 1) wrong than we can that (*b*) is right and (*a*) wrong. In other words, Darwin's evidence for natural selection and the struggle for survival is stronger than the evidence for evolution itself.

It may be asked: then why choose for one's working hypothesis Evolution rather than Special Creation? The reason is precisely the same as explains the choice of one alternative rather than another throughout the whole field of science. The choice

is the more practically useful of the two theories for further scientific exploration of nature. If we chose Special Creation it could only lead us to read the Bible once more, and perhaps persecute those who refused to believe with us; whereas by choosing Evolution we set ourselves the problem of discovering how many living forms could come out of a few simple ancestors; and of so imposing a logical and meaningful order on the chaos of observed facts. Naturally, to Darwin's contemporaries the choice between (*a*) and (*b*) seemed a choice between a religious and an irreligious selection but fortunately that useless controversy is not heard very often nowadays and popes and bishops can be evolutionists.

But there we face a serious danger: we must not strain and distort any fact for the mere purpose of fitting it into the picture of our choice. Darwinian Evolution may be only a first approximation to the true theory; and blind natural selection may have to be supplemented by some unknown principle which indeed puts purpose back into the scheme of things, though not in the crude way that was attempted by the Victorians. We have been given no mandate to regard "teleology" as wrong in any form, we have simply found from the facts that the old-fashioned forms of teleology were unnecessary as part of the explanation of those facts.

§2. *Evolution and Human Nature*

Various adaptations made it possible for man to attain his somewhat exalted position in the evolutionary scale—the upright position, the thumb opposed to the fingers, the superiority of the sense of vision over the sense of smell—looking back we can thank our ancestors who handed on to us these and many other advantages. But the chief human weapon in the struggle for survival has been his superior brain. When studying man as the product of evolution we must regard the brain as a tool fashioned by the struggle for survival and "intended" for use in that struggle, and for no other purpose.

The logic of the situation demands that we regard the human brain as having one "purpose" only—you see how difficult it is

to avoid using these *verboten* words!—namely to get the most out of our surroundings, so as to avoid the extinction of our species as long as possible. Our entire lives must be given up to the avoidance of death, and it seems to follow that our brain can only be capable of initiating death-avoiding actions.

I am not for the moment wishing to dispute this; I simply want to insist that we face this as the logical conclusion to be derived from the assumption that a complete explanation of human nature can be found inside the framework of the hypothesis of evolution by natural selection.

The position has been very prettily stated by Wauchope in a book which ought to have had more attention—*Deviation into Sense.*

The author invites us to consider a cat basking in sunlight in the middle of a green lawn. Suddenly, and, as far as anyone watching can see, for no reason whatever, the cat jumps up, runs as fast as it can to a nearby tree, races up the tree to its topmost branch, and only then pauses to look around and compose itself once more to rest.

Why does the cat do this? The orthodox evolutionist of the Victorian age (who has survived in the minds of not a few contemporary biologists) is apt to explain the matter thus: "The cat," he says, "behaves like this because otherwise he would belong to the class of cats which never having practised the sudden ascent of an apple tree would not be able to get there in time if a dangerous dog entered the garden. Had not this cat practised, used what we wrongly assumed, perhaps, to be a play instinct, he would be dead, and had not his fathers before him done so he would never have been born; but he comes of ancestors who made a habit of climbing trees without cause, and therefore, has survived and will survive to produce offspring, because he is prepared for the advent of a possible dog."

This explanation boils down to saying that the cat's action is nothing but a death-avoiding action. If every action of cats and of all animals, including man is to be explained in the same way then we have the astonishing picture of all living beings spending their whole lives in death-avoiding action. There is no room left for life-enjoying action. Everything is preparation for survival when danger comes. It is only as a sort of afterthought that the unalterable laws of the Universe permit us to find death avoidance

sufficiently pleasant to make it seem worth while remaining alive.

Mr Wauchope suggests that it would be just as simple logically, and far more likely on general principles, to suppose that the cat jumps up and rushes to the tree and climbs it *because it enjoys doing so.* A fortunate by-product of its way of enjoying itself is that should a dog enter the garden with malice aforethought, the cat's muscles and nerves will be ready to deal with the dangerous situation.

Can it be possible that all life has evolved for no other purpose than to express itself in death-avoiding action? If not, there must be something beyond the study of the animal within evolution and specifically there must be a need to study man outside evolution. Human nature cannot be studied solely in terms of the struggle for survival.

Yet he will certainly be wise to begin by realizing that the human brain, with its attendant special senses, and the whole nervous system of the body, are most definitely tools to be used in the struggle for survival.

One important corollary of this is that the universe as we know it through our senses is not necessarily "reality," whatever meaning we give to that term; it is the model which the brain constructs because it is of greater help in our struggle for survival than any other model. If we can only see light waves between certain frequencies, it is because those frequencies are valuable and other frequencies not so valuable for that struggle. If we can only hear certain sounds, it is because there is no particular advantage in our hearing sound-waves of higher or lower frequency. For a bat on the other hand higher frequencies are useful, and a bat can hear sounds of higher frequencies.

I write in a library lined with books. It has pictures on the walls and boxes and drawers for stationery and documents. As it is warm in winter and secluded in summer the cat occupies this library for almost as many hours as I do myself. Yet of the meaning of all the things which the room contains, the book, the pictures, the papers, the cat knows absolutely nothing. For it, there are but two real things in this library, the warmth of the fire and the softness of its favourite chair.

Is it possible that I and my fellow men are as ignorant of as many things in the Universe around us, as is the cat of the con-

tents of this library? Do we miss their "meaning" as completely as the cat misses the "meaning" of this room? Is our knowledge, like the cat's, limited to matters which concern our material welfare and continued existence?

These questions have been answered affirmatively, though in many contradictory ways, by religious and philosophical systems, while scientists have tended to refuse to face them. They have a ready excuse: the field of their labours is limited to what can be apprehended and whatever else may lie hidden is no concern of theirs. If the universe has any secrets let them be exposed in the form of facts and then the scientist will deal with them.

Thus too a cat theologian or cat philosopher might dimly suppose that all these books on my walls may be there for some reason, but the cat scientist would acknowledge the importance, even the existence, of nothing but the fire and the chair. Put in this way the problem clearly leads to some interesting questions. The biologists of today, with few exceptions, would insist that cat and man are alike in an essential particular—they are both the product of the struggle for existence and all their faculties have been developed as weapons to be used in the struggle for existence. Their knowledge of their surroundings is limited to what is useful to them in that struggle. Hence the difference between the cat's picture of the library and the man's.

If this is so there is no escape from one or other of two beliefs: either know-able "reality" is merely what is useful for survival or man is something more than an animal struggling to survive. Because conventional biologists do not wish to consider man as anything more than an animal struggling to survive, they have a tendency to distort awkward facts into the oddest shapes so as to leave man no activity except struggle. Thus Beethoven's Symphonies are made to fit into the picture by the invention of a *deus ex machina* called *sublimation*. They are sublimations of the reproductive instinct. Perhaps indeed this is true, but if so, the reproductive instinct of man is fundamentally different from that of the cat.

True enough in man's case knowledge is not solely dependent on physiological possessions. Our agile brains can devise instruments which extend the limits of our sensibilities, but only when these instruments create a result which is in itself valuable in the struggle for existence.

We do not make miscroscopes or telescopes, we do not discover X-rays or rays of frequencies useful for wireless purposes unless such discoveries are of practical advantage.

Now we begin to see a danger in the line of argument we have taken. It is only one step further to say that all scientific research and invention can be explained in terms of the economic and practical desires of each succeeding generation of men. Certainly even the most philanthropic millionaire is unlikely to endow research in a field which does not seem to have practical application; and, even more certainly, no government is likely to endow research except in directions deemed important politically, socially or economically. That much we may allow, and a whole school of historians of science has been content with this economic interpretation of the human pursuit of knowledge. At best, however, it may be called, using an analogy from physics, a statistical law. This is how masses of men—governments, groups of industrialists—work, but it is by no means always valid for the individual man. A formidable list of scientists could be drawn up whose discoveries may have led to economically useful results, but whose urge to make the discoveries has been a pursuit of knowledge for its own sake.

It may well be true that no invention, no discovery, will get very far unless it turns out to be valuable in man's struggle; but the evidence seems to show that the incentive does not always lie there, that men use their brains for other purposes than the struggle for survival.

Now an age which has long regarded a house merely as a machine for living in will naturally have no difficulty in assuming that the mind-body is a machine for fighting with, but let us not assume too easily however that this summary of human motives solves all the problems. Indeed, it leaves nearly all the problems unsolved, useful though it has been for practical purposes in the sphere of general biology.

Nor is this the only ground for criticism; for though it is true that man is born to fight and struggle for survival *in* his environment, it is not necessarily true that he must only fight *against* this environment. Yet too many men seem to regard nature, the whole content of the biosphere except man himself, as something to be conquered by Man standing outside, lonely, belligerent, cut off from his living kindred and the soil from which he derives

his being. This too is a dangerous and an unhappy doctrine, and like many other accretions does not inevitably follow from the hypothesis of Evolution.

§3. *The Origin of Life*

Ignorant critics have complained that the Darwinian hypotheses do not explain the origin of life. This is true; but Darwin never claimed otherwise.

There are, at first sight at least, three very puzzling "origins" involved in the history of life on this planet: the origin or emergence of vegetative or unconscious life, the origin or emergence of conscious or instinctive life, and the origin or emergence of intellectual and self-conscious life. We can express the three problems thus: How did a protein molecule develop into a simple cell, animal or plant? How did a low form of life reacting to outside stimuli like light, heat, obstacles, by simple tropisms develop into a form with the complicated instincts and choice of action of an animal like a dog? How did a higher ape evolve into a man with self-consciousness and all that comes of it?

These three critical moments in the history of life puzzled Alfred Russell Wallace, Darwin's co-discover, and he was not content to pass them by with a shrug of agnostic shoulders. In his opinion, God, the Creator, was active on all three occasions. He created living matter, that is he bridged the gulf between the complicated protein molecule and the first truly living entity. Later, God personally breathed into this living matter, consciousness: and finally (so far at least) he breathed into man a living soul. Wallace went rather further than Genesis in describing this final creative act: he was a spiritualist and believed in a multiplicity of disembodied spirits; one of these may well, he suggested, have started the human race by entering into the body an of anthropoid ancestor.

Thus Wallace combined individual creation and evolution, retaining the former whenever the latter seemed particularly unsatisfactory. According to Emanuel Radl he "favoured the belief that man is not related to the animal on his spiritual side, but that his soul was breathed into him from a supernatural world. Only thus could he account for mathematical talent, for

musical genius, the capacity for martyrdom, true friendship—for in short, all the highest human qualities and capacities."

It is as well to remember that although Wallace's solution of these three problems are not at all fashionable today, other suggested solutions are held on no firmer scientific grounds. All we can say is that the fashion nowadays is to look for solutions which emphasize continuity rather than these cataclysmic interventions.

Long after people had given up the idea of special creation to account for the multiple forms of living beings, they clung to the belief that there was a definite break between the living and the not-living, and another between self-conscious man and lower animals, which, however highly developed, are nevertheless only reflex automata reacting without forethought or afterthought to environmental stimuli. They may not have believed in an original act of creation whereby life came into the world, nor yet that God breathed into Adam a living soul; but it is clear, today as ever, that these phrases, whether they are allegories or not, are attempts to formulate unsolved problems. Even if natural selection working with the apparatus revealed to us by the modern geneticists can account for evolution of species, it is hard to believe that human self-consciousness can be the result of a favourable mutation of anthropoid genes.

According to Sir Ronald Fisher, the statistician, the gene-mechanism of heredity works in such a way that results which could not have occurred fortuitously in the millions of years available, become mathematically probable and therefore humanly credible; but that leaves us with the insoluble problem of how a complicated protein molecule, the prerequisite of living matter, could have come into being by chance. Professor Mottram argued long ago that there has not been time enough since the cooling of the earth's surface for a complicated protein molecule to have resulted from chance encounters of appropriate atoms.

If we are right in believing that the gene-structure working through natural selection is the only way to account for organic evolution, perhaps we shall have to look for some similar selective principle, working with appropriate machinery, to explain in the non-living world the arrival of these complicated molecules.

Such a hypothesis may seem all the more necessary now that advancing knowledge has made the boundary between living and non-living far less clear cut than was once thought. Certain protein molecules may be self-producing, and certain viruses possessing all the attributes associated with living matter can nevertheless be crystallized without destroying their vitality. This makes the boundary line shadowy indeed.

As to the problem of self-consciousness, there is, of course, great warfare between two schools. The more orthodox is forever bringing evidence that the psychological break between higher animal and man is by no means as complete as was once thought. The other school asserts that the break is complete.

Even if the latter is so it is not necessary to believe in the special creation of a "living soul," an idea which is repugnant to the whole trend of modern thought. Two alternatives suggest themselves. One is the hypothesis of emergent evolution. This accepts that there is an essential difference between the animal and the human mind. It sees the whole history of the universe as a single, unbroken process characterized by the occasional emergence of new states of being, which could not possibly be foretold from what has gone before. According to this theory future history may have surprising developments just as unforeseeable as that by which an animal began to think about itself, by which, in short, the unpredictable birth of human nature came about.

Scientists are for the most part not very enthusiastic about such lines of thought, since, although they may have the advantage of not shirking awkward facts, they have the disadvantage of not leading to any useful advances in our understanding of life. Scientists call hypotheses which lead to no practical advance of knowledge "otiose," and it is not very clear how the hypothesis of emergence could be scientifically applied. However, it may have the general value of keeping our minds open, and even if it does not explain awkward facts, it does not blind us to them as some other hypotheses are apt to do. Emergence may be little more than a word, but at least it is less crippling than any hypothesis which suggests that everything follows logically, mechanically and, by a superman with super-knowledge, predictably, from what has already been.

And, after all, we should be careful not to exaggerate differences of theory which are often little more than differences of vocabulary brought about by changes in the general climate of opinion. Thus, is there very much difference between Wallace's belief in three interventions of a Creator God by which evolution was radically changed, and a belief in Emergent Evolution? One is as mysterious as the other and both agree in placing the emphasis on radical and unpredictable change. We find the same thing in physics. We imagine that there is a great advance in understanding the universe when for the orthodox idea of angels pushing the planets about we substitute the idea of a "Force" doing the same work. Is there really an advance in understanding? Surely existence is full of a number of unknown X's, and the most we can do is to alter the names by which we know them! In doing so we should choose the names which leave open the largest number of possible explanations so that we are less likely to be blind to the right explanation when it turns up.

Wallace and Emergent Evolutionists emphasize breaks in continuity. This is valuable if it keeps our minds open for major surprises in man's future. The other way of looking at things is equally valuable as a means of keeping our minds open. It is also a corrective to those who wish to explain life and mind and thought in terms of the mechanical sciences. If we call this mechanistic tendency an attempt to physico-chemicalize the field of biology, this other way might be described as an attempt to biologize the field hitherto reserved as physico-chemical. Instead of explaining biological phenomena in terms of material entities —molecules and atoms, behaving in accordance with physico-chemical laws—the behaviour of the very molecules and atoms is explained biologically. It would perhaps be deceptive to describe this tendency as one of giving non-living matter minds and mental attributes, but it is just as possible to find evidence that non-living matter behaves according to the principles found to apply to living matter as to justify the opposite point of view.

In any case the whole tendency of modern scientific thought is to see an unbroken unity between the ultimate particles of matter and the most highly developed human mind. It is a wonderful vision thus to see the entire universe as a living and evolving thing, which, without a break in continuity, self-creates ever higher states of consciousness of which the human con-

sciousness is merely the highest that has as yet been reached. Dangerous as any hypothesis must be which has considerably outrun supporting facts, a man who sees things thus cannot be criticized as unscientific.

§4. *Why Does Life Get Complicated?*

If we are to accept natural selection as the explanation of why so many forms of life have come into existence we must assume that every new form of life is more suited to its environment than previous ones, more able and competent to survive in a given environment than its predecessors. We can leave out for the moment the effects of considerable changes in the environment which will, of course, require that living forms accommodate themselves to new factors.

This is not the same problem as that which Julian Huxley rather cautiously calls "biological improvement." It is very easy to see that later horses are improvements on earlier horses, but why a horse at all? Why not a biosphere entirely populated by a few very low forms of life which, because they ask for so little, have all the greater chance of persisting?

It is surely legitimate to argue that an ant is more fitted to survive than a man. The ants, some of them at least, have found themselves under no necessity to change their form for the past fifty million years, but man has had to change his physical form in a fiftieth of that period, and his major mental characteristics every few generations. Why was anything more complicated than the ant ever evolved? And, for that matter, why anything *so* complicated as the ant? For lower forms of life still are more persistent, that is, more successful in solving the mere problem of survival. From the point of view of survival the human being is by no means an outstanding success and there must be some other explanation of the tendency to complicate life which is certainly manifested throughout the biosphere. It may well be that man is better fitted to survive changes of environment, and to survive in more types of environment, than other animals, though this would be arguable; but that involves more than a mere ability to survive. We must assume a "law" whereby the species not only improves as a species, but eventually commits

suicide by propagating a new and more complicated species which will take its place.

Why is it not the simple forms that are to be considered the most successful? Granted that it is not the survival of the individual that is the criterion but the survival of the species, man is not in the leadership at all. The oyster produces millions of offspring of which all but one or two die, but oysters are very much as they were millions of years ago. No drop of water but contains the same types of diatoms, algae, rotifers, worms, differing comparatively little from the tropics to the arctic, in salt or fresh water. Have not these solved the problem of survival more economically than the higher forms of life? Grass springs up wherever a rock has crumbled or a stream deposited a film of alluvium; man to survive must pass the grass through a cow or a sheep. It is no answer to say that his ingenuity enables him to survive better than the cow or the sheep which he finally slaughters, for had he remained simple so much ingenuity would never have been necessary. If survival in time is the criterion, the ant and many other forms are superior to man; if survival in space, innumerable simple plants can live in more of the biosphere than man. There must be a further incentive. But what is it—if no such thing as purpose may creep into our argument?

Is it necessary to assume that man is at the top of the evolutionary ladder, and able to look down from that perch—a precarious one—at all the lower forms of life? There are other ways of looking at things.

It is perhaps unfortunate that the idea of biological evolution has to coincide with the Victorian epoch. That epoch was one of unexampled material progress in human society. It was natural, therefore, for the society of the expansive nineteenth century to imagine that it was progressing on a scale which the whole cosmos must recognize; and it was more than natural to assume that man had progressed over all the other animals. We find the dubious idea of inevitable human progress saddled on the back of biological evolution. The picture which grew up was one of a family tree stretching all the way from the one-celled amoeba to mankind, the finest fruit on the topmost branch.

As I say, this was natural in Victorian English Society, intoxicated as it was with its technical and financial triumphs, and at the same time doubtful of itself. All societies which are in a state

of rapidly gained and rapidly expanding material wealth are unhappy about the fundamentals of life; partly because with this progress comes change of habit, the pulling up of old conventions, old restraints, old standards, which are only after a time-lag replaced by new ones of uncertain and slow growth; partly because the chances of making a fortune involve the chances of losing a fortune. Hence the anxiety felt by the man who has learned to estimate the value of his living Soul in terms of his worldly success, and here too his need to find progress implicit in biological evolution. This was the besetting sin of popular science fifty years ago, and it led to an unbalanced view of life and its problems.

For consider how foolish it is to suggest that man must be higher and more progressive than, let us say, an octopus. It is like saying that one boy is better at mathematics than another boy is at Greek. You can say that one boy is better at Greek than another, but to say that one is better at mathematics than is the other at Greek is meaningless. You can say that one of the cephalopods, the order to which the octopus belongs, has progressed or has evolved further along a given line than another of its near relatives, but you cannot say that the cephalopod called an octopus is in any way less successful than man, if the objective of all forms of life is merely success in the struggle to survive. No man could survive where an octopus survives, and *vice versa*, and there is nothing more that can be usefully said about it.

The true picture of evolution, perhaps, is not a process which ends in the relative perfection of mankind, but rather a process which gives every form of life a possibility of achieving perfection in its own specialized direction. One path has led to man, another to the astonishing perfection of the bee, the wasp and the ant; yet another to the salmon and another to the nightingale and the eagle, and, we should add, yet another to the perfection of the rose and the palm tree.

§5. *What is Success?*

But even as we say this we are putting a severe limit to the value of the hypothesis of evolution as an explanation, or a summing up, of biological fact. There must be more to it than

success in survival and someone some day will have to make another splendid generalization to be placed beside the magnificence of Darwin's. It would seem that a planet once entirely inanimate, developed what we now call life out of the raw material of its gases, liquids and solids. To the spheres of water, air and earth there was added a fourth sphere, the biosphere, or sphere of living things, and an imperious law demanded that the biosphere should be extended in every possible direction. There must be no place capable of life which does not contain life. Even the hot springs of geysers, the unfathomable depths of the deepest seas, the caves in the bowels of the mountains where light never was, must contain life. The inanimate must be replaced by the animate in whatever form of animation could survive in any given locality. In course of time living beings themselves became fit environments for other living beings. On the large scale all animal life depended upon vegetable life for its sustenance, and *vice versa*, since vegetation breathes the excreta of our lungs. On the smaller scale parasitism became universal. Life supported life, sometimes on a basis of implacable enmity, sometimes on one of co-operating friendship. But always and everywhere the fundamental rule was that what had been inanimate must be made to support life.

Instead of the popular view, therefore, of all forms of life struggling upwards in an attempt to become the highest, and the prize being ultimately won by ourselves, we have the picture of all forms of life, after their kind, struggling for their own perfection.

This must give us a different idea of the place of human nature in the universe. In so far as we are perfect our perfection is only one of many. The palm tree and the eagle are just as much lords of creation as man himself and, so for that matter is herpes simplex.

And this indeed was Darwin's own point of view. This is the last paragraph of the *Origin of Species*: "There is a grandeur in this view of life, with its several powers, having originally been created by the creator into a few forms or into one; and that . . . from so simple a beginning endless forms, most beautiful and most wonderful, have been and are being evolved."

In this paragraph Darwin lays the foundation of the true view of evolution and progress; this is not a process whereby

the ages have turned out one perfect animal, man. It is a process whereby each living form is induced, by the pressure of the environment, to become perfect of its own kind. It is a way whereby the form, once it has come into being, is educated to approach its own ideal.

Perhaps, too, man's only claim to a greater perfection than that possessed by these other successful forms of life is that he alone, as far as we know, is fortunate enough to be able to admire their success. It is unlikely that the eagle or the rose can admire human success any more than their own. In consequence man has the unique ability to view the universe with reverence and out of reverence to invent ethical and aesthetic values which mean nothing to the palm tree or to herpes simplex.

There is nothing unscientific about this way of looking at things. Indeed, the hypothesis that, instead of man being at the top of the evolutionary tree, there are many forms of life each after their own kind struggling for perfection, is in many ways less dangerous. What is absurd, however, is to make the judgment of the relative success of any form of life solely on the basis of its ability to survive.

Let us consider a simple form of life which on all counts must be regarded as the most successful of all living things, if success is to be measured by ability to survive. A large number of us when we have a cold in the nose develop a "cold sore" on the upper lip. This very slight disability is caused by a virus, herpes simplex, which takes advantage of the abrasive effects of handkerchiefs on inflamed noses and surrounding tissues to find a home and to multiply.

By all standards herpes simplex has been more successful in finding a way to survive than any other animal, and certainly than man himself. To begin with it has been estimated that 90 per cent of the human race offers a home to uncounted trillions of this virus for 90 per cent of their lives. Nor is this all; not only does herpes simplex occupy so large a proportion of its habitable world but it takes good care, as it were, to avoid behaving in such a way as to involve itself in any great catastrophe. In a cholera epidemic there are probably as many cholera morbus bacteria as there are herpes simplex virus, but just consider the difference in their fate. Every time a man dies of cholera

and his body is burned or buried, enormous numbers of the responsible organism meet their death in the same tomb. By killing the man cholera morbus makes certain of countless deaths of its own species. Herpes simplex on the other hand kills nobody. It can go from person to person by the simple mechanism of a kiss and it can be blown with the wind or distributed in countless other ways. Now we must surely agree that a living thing which thus secures its survival is a winner in life's lottery. Compared with herpes simplex mankind has made a miserable failure of survival.

We must not, of course, regard the virus as one of our primitive ancestors. In the course of its evolution there has been almost as lengthy a process as in our own; but whereas we have added to our complications, to our size, to our machinery for dividing the labour of living, the ancestors of the virus took an opposite road. The characteristic of a virus is that it is completely dependent on other living beings for its entire existence. It is a parasite to such a degree that it cannot even live on the products of other living beings as, for example, bacteria can. All viruses must live inside a living cell. It may be able to move around, or rather be moved around, in the body fluids, or for that matter through the air, but only in an inert condition; if it is to "come to life" and function like a live thing, it must get inside a cell.

It is possible that the ancestors of the virus were bacteria, which lost even the few abilities bacteria have of getting nourishment for themselves, and became absolutely dependent on the life processes of cells of other animals. That the virus is the last word in total parasitism is the most likely estimate of its status in the universal family tree.

Indeed, it would not be extravagant to imagine that if the universal ancestor of us all was an amoeba-like single-cell animal which divided in two by way of reproducing itself, then perhaps one-half of this original Adam amoeba might have gone on, in the course of evolution, to be the ancestor of man, and the other half of the same Adam amoeba gone on, in the course of its evolution to be the ancestor of the herpes simplex which today batten on the person who has a cold in the nose.

But surely the virus emphasizes the fact that there must be some other criterion besides mere ability to survive, when we

come to estimate the relative importance, or value, or position in the evolutionary scale, of one animal and another. It would be childish to suggest that herpes simplex and Socrates are on a level just because the cold-sore virus on Socrates' lip found it as easy or easier to survive. Nor can the biologist escape by saying that the value judgment which sets Socrates higher than the dwellers in his rugose lip is a matter for metaphysicians and not for him: for a biology content to see no difference between the two would be very restricted as a guide to human nature.

§6. *Evolution: The Human Phase*

It is here that Julian Huxley has come to our aid in his recent book *Evolution in Action.*

In applying the hypotheses of Evolution and Natural Selection to man Huxley must have been acutely disturbed by two subsidiary theories which have been commonly drawn from them.

The first is the Victorian hypocrisy of *necessary* progress with its corollary that the Victorian successful gentleman was the noblest product of creative evolution.

The second was the school of thought which opposed all political and social progressive measures because any interference with nature's law of survival of the fittest to survive would mean that humanity was hastening its own extinction.

Whenever there is a revolutionary scientific advance all political schools of thought do their best to cash in on it, and in the case of evolution justification was found for the most diverse dogmas. Free competition, or as it is called nowadays free enterprise, was obviously beatified by nature's new-found laws, while everyone who believed in aiding the weak of body or mind, unfit as they were for an unaided struggle for survival, could be regarded as impeding progress. The grain of truth in this led charitably minded men like Huxley himself to put great emphasis on eugenics. In his most recent book Huxley soft-pedals eugenics. Compared with the programme of a generation ago his present ideas are indeed modest:

> You may have been surprised that I have not mentioned eugenic possibilities, and indeed I must say a word about

them. In the human phase, the biological mechanism of evolution—physical heredity and natural selection—are now subsidiary to the psycho-social ones. . . . In general, the more elaborate social life is, the more it tends to shield individuals from the action of natural selection; and when this occurs . . . harmful mutations accumulate instead of being weeded out. . . .

On theoretical grounds, we could certainly breed up a number of specialized human types if we set our minds to it. But if the general argument of the chapter is sound, we cannot think along these lines. The essence of man's success as an organism is that he has not evolved as a set of separate specialized types, but has kept all his genes in a common continuity. However, that does not preclude the possibility of a general improvement. Eugenics for general improvement does not mean trusting the state or any other authority with some arbitrary power for deciding what are good and what are bad hereditary qualities. . . .

At the moment, large-scale eugenics is outside the range of practical possibility; but already, on the basis of our present knowledge, the eugenics idea can become an incentive and a hope.

It would be possible, of course, to read these paragraphs merely as expressions of hesitancy, almost of bewilderment. Here, the unsympathetic reader might say, is a scientist pussyfooting the very dogmas he has striven to uphold; for orthodox evolutionary thought applied to the human being demands that eugenics should be the central plank of any scientific platform. Is Huxley a renegade? No, his hesitancy is proof that he is not merely the best contemporary expositor of his grandfather's scientific age, but a pioneer of a new age, just as scientific, but free of the blinding dogmas which have held us back in the nineteenth century. Julian Huxley is one of the four most important educators of our generation (the other three were Shaw, Wells and C. K. Ogden), and in his most recent book, a reprint of his broadcast addresses, he has put his finger on the mistake in biological thinking which has held us back. Here is the essential statement:

"We have tended to misunderstand the nature of the difference between ourselves and animals. We have a way of thinking that if there is continuity in time there must be continuity in quality. . . . The critical point in the evolution of man—the

change of state when wholly new properties emerged in evolving life—was when he acquired the use of verbal concepts and could organize his experience in a common pool. It was this that made human life different from that of all other organisms; and we can now begin to grasp the nature and profundity of the difference. The development of animals is always closed; their evolution is always sooner or later restricted. Man's individual development, on the other hand, is potentially open . . . man has an unlimited field of possibilities, and he can never realize all of them. He has developed a new method of evolution: the transmission of organized experience by way of tradition, which supplements and largely overrides the automatic process of natural selection as the agency of change in the human phase."

We can now see how the anomalies about human nature regarded as the product of evolution can be resolved and usefully understood. Man is the animal nurtured by natural selection which has broken through the chains and shackles imposed by natural selection. Once we accept this (with a limitation to be considered in a moment) we are able to see ourselves in a new light. We do not have to pretend that we are the outstanding success claimed by nineteenth-century evolutionists. Indeed we are an animal which, so long as success depended on obeying the rules of natural selection, was doing so badly that we were already in danger of becoming extinct. We are not out of danger yet, but we have been given another chance by God, or Emergence, or whichever we like to call an unknown powerful X which from time to time changes the course of things.

It is as well to rub in our incompetence in the struggle for survival as far as those abilities are concerned which we share with other forms of life. That struggle involves three major tasks, a struggle to preserve life when attacked by enemies, a struggle for sufficient food to maintain health and strength and a struggle to reproduce our kind. In each of these we have failed miserably compared with other animals.

We will dismiss our failure in the fight with the remark that we are almost the only animal which kills its own species, except in times of stress for food, and we have more diseases than any animal except those we have corrupted by domestication.

Let us spend rather more time over our second failure: it is instructive.

At the present time more than one third of the human race suffers from malnutrition. Those who are in a position to do so are very often "digging their graves with their teeth." A large proportion of human ailments are due to wrong diet. Thus hypertensions and hardened arteries can be correlated with the eating of too much salt and too much animal fat respectively. The human animal is apt to pride itself on such medical discoveries as these; but these and a very large proportion of medical discoveries are no more than a belated awareness that the human animal knows nothing naturally about what he should eat. In comparison with the wisdom of other animals this is very little cause for boasting.

Consider the rat and consider also Brown-Séquard. In 1859 Brown-Séquard began to try and discover the function of the adrenal glands. The answer remained unknown for nearly eighty years, and was finally discovered by R. F. Loeb and his co-workers in 1935. The adrenal glands, among other things, control the absorption of sodium in the animal body. We rightly regard the discovery as a most praiseworthy example of the scientific abilities of the human brain.

If a rat has its sodium regularity apparatus put out of balance by the excision of its adrenal gland it discovers what is wrong within six hours. Place before it a number of little dishes containing mineral solutions, sugar and other foods and the answer which took physiologists eighty years to discover is at once given by the rat. "Within a week or two it could have been determined from their avid selection of sodium-containing solutions that one function is concerned with sodium metabolism and from their partial rejection or refusal of sugar that another function is concerned with carbohydrate metabolism."[1]

If you remove the rat's parathyroid gland its "calcium appetite is so reliable and delicate that it can be used in the bio-assay of other substances, for instance vitamin D." If you add substances which help the body conserve calcium, the rat immediately reduces its intake of calcium solutions and if you add alcohol to its drinking water, thereby forcing it to take in calories with its drink, it reduces the amount of food it eats as so to reduce the number of calories by precisely the same amount.

[1] Curt P. Richter, Josiah Macy Jr. Third Conference on Neuropharmacology, N.Y. 1951, p. 40–1.

Further experiments have shown that this ability to select precisely the right diet depends on the sense of taste; if this is destroyed, the rat cannot choose its food properly and dies.

The rat's sense of taste is far more usefully developed than a man's; and, for example, whereas few human beings know the difference between one sugar and another and fewer still know how much of the various sugars are healthy to eat, "In another experiment in which we measured the amounts of sugar that rats will take voluntarily when they have access to a solution of sugar in addition to the stock diet and plain water, the rats ingested far the largest amounts of maltose and dextrose, the smallest amounts of lactose and galactose, and intermediate amounts of sucrose and levulose. It was shown that the amount of sugar taken closely paralleled the 'limits of assimilability' of the various sugars as determined by Ariyama and Takashi." (Richter op. cit. 51.) Finally, since the rat never makes a dietary indiscretion it never needs to vomit; it has in fact even lost the power to vomit since the muscles necessary for this essential function of man, the domesticated dog and the cat, have atrophied.

To drive in the humiliating contrast, let me quote Dr Richter once more: "The selections that a rat makes are of special interest because of the close relationship between the dietary requirements of rats and men. As a matter of fact with the single exception of vitamin C they are almost identical. . . . Nutritionally speaking it would appear that man is more closely related to the rat than to apes and monkeys; however, this may be a result of the operation of natural selection during the long years of close association."

Dr Richter's last suggestion is not very convincing, since other animals in which the association has been long and close have not achieved the same close dietary relation, but what is important is to grasp the indictment of man involved, if we consider him from the point of view of natural selection and the struggle for survival. Think of all the clever work that has been put into nutritional science, into the discovery of the laws of dietetics, our needs in terms of calories, vitamins, mineral traces, carbohydrates, fats, proteins—perhaps all this is merely a lengthy and laborious effort to recover a lost wisdom, a natural knowledge as to what we should eat to keep alive and well.

Consider the immense structure of health services, medical education, hospitals, chemist shops and their loaded shelves—most of this is needed because even when by our laborious methods of experimentation we have regained a part of the lost wisdom we refuse to be sensibly influenced by it.

And as for taste, for our gourmet aestheticism—consider an observant rat watching a Roman senator's slave tickling his master's throat with a straw to make him vomit, so as to start his banquet all over again. What book would the rat write on man's place in nature and on his chances for survival in a struggle where food and its proper use are fundamental?

We pass to reproduction. Here we find that almost throughout nature there is a law which man has long ago given up with disastrous results. This is the law of sexual periodicity which secures that the sexual desire and the nutritional desires are to an adequate extent kept separated in time. This does not of course mean that an animal in heat or a nesting bird give up eating, but it means that for an appreciable part of the year an animal gives its undivided attention to building up its strength and securing its access to food. Throughout nature mating and nesting are seasonal. No animal is bewildered by trying to satisfy sexual and nutritional desires at the same time at all seasons of the year. When man ceased to have a natural sexual periodicity he became degenerate from the point of view of fitness to survive. By allowing himself no periods of rest in the peace of neuter quiescence he overstrained himself to such an extent that he had to devote an enormous part of his social potential in building up an aphrodisiac environment, and this seems to have undermined his nervous equilibrium with the disastrous results we all know. Erotic aesthetics are certainly not to be despised and human life is the richer, even if the more precarious, for our obsession with our erogenous zones, but from the point of view of the survival of the fittest in a crude animal and vegetable struggle for existence there is little to be said for human reproductive arrangements. In this nearly all living organisms are superior to us.

In fact, whether we are considering (*a*) the human energy—used up in the destruction of humanity by means of unending civil war—(*b*) the incompetence of nutritional functions, or (*c*) the degeneracy of our reproductive habits, we must admit that

man, far from being the fruit on the topmost branch of the evolutionary tree, was a degenerate animal about to go down to defeat in the struggle for existence, when his chance came, and he found himself able to cut free from the inexorable workings of natural selection, by "the transmission of organized experience by way of tradition, which supplements and largely overrides the automatic process of natural selection as the agency of change in human nature."

But mankind has not certainly taken the chance which came to it. *That* is the essential starting point for the Age of Wisdom for which we must all build. Man as an evolutionary animal can still become extinct, UNLESS—

1. He is able to make good by the use of his brain, a clumsy method in this context, the decline in basic wisdom about the necessities for survival. This means that he must achieve a state of equality as between one group and another of the human race in all that concerns animal efficiency. From the point of view of evolution the present enmity between Russia and the West is dummy fighting. If Russia remained a have-not nation then there would be some sense in it, but within ten years the standard of living in Russia may well be as high as in the USA and then both countries will find themselves in alliance against the remaining have-not countries. For there will be no peace until every Asiatic and African has as high a standard of living as every American or European. Unless this can be achieved by common sense rather than by war man will deservedly become another extinct failure. An accident of history which will not continue to operate has put the white races in a temporary position of strength. If they acted according to the rules of natural selection and the struggle for survival they would exterminate the other races now. As they have ceased to be solely governed by the law of the jungle they cannot do this, but that does not mean that the coloured races may not exterminate them, if they do not use their superior position to even up living conditions throughout the globe.

It is not so much the existence of poverty, hunger, disease that menaces the human race, but rather the gradients between the various groups judged by these defects. It would be far better if we deferred the possession of television sets until we could provide Chinamen with more than a handful of rice a day,

and man cannot be said to have accepted the chance to free himself from the animal struggle for survival until this has been done. An attempt to achieve it is bound to come, and the choice between the old methods and the new is the choice between extinction and continued evolution.

2. Man must learn to make better use of the faculties afforded him by the changing emphasis in the human phase of evolution. Instead of gloating over the similarities between himself and other animals he should examine the differences. He need not worry too much about how these differences came but he must not neglect them. "The highest and most sacred duty of man," writes Julian Huxley, "is seen as the proper utilization of the untapped resources of human beings." It is to the examination of these resources that the rest of this book will be devoted.

3. Only when we have some idea of what these untapped resources amount to qualitatively as well as quantitatively can we formulate clearly the last of man's three evolutionary tasks. That task is to put the right purpose into the evolutionary process. It may be that there was nothing but blind chance working towards the making of man—although one cannot help feeling that if the universe had man up its sleeve all the time, even when protein molecules struggling into protoplasmic patterns were all that the warm shine of early seas had produced, then the purposeless X was building better than it knew; but there can be no doubt that as man has now taken things into his own hands, teleology is respectable at last. Let those who enjoy such things continue to claim that man is a rather badly constructed electronic machine; we know better. We may not again imagine the unknown X as a creator standing outside his creation and rather nonchalantly letting it go on the rocks, but we may find that the creative X is within man and working through him. Thus instead of rejecting evolution as a devilish heresy the religious man may find in it the evidence for which he seeks, that there is a meaning in life after all.

We can now answer the question put at the beginning of the chapter: Is there perhaps a study of man outside evolution? The answer, now that a few words and ideas have been clarified, is that the question was meaningless. What should have been asked was: Is there a study of man outside Natural Selection by the Survival of the Fittest to Survive? The answer is, yes.

Yes, there is a study of the evolution of man in a phase where natural selection as experienced by animals is no longer the main-spring. Since this involves man as the controller of his own evolution, it involves teleology and it involves the possibility of failure as well as success. What man has gained to set him above the beasts of the field involves the ability to make mistakes. He can decree his own extinction, whereas an animal becomes extinct because the climate changes, because an ice age returns, because the rivers dry up, because another animal intervenes. At present man looks like committing suicide. Why? That is the subject matter of the rest of the book, where we shall consider the kind of knowledge about himself that man must acquire if he is to lead his species, and therefore life itself, to further conquests over the inanimate, the mechanical, the instinctive, the ignorant.

CHAPTER FIVE

MAN'S HIDDEN CREATIVENESS

§1. *Man's Unconscious*

EVERY MAN EXERCISES mysterious creative powers, even if his creation is no more than the prose of everyday speech; for any sentence uttered, beyond mere exclamations or conventional ejaculations, involves a mystery of which few people are fully aware.

When you begin a sentence you do not consciously know what the last words of the sentence will be; yet for the sentence to be correct and for it to convey your meaning, you must choose the first words with some sort of precognition of the sentence as a whole and of its last words. How is this possible? What is the mental process which enables the as-yet-unknown sentence to be started correctly?

Superficially an answer is quite easy to find: the intellectual work involved is done unconsciously, or, as some would say, *in the unconscious*; but this last is a dangerous way of putting it, because it might lead us into unending controversy as to what the metaphor means.

If we use the noun "the unconscious," and involve ourselves in imagining a thing or a place, we are forced to ask where and what is this thing or place, but it would be unprofitable to discuss this here. It is sufficient to note that we are aware of only a small part of the mental processes which go to produce even a conversational sentence, just as we are aware of only a small part of the muscular processes involved in our standing still for one moment.

It is surely surprising that man who has had the intelligence to disintegrate the atom and to imperil the stability of the ground beneath his feet, has been so negligent as to leave his finest

abilities largely unexplored, and indeed to consider such "inspiration" uncontrollable.

There are four good reasons why in our search for an answer to What is Man? it is important to throw all possible light on the subliminal part of our nature.

There is the theoretical interest: How far does the human mind, as it were, *stretch*? What we know, what we are conscious of, is a relatively small island, but this undiscovered country is vast, and, moreover, right off the map.

There is the practical interest: If hidden riches of creativeness are to be mined in this invisible hinterland how can we set about availing ourselves of them?

There is the light thrown on evolution in the human phase: that phase is distinguished by the possession of a conscious mind able to reason, and yet, if one thinks of it, this unique conscious mind is dependent even for its ability to reason, on completely unconscious processes. The only difference between us and other animals is that we can comment on, criticize and take into account for action, the one event of a continuous stream of events flashing past the window which we call the Now.

Finally we must surely ask ourselves whether greater knowledge and greater control of the potentialities of our hinterland might not change our outlook on life and its possibilities, and on what is worth while in it for a living man. The first explorers of a new country may find themselves in rich agricultural land and base their economy on farming; but when they go further inland they find minerals abounding and raise their economy to the greater wealth of an industrial level. So we with our present knowledge of our mind regard life largely as an economic problem with economic rewards and punishments. If we knew more about the inner hinterland it is not impossible that we should regard this as a mere beginning, to be made as automatic as the beating of a heart, while a new vision of creative values, with aesthetic triumphs and failures, would contain the meaning of life.

Thus there is a possibility which has revolutionary implications. Our brain, faithful to its task of helping us win the struggle for survival, dredges up from the depths only that which is useful for that struggle. Only the occasional artist or pure scientist brings something quite different to light. When he does we accord

him worship suitable for such a saviour. For mere success in the struggle to survive for survival's sake is the most depressing of achievements, and we know that the artist and the searcher after knowledge for its own sake are our chief witnesses that there is something else besides this within the capabilities of the human mind. It may well be that if we learn to mine our own hidden creativeness we shall not merely gain power to be more efficient in the struggle, more mechanically inventive, more nimble-witted in our contests with our neighbours, but, better far than these, more endowed with the experience of beauty which makes survival worth while. In short the hidden riches may have aesthetic value as well as, or rather than, economic value.

§2. *Whence come Ideas?*

Here is a great mathematician, Poincaré, describing his creative act:

> I was very ignorant at that time; every day I sat down at my table; I passed an hour or two there; I tried a great number of combinations, but I did not reach any result. One evening, I drank some black coffee, which I was not accustomed to do; I could not sleep; ideas crowded in on me; they seemed to me to collide with one another, until two of them hooked together, as it were, to form a stable combination. In the morning I had established the existence of one class of fuchsian functions, that derived from the hyper-geometric series; I had nothing to do but to check the result, which took me a few hours. . . .
>
> At this time I left Caen where I was living at the time, to take part in a course of Geology. The journey made me forget my mathematical work; when we arrived at Coutances we got into an omnibus to make some excursion or other; at the moment of putting my foot on the step, the idea occurred to me, without anything in my immediately preceding thoughts having prepared me for it, that the transformations which I have used to define fuchsian functions were identical with those of non-euclidian geometry. I did not verify this: I had no time to do so, since no sooner was I seated in the omnibus than I took up the conversation I had begun; but I was entirely certain of the result. On returning to Caen I verified it at leisure, in order to satisfy my conscience.

I then set to work to study arithmetical questions without any apparent result of importance, and without suspecting that there would be the least connection with my previous researches. Disgusted with my failure, I went for a few days' holiday to the seaside and thought of quite other matters. One day, while walking on the cliffs, the idea occurred to me, again with the same characteristics of brevity, suddenness and certitude (I underline these words) that arithmetical transformations of indefinite ternary quadratic form were identical with those of non-euclidian geometry. . . .

This was followed by my departure for Mont-Valerien where I had to perform my military service; I thus had very different preoccupations. One day, whilst crossing the street, the solution of the difficulty which had stopped me appeared to me quite suddenly. I did not attempt to go into it more deeply at once, and it was only after my service that I took the question up again. I was in possession of all the elements, and only needed to assemble and arrange them.

. . . . What will strike you at first are these appearances of sudden illumination which are the manifest tokens of a long unconscious labour which has preceded them; the part played by this unconscious labour in mathematical invention appears incontestible to me, and traces will be found of it in other cases where it is less evident. Often, when one is working at a difficult question, one produces nothing of any use on the first occasion of attacking the problem; later, one may take a rest of greater or less duration, and sit down at the table again. For the first half hour one may continue to get no result, and then quite suddenly the decisive idea is presented to the mind. One could say that conscious labour has been more fruitful because the rest had restored to the mind its power and freshness. It is more probable that the period of rest is filled by unconscious labour, and that the result of this labour is afterwards revealed quite suddenly to the geometer, as in the cases that I have cited; only that the revelation, instead of appearing during a walk or a journey, has been produced during a period of conscious work, but independently of this work, which plays at the most the part of a releasing force, acting as a stimulus which excites the results already attained during the rest period, but still buried in the unconscious, to take a conscious form.

Montmasson, pp. 80, 81, 82.

It is certain that not everybody has the power to be a Poincaré simply by drawing from this unknown source within. Nor can it be supposed that by learning some trick we can avail ourselves of whatever lesser riches there may be within us, without effort, without hard work of a very conscious and definite sort. But it is equally certain that however humble compared with the Masters we may be, we use only a fraction of our potentialities, and that the "trick" of learning to use far more of them can be mastered at a price.

If a man of, say, thirty years of age were to go to a hypnotist and say: "I am very fond of mathematics; I know that profound mathematical understanding comes in up-rushes from the unconscious mind; I am told you can by hypnosis assist these up-rushes; please make me a Henri Poincaré!" what would the wise hypnotist reply?

He would ask whether the man had subjected himself to that disciplining of his conscious mind by hard work, and practice in clear thinking, without which nobody can avail himself of his hidden riches, however great they may be.

If Coleridge had not spent a life-time reading books and absorbing their contents, not merely as a sponge absorbs water but as a digestive system digests food, he would not have dreamed of Xanadu. Luckily, in Livingstone Lowe's The Road to Xanadu we have an excellent study of the conscious intellectual labour which must precede dreams like these. There we see how the unconscious creativeness of man has to be fed by the unceasing conscious effort of a life-time, if that occasional uprush is to produce pure gold. Let no man deceive himself that there is a short cut to genius to be found on the hypnotist's couch or anywhere else. Only quacks write books with such titles as *How to be the Genius you Are* and only fools read them. However, it remains a humiliating mystery why we do not make greater use of our hidden creativeness. Yet look at the books in which psychologists describe how the unconscious mind can be tapped, how the subliminal uprushes can be stimulated; and we find almost all the attention concentrated on one aspect only: how to get rid of the dirt! We seldom think of what lies hidden in our minds unless something goes wrong.

§3. *Hypnosis*

Of the means of getting in touch with our unconscious minds, the most commonly used today are the various techniques of psychiatry which owe their origin to the great original genius of Sigmund Freud, and their use is virtually restricted to the service of the healing art; but there is an older scientific means which, after years of discredit, is once more occupying the attention of scientists, and that is hypnosis.

From the days of Mesmer and indeed long before, it was found that certain remarkable changes in human nature were induced when various techniques were used; though very often the techniques themselves were afterwards shown to be futile and mistaken. Mesmer mesmerized his subjects by methods which have been discarded and discredited along with witches' cauldrons, alchemists' unsavoury messes and astrologers' computations. Yet there was something in them, since they produced results, so much so that, although Mesmer's methods were discredited, people continued to use mesmerism or animal magnetism or hypnotis, but with very little idea of what they were doing—and they got results.

The general public of course was thrilled by the apparent implications of these early practises. Here was a man with "a magnetic personality" who, by making passes with his hands, accompanied by fixed stares which revived in those who experienced them every frightening superstition about the evil eye, was able to subdue another to his will. Tens of thousands of young men, and young women too, saw the possibility of their wishes being fulfilled, and imagined themselves Svengalis and Trilbys. Today only an unfortunate few, incarcerated in mental homes, imagine that they can be mesmerised for evil purposes —usually, in the modern version, by an enemy directing towards them an evil ray. The explanation of hypnosis is far less romantic, less flesh-creeping, than was thought.

In the early scientific period of its history, hypnosis was chiefly thought of as a means of preventing pain. The pioneers, after extracting the nonsense out of mesmerism, discovered an invaluable residue which could genuinely be used as an anaesthetic.

And this was at a time before anaesthetics of a chemical sort had been discovered.

A historical coincidence cut short the growing interest in hypnosis and set its progress back by a number of years; for just as Elliotson and Esdaile and James Braid were, by their successes, beginning to overcome prejudice, chemical anaesthetics were discovered, and the value of hypnosis, regarded, as it was, almost solely as a means of relieving pain, became negligible. That was in 1848; and it was not until 1892 that the British Medical Association could be induced to admit that the phenomena demonstrated by hypnotists were genuine and of value to the cause of health.

By then, however, valuable work had been done to show that hypnosis has other claims on our attention than the therapeutic, and it is these claims which will interest us here.

§4. *Hypnosis and Our Senses*

We are interested in hypnosis in this book only for the light it throws on the question What is Man? and for the fact that what has been discovered by its use must alter in some important ways our picture of human nature. We are not concerned with the fact that we can, for example, have a tooth out under hypnosis without pain; our interest lies in finding out what it is about human nature that makes such an interference with normal physical cause and effect possible; what use we can make of hypnosis as a tool to discover more about human nature, and how it can be used to set free the best in a man quite apart from any medical help it can give.

Can hypnosis make us more intelligent and wiser? How can it serve the Age of Wisdom?

For the proper use of our intelligence we depend first of all on our senses. Thus, other things being equal, the man who is handicapped with bad sight or hearing, is handicapped in the use of his brain.

Now, as long as seventy years ago there was a case described by Dr J. Milne Bramwell of a woman of about forty years who was subjected to hypnotic experiment in first-class conditions. Dr Bramwell used her as a test case and arranged for everything

to be witnessed and verified by independent observers of high scientific standing.

The object of the experiments was to show how various physical functions, particularly those of the special senses, could be improved either during the hypnotic state, or, more important, permanently, by hypnotic treatment.

It was shown that her muscular sense was made so much more delicate that when given two weights differing from one another by only eight grains who could distinguish the lighter from the heavier. Now a grain is one seven-thousandth part of a pound and nobody could normally distinguish so small a difference. In the same way she could distinguish very slight variations of temperature, and when her cutaneous sense was tested in the usual way by touching her with the points of a compass very close together, she could feel the two points when they were only half the distance which is normally distinguishable. Her range of hearing was doubled also.

Most important was the effect on her sight. She suffered from a severe visual defect and could only read the third line of the test types used by oculists. After Dr Bramwell had given her suggestion-treatment under hypnosis, the muscular defect which was responsible for her bad sight disappeared, and a year later her oculist reported that her sight had become normal.

Now this case suggests two important questions. Plainly, if hypnosis can enhance our sensitivities it can make us more efficient intellectually. Though there is, of course, a great deal more to intelligence than good eyesight and hearing and muscular sensitivity, it is a commonplace that these are the gateways through which the raw material of knowledge must pass. We ask therefore if such results could be obtained from everybody, or whether Dr Bramwell's case was a rare exception; but also we ask what it is in human nature which makes it possible for physiological changes, for example to eye muscles, to be brought about by purely mental means.

Let us consider the latter problem first. How does the hypnotist act on the muscles of another person's eyes simply by verbal suggestion? The fact seems so incredible that it took a long time before people would accept it.

It was thought that something physical must pass from the

hypnotist to the hypnotized person, a magnetic or electric current perhaps, or a vibration or a ray; but in due course it was found that no such mechanical explanation was needed and that the secret was to be looked for in the hypnotized person himself. The part of the hypnotist was simply to help this person to exercise powers latent within him; far from the hypnotist imposing his will on the patient, he encourages the patient to make use of his own powers.

We can say indeed that all hypnosis is ultimately self-hypnosis, and that whether or not a trained specialist is necessary to make the suggestion to us in the first place, nothing happens until we ourselves make an auto-suggestion; no rays, no magnetic currents—simply encouragement to use power latent within us.

Of course that is not a full explanation of the facts, for it still remains a mystery as to how the human mind can act on the human body in this way; but it seems more mysterious than the fact that our mind can induce our arm to move, only because it is a less common experience; and there is no more *a priori* reason for doubting that the unconscious mind can move the ciliary muscles of the eye than for doubting that it can make the eyelids blink.

§5. *Hypnosis and Memory*

We gather the raw material of knowledge through our eyes and other senses, but the result will be of little use unless we can find a particular item of knowledge whenever we need it: a good memory is a prerequisite for any intellectual work.

Now memory is hard to understand. On the one hand we know by daily experience that we forget things, on the other there is a good deal of evidence suggesting that nothing ever experienced is permanently and irretrievably forgotten beyond recall. We even remember, without knowing it, things we have never known.

Here is an example: an uneducated soldier is hypnotized and a page of *Hamlet* is read to him seven times. He is at once able to repeat the whole page without a mistake. He is woken and asked to recite the page of *Hamlet*: he has forgotten every word.

A week later he is hypnotized again and at once recites without a mistake the entire page.

Or this:[1] "During somnambulism, I have been able to bring a twenty-four-years-old patient back to the memory of his first birthday. While under hypnosis he recalled the happenings of that day and described the clothes he wore to the minutest detail. His mother confirmed everything the boy recalled, albeit with unbelieving astonishment."

Finally: "In one experiment," writes Gindes[2], "with fifteen average college students about to take their final examinations, I hypnotized them and gave these suggestions for post-hypnotic effect:

"'Everything you learned during classes you have committed to your memory; you retain all this knowledge. Whenever you are required to bring this information forth, you will be able to do so without the slightest hesitation. You will have full confidence during your examination, for you will be able to recall immediately all that you have learned.'

"This speech was repeated twice, and the subjects awakened and dismissed. The examination took place a week later, and all but one received amazingly higher grades than others of similar intellectual calibre in the class."

These are *facts* and there are thousands like them. They suggest that our minds retain everything that we have ever experienced and that forgetting is simply inability to recover from the hidden store-houses of memory something which we may want to know. They show also that there are ways of recovering such apparently forgotten experiences. Yet very little use of these proven truths has as yet been made except in psychiatry for the purpose of reviving memories so unpleasant that they are causing trouble. This is of course excellent in itself, but would it not be possible to improve the intellectual processes of healthy people as well as to heal sick people?

[1] Bernard C. Gindes, *New Concepts of Hypnosis*, p. 48.

[2] Op. cit., p. 52.

§6. *Our Hidden Time Sense*

The unconscious mind thus revealed under hypnosis is no mere store-house of which the contents can be made more accessible by various means to our conscious mind. It has active powers of its own. The case of Miss D carries the phenomena a step further.

Miss D was a nineteen-year-old girl with a pack of physical troubles which do not concern us here. Sent to Dr Bramwell, she was very considerably relieved of them, and, when she was well, he resolved to use her to repeat some well-known experiments of Professor Delboeuf. Miss D was intelligent, but hardly proficient as far as arithmetic was concerned. She could multiply and subtract on paper but not in her head. It is important to know this as the surprising thing in her story is her ability to carry out commands given her under hypnosis which involved quite a little mental arithmetic.

On November 5th, 1895, at 4 p.m., she was hypnotized and told that after five hours and twenty minutes she was to make a cross on a piece of paper and write down the time she believed it to be without looking at a clock or watch. She was then wakened and, as usual with people who have been given a hypnotic suggestion, she remembered nothing of it. At the exact minute indicated she carried out both instructions. Her mother reported that at 9:15 p.m. she began to be restless, saying: "I feel I must do something but cannot tell what"; five minutes later she made a cross and wrote on a piece of paper "20 minutes past 9," adding "it's all silliness." Her mother went into the next room where there was a clock and it was indeed 9:20 p.m.

On later occasions she successfully carried out commands after 24 hours 100 minutes, 2880 minutes, 7200 minutes and so forth. She was completely right 45 times out of 53 times. In most of the other eight she was a minute or two fast or slow.

Here we have a girl carrying out an act which had been asked of her when she was in hypnotic sleep, which involved more mental arithmetic than she could normally do even if she had remembered the command and tried to carry it out by normal methods. Further, she possessed quite unconsciously an accurate appreciation of the passage of time. Was she some abnormal

psychological case? Or were her capabilities such as are possessed by all of us?

There is not sufficient known to answer these questions: yet most of us, if we cared to experiment, could find out some curious things about our unconscious time-sense. Many people can train themselves to wake up at a given moment without an alarm clock. I myself have this ability, and also I have noticed on scores of occasions that if my wrist-watch or a clock in the room stops, I waken within a few seconds or minutes. This last may well be due to the disturbance caused by the sudden cessation of the ticking of the time-piece, but if so we can only assume that during sleep the sense of hearing is far more acute than when we are awake, for, being slightly deaf, I cannot normally hear my wrist-watch. On the other hand, I cannot on this personal evidence claim to have "time sense" as my watch may have been wrong. I can only claim that I know when my watch has stopped and wake.

Once more we are brought up against a remarkable and neglected characteristic of human nature, namely that much goes on in our minds when we are asleep and therefore unconscious. It is important to remember this, because it would be a mistake to imagine that the phenomena we have been discussing are *caused* by hypnotic suggestion. Hypnotic suggestion is simply one way of helping a person realize, and profit from, their unconscious creative powers. It opens the door; it is not itself the door. Moreover there are other keys.

This time-sense which can be elicited by hypnotic suggestion has been known for many years. The first reported experiments date at least as far back as 1885. It is an excellent example of the study of human unconscious powers that nobody seems to have troubled until 1922 to take suitable steps to find out *what happens* when a person succeeds in estimating the passage of thousands of minutes without conscious calculation.

Sydney E. Hooper, in 1922, made the first real contribution to our understanding, a contribution which has as yet not been used for any practical purpose, in spite of its potential importance.

Hooper was able to experiment with two somnambules, who not only were able to rival Miss D's time calculations but to give valuable information as to how it was done.

Having satisfied himself of Miss E's powers he suggested to her, when deeply hypnotized, "At the expiration of 2670 minutes make a cross and put down the time before looking at any time piece." That was on a Monday. On the Wednesday afternoon she was working in her office checking a column of figures when she suddenly said: "Three-thirty Mr Hooper," and scribbled 3:30 on a piece of paper. A few seconds later she looked at the clock which said 3:25. "You see," she explained to the experimenter next day: "I felt I had to tell you something, but it was such a blank, vague feeling."

Hooper now put her into a deeper trance-state than usual and although she had previously denied making any calculations she now explained that having first calculated that 2670 minutes made forty hours and a half, she began to count and continued to count, waking and sleeping, until she had reached the proper minute. This counting was completely unknown to her conscious mind and went on whatever she was doing without interfering in any way with her conscious life. "It seemed," she said, "separate from my waking mind." This unconscious counting did not, for example, interfere with her conscious mind adding up a column of figures. It was difficult to find out what intervals she was counting as all she could say was that she counted "spaces."

"Another feature," says Hooper, "that strikes me as remarkable is what may be called the unruffled patience of the subluminal level of the mind, which went on rhythmically counting 136,800 intervals in the last experiment without complaint or even boredom, showing a persistency of purpose worthy of a greater cause."[1]

Exactly! We know by scientific experiment that there exists deep down in human nature a silently working, imperturbable force capable of concentration such as our ordinary minds can never achieve. For all we know, it might be trained to do those parts of our intellectual and creative work which it could do better than our conscious mind. But nobody has taken the trouble to work out the possible implications in the field of education.

[1] It is only fair to say that a plausible alternative explanation could be that the subject worked out the sum at the beginning and produced the correct solution without knowing that she had done so. Even this suggests unexplored unconscious power.

Once more let me repeat: the emphasis in all this should not be on hypnotic suggestion. That is simply one technique whereby we can tap the astonishing resources of the unconscious mind. These resources include an ability to alter and improve our physiology so as to make our body a better gatherer of knowledge, an ability to free our natural memory from the causes of forgetfulness, an ability to concentrate on intellectual tasks without disturbing, indeed without the knowledge of, our ordinary daily unconsciousness. Yet, with the possible exception of brainwashing behind the Iron Curtain, these abilities have not been turned to any use. They remain the subject matter of rare experiments. We deliberately neglect natural powers which might transform life.

So far we have considered what we might call the more mechanical of man's hidden creative powers. To gather knowledge better and to remember it better are not in themselves more than useful adjuncts to true creativeness. As we saw, the great musician, the great mathematician and the great poet alike described their works of art as being due to uprushes from some unconscious source. Has anything been learned of those processes to make them available more easily or to more human beings?

Now even if we admit that no amount of suggestion or hypnosis will turn us all into great creative artists, there is plenty of evidence that more people possess artistic creativity than know it. Since the neurosis of our age is very possibly due in part to the repression of our aesthetic needs by the mechanical civilization in which we live, it would be not only an individual but a social advantage to discover how to reduce these repressions.

§7. *The Unconscious Birth of Printing*

Now what revolutionary step in man's evolution can we expect from a proper understanding and control of his unconscious creativeness?

Of course it is still only a short while since the average man became familiar with the idea that he had an "unconscious mind." And, when the knowledge penetrated, it appeared to

most people that this unconscious was for the most part a storehouse of forgotten experience. Its contents were the things we had not a use for at the moment because we were thinking of something else, and the things which we had scarcely noticed when they happened because we had so little use for them then. Besides these, Freud familiarized us with the idea of a third type of experience stored away out of sight, the too-important experience which was also too painful to be allowed into our conscious mind.

Freud invented for us the image of a trap-door with a sort of demon-censor seated there preventing these last experiences from ever coming out again, except in such heavy disguises as to protect us from recognizing them.

Of course all this is no more than a picturesque metaphor so misleading that psychologists and philosophers have had their hands full ever since rescuing us from false assumptions built on its rotten foundations. We must, however, continue to think metaphorically, dangerous as it is, and just try to avoid the pitfalls.

But there is another truth which has not yet been assimilated into the climate of opinion in the way the Freudian discoveries have done. We now see that the unconscious is no mere storehouse where things remain unchanged except for the occasional interference of the censor; it is also the artist's workshop where our entire creative life is carried on, leaving for the conscious mind little more than the power to collect raw material and to pass judgment on the way in which the unconscious elaborates it.

To be intellectually creative is not the only function of man, but all men must aim at some form of creativeness if they are to be something more than merely animal. In fact, from the social point of view, unless an individual finds out how to satisfy his desire to create, he becomes brutalized, possessive, a prey to the deadly sins, a cause of social rottenness and of universal war. How then can we increase our command over these hidden creative processes, so that they may be harnessed to produce satisfaction for ourselves, stability for our societies? What are the techniques, the disciplines, the exercises involved?

Let us take one example from history and generalize from it.

In the middle of the fifteenth century there was a man who had an almost obsessive desire to perform a specific service to religion. There was shortly to be a pilgrimage to Aix-la-Chapelle. What this man wanted to do seemed impossible, for it was nothing less than to put a copy of the Bible in the hands of each pilgrim. "For a month," he wrote, "my head has been working. I wish to write by a single application of my hand, by a single movement of my fingers, in a single instant, and by a single effort of my thought, everything that can be put on a large sheet of paper, lines, words, and letters, by the labour of the most diligent class of copyists in a whole day, nay in several days."

To his contemporaries such an idea was childishness. Monks spent their lives copying manuscripts, and one single copy of a Bible was the work of a lifetime of unremitting effort.

The original source of this childish idea came from considering playing cards, the devil's picture books, which had a few letters or words engraved on them. These could be easily duplicated by the thousand. But how could such a process be applied to duplicating the thirteen hundred pages of the Bible?

"It is useless," wrote Gutenberg, "to think of engraving on pieces of wood the whole thirteen hundred pages or of obtaining prints by rubbing, for one could not print the back of a page already charged with ink on one side excepting at the expense of the first side, the writing of which would be rubbed out.

"What am I to do? I do not know: but I know what I want to do."

Creativeness begins with passionate desire, and without it no one can create much or indeed anything. There are many people who do not really want to do anything more than to keep living; unless something happens to alter this indifference they will never use the material in their unconscious mental workshops.

It is not always found that this desire takes such a specific form as in the case of Gutenberg. Often the object of the desire, or the form in which it shall be finally satisfied, is hidden for years; and it is when this happens that a man is likely to make a curious and consoling discovery.

Provided that he has always had creative desire, however vaguely it has been orientated, however much it has been wasted on unsatisfactory objectives, when the right objective is revealed,

he discovers that he is provided with precisely the right raw material, by his reading, his experience, his explorations in many fields, to help him towards that objective.

"I know now what I want to do," a man may say to himself, "and how lucky it was that twenty years ago I learned so-and-so; although it was with quite a different end in view!" The explanation is that the harvests of the years have long ago been elaborated, arranged, moved into the right positions to serve the creative desire and the definite and specific form is no conscious choice but the solution found by the unconscious and revealed by an uprush from it.

And so with Gutenberg. I imagine that before he became obsessed with the desire to duplicate the Bible he had had for years the more generalized desire of doing something for the greater glory of God. When the desire took specific shape the right experiences were at hand because the specific desire was simply the unconscious elaboration of the experiences. The "I do not know" was not the important part of his state of mind, but the "I know what I want to do." But if he had never collected experiences, while ignorant of any motive, he would never have reached the stage of knowing what to do.

Failure in life does not come from not knowing how to do a thing but from not knowing what one wants to do. We have to wait until the fires of our unconscious forges have melted our experiences down to a recognizably desirable shape. If this does not happen we fail.

Gutenberg had seen the devil's picture books multiplied and that made his desire to glorify God specific. He had also seen how coins are made and pondered on it. Shortly after his first letter he wrote again to his friend: "Every coin begins with a punch. The punch is a little rod of steel, one end of which is engraved with the shape of one letter, several letters, all the signs which are seen in relief on a coin. The punch is moistened and driven into a piece of steel, which becomes a hollow or stamp. It is into these coin-stamps, moistened in their turn that are placed the little discs of gold, to be converted into coins, by a powerful blow."

In this way Gutenberg thought once more of how things can be duplicated; the playing cards were duplicated by a rubbing process, the coins by a powerful blow, but neither of these seemed

to be useful for what he wanted to do. Though he had no other more positive idea as yet, his mind rejected them.

And now another experience comes into his mind. "I took part in the wine harvest. I watched the wine flowing, and going back from the effect to the cause, I studied the power of this press which nothing can resist."

And in his unconscious mind the wine press changed to a printing press, for here was the right sort of pressure, neither rubbing nor punching, but steady, inexorable, even pressure. This could be used in a way that would not destroy the printing on the other side of the paper. But what was to be used in the press? It must be something that could be used for duplicating the impressions as often as possible. Gutenberg thought of the seals with which documents were sealed:

"When you apply," he wrote to his friend, "to the vellum or paper the seal of your community, everything has been said, everything is done, everything is there. Do you not see that you can repeat as many times as necessary the seal covered with signs and characters?"

"One must strike, cast, make a form like the seal of your community, a mould such as that used for casting your pewter cups, letters in relief like those on your coins, and the punch for producing them like your foot when it multiplies its print. There is the Bible!"

At this point Gutenberg had his first inspiration, his first "secret revealed by God," as he put it, his first uprush from the unconscious. He became aware of the ideal material for his work:

"To work then! God has revealed to me the secret that I demanded of him. I have had a large quantity of lead brought to my house, and that is the pen with which I will write."

The account in these letters is somewhat obscure as to chronology, but it would appear that even now the main invention which was required to set all these minor inventions in their proper light was unknown to Gutenberg. It was unknown, but it must have existed since without it the rest does not make sense. It is exactly like the situation to which I referred earlier: when we start a sentence we are quite unconscious of the words which will bring it to a meaningful end. He had a press, he had the material for making his type, he had the *idea* of re-duplication but as yet not the means. Indeed all that had so far been set

together in his mind was scarcely any advance towards his main objective over the block-printed books which had long been familiar. What was it that he was to pour into the moulds? A whole page of the Bible? No. There came another secret revealed by God, another uprush from the unconscious; the unit for moulding and for re-duplicating was not a page but a single letter.

"The letters are movable. The mobility of the letters is the true treasure which I have been searching for along unknown roads. With these letters and with the blanks which give separation, I compose words." It was this invention of movable types, last to come from his unconscious work-shop, that gave Gutenberg his place in history and that gave all his previous work, conscious and unconscious, its meaning.

Passionate desire, a capacity for absorbing experience, an ability to melt and mould these experiences in the fires of the unconscious mind and a mysterious ability to profit by the uprush when it comes—it is these that form together man's intellectual and spiritual creativeness. With them of course there must be certain moral characteristics, especially patience and courage, sometimes even for long years after the objective has been reached but remains hidden, a secret within our unconscious mind.

§8. *Suggestion*

The first essential for achieving maximum results with our hidden creativeness has been perfectly well known and practised for a good many years. Unfortunately people have used the methods popularized by Baudouin and Coué chiefly to combat ill-health. Unfortunately too the methods were described so simply and in such elementary language that intellectual snobs and frivolous people alike have made a mockery of them.

Yet in the simple doctrines of the Nancy School with their platitudinous "every day in every way I get better and better" there lies unfathomed wisdom. There lies also the answer to the question whether hypnotic suggestion is something that can only be applied successfully to a rare person here and there, or whether all men respond to it.

The answer is that we are all victims of suggestibility, for most of our lives, with cramping effects on our capacities. We live in an atmosphere of harmful suggestions which lead us on to every sort of mental, physical and spiritual incapacity. It is in our power to reverse this to some extent at least. The weapon we can use is our creative imagination and to use it well we must lay aside sometimes that other weapon, on which we rely too much and too often, the indomitable will. The will to succeed in general terms, yes, but, in order to achieve the success we desire, our wills must hand over the detailed tasks to our imaginations.

If we ponder over what hypnosis has revealed about our hidden creativeness, we see that the first step to secure the uprushes from the unconscious self, on which all artistic creation depends, is to send the will to sleep, so that nothing remains active except the certainty that what we desire will come about. The will is, or should be, an admirable governor of all that is conscious about us, that is, all that involves action. By the possession of a firm will we secure for ourselves efficiency of the mechanical side of our nature. But, unless we are able to drug the will into helplessness on the right occasions it will not be content with keeping our mechanical, active selves efficient; it will also keep the contents of our unconscious minds in their proper place from the point of view of an evolutionarily efficient animal. For, after all, the uprushes of creative lava are both useless and dangerous from the animal point of view, and the will, faithful servant in the struggle for existence, is their enemy.

Now there is a perpetual conflict within us between the forces which serve the struggle for animal existence when natural selection is the main-spring and the revolutionary forces which we require in what Huxley calls the human phase of evolution. These last leave us less efficient in the present, but enable us to remain potentially more efficient when we advance fully into the human phase. Natural selection in the animal phase has always left the animal a prey to a fatal danger—over-specialization, from which no animal can escape. Dinosaurs and dodos and many another animal over-specialized and became extinct. In man the captain of these forces of over-specialization is the will. Against them are the forces led by imagination, capable of producing something new, often inappropriate for the now, but hopeful for the unborn future.

Of course this civil war must stop. We must have will, though not the blind will of our animal phase, and we must have imagination which no animal ever had but which is essential to man's progress, but they must not fight against one another, for when they do we have an incompetent today and a still-born tomorrow. The imagination becomes negativistic and the will powerless even in its own sphere.

"When," said Coué, "the will and the imagination are in conflict, it is always the imagination which wins. Such a case is only too frequent, and then not only do we not do what we want, but just the contrary of what we want. For example: the more we try to avoid an obstacle, while *thinking that we cannot do so*, the more excited we become, the less we can remember the name, the more uncontrollable our laughter becomes, and the more surely we rush upon the obstacle.

"It is the imagination and not the will which is the most important faculty of man; and thus it is a serious mistake to advise people to train their wills; it is the training of their imaginations which they ought to set about."

Bear in mind these words, and look at history and the contemporary world. We see nations which have made a fetish of will and others which have relied too much on imagination, and here we have one cause of human conflict. Looking at individual human beings we see many with imagination and will in conflict, and these are frustrated; we see others with creative imagination and atrophied will, and these are sterile, since action, the realization of imagination in a form which is of value to the outside world, involves will. But what of the magnificent masters of will, with jaws thrust out and any amount of drive? They are the successful ones, who find success but Dead Sea fruit. Admired by their communities, they alone know that their lives are hollow within. Action has prevented the creative uprushes from their unconscious from ever passing the censor.

It is not that we need more poets and painters, nor even inventors, philosophers, creative scientists; imagination has other effects when it is in correct alignment with will, notably the happiness which comes from creative uprushes from our hidden artist's workshop, rather than of the pleasure that comes from Things. Without this the nations worship false idols, and since there are never enough *things* to go round, the substitution

of pleasure for happiness breeds war. That is why, before it is too late, we should put to practical use the neglected lessons of our abundant knowledge of hidden creativeness.

§9. *Experiment in Depth*

Since Freud and his followers were able to convince the world that deliberate attention to our unconscious could achieve results in the field of therapy, no major step forward in our dealings with it has won the approval of scientists or caught the imagination of the world in general.

There are, however, at the present time groups of pioneers who, having asked themselves, Cannot more use be made of the unconscious part of man? are experimenting in various ways with a view to enlarging human capabilities. It is from their work that we may expect the next revolutionary development in our mental life. Briefly their research is an attempt to develop the use, in everyday life, of the unconscious powers until their importance equals that of the conscious powers. The assumption on which they work is that man's preoccupation with the external world should be matched with an equal preoccupation with his hidden internal world. In this they differ from most forms of mysticism which tend to invite a man inwards and to shut out the exterior world as much as possible so as to achieve this.

Freud saw that the dream, a much-neglected experience common to almost all men, was of importance as a means of making contact with the hidden parts of the mind. Here in the dream appeared, wonderfully disguised, the monsters of the interior sea. Strip them of their disguises, destroy them, and the conscious man could free himself of whatever disturbed his equanimity. Freud taught the conscious to win the war against the unconscious, but he did not teach us to win the peace. Must the unconscious be treated solely as an enemy to be defeated? It is as if a community having come into contact with only the gaol and asylum population of a neighbouring community, decided that it was fit for nothing but extermination. Perhaps there are other uses for the bridge of dream and fantasy beside that of disarming enemies.

Let us ask what other way there might be of relating the daytime world of fact with the night-time world of fantasy. We dream: sometimes as Freud taught us, we enact our suppressed wishes, wishes that have to be repressed if civilization is to go on. We readily accept this, but looking at our civilization we think that perhaps repression is not enough. Can we not distinguish between dream and dream, fantasy and fantasy? The experiences of Mozart, Poincaré, Coleridge, as well as Dr Soal and Mr X suggest that we should.

An interesting book, P. W. Martin's *Experiment in Depth*, describes the work he and a group of pioneers are carrying out in a quiet spot in the Home Counties. It is a book which the tough-minded would reject out of hand, if only because it is based on attitudes and theories from Jung, T. S. Eliot and Arnold Toynbee. Of these three only the poet is quite respectable; Jung is "not a scientist" and Toynbee is "not a historian," at least so most scientists and most historians would say.

The basic hypothesis of the Experiment in Depth may be summarized thus: According to Toynbee when a nation or a civilization finds itself in a "Time of Troubles" its members go in on themselves, and, having found that extraversion does not pay, seek new riches and new power from their unconscious inner life, and, Jung would add, from the collective unconscious common to the whole group. With this inward looking a new force is born and the group has a second and fruitful adolescence. We are passing through a Time of Troubles today. T. S. Eliot has found out of his incessant struggle with words and meanings, the aesthetic interpretation of it, Jung has found the first hints of a technique for dealing with it.

What is needed is a technique for getting strength, direction, leadership, not from an outside dictator whom we can follow mechanically, but from the revitalizing forces which are at our command hidden within us, our spiritual nuclear energy. The first step in this is to pay attention to precisely those trivia, as we think, of our daily psychic experience which we have most learned to ignore—our dreams, our wandering and untutored reveries. If these can to some extent take the place of movies, wireless, television as stimuli for our imagination, we will find that there is hidden in our personal life of fantasy a reality which cannot come from the synthetic fantasies which we buy. We

shall be building up our inner world of experience so that it balances our outer world of experience.

It is clear that at present the world is divided into a Western Civilization which has allowed the world of fantasy to atrophy in its pursuit of material prosperity and an Oriental Civilization which until it became corrupted by the twin demons of Hollywood and Karl Marx tended to practise withdrawal into fantasy. Western man only uses the material so lavishly existing in his unconscious mind for practical purposes. He sets his intuitions to turn wheels so that he may make more and more things. Oriental man has had most success when he is looking inwards; and, in passing, it should be observed that this very habit of enriching the psyche from interior sources has had an effect which is becoming more noticeable every year; the great discoveries in mathematics, in theoretical physics, basic biology are being made to an increasing extent by Chinese, Japanese and Indian scientists; the habit, imbibed from their environment and unconsciously continued, of using the riches of the interior world is bringing success in the very fields which once were regarded as the property of the extraverted West.

The Experiment in Depth is intended to make the best of both worlds; there is the withdrawal from the world outside to the interior deep unconscious which has been neglected by the West, but there is also the return in an enriched condition to the tasks, the duties, the pleasures of the outside world which have been frowned on by the Eastern mind.

It would be impossible to epitomize here how this can be done and readers must search in Mr Martin's book and elsewhere for further enlightenment, but two points emphasized by him seem to me so important that they should be considered here.

Those who are experimenting in this way claim that although everything today seems against any approach to human nature such as they contemplate, "there are four notable possibilities implicit in the present situation, which, together, may prove sufficient to turn the scale."

First, there is the change wrought in the outlook of the free peoples by their experience of totalitarian methods. Events of the present century—world wars, concentration camps, "mind-washing," mass destruction—have made us aware

as nothing else could, of the reality of evil. We have learned (and may have occasion to learn yet more fully) that, taking mankind as a whole, "there is *something wrong about us* as we naturally stand." This is the possible beginning of the withdrawal-and-return; the realization that we are living, not with Utopia just round the corner but in the City of Destruction, the city doomed to be destroyed by fire.

Second, there is the special character of the constructive technique. It is not the all-too-familiar latest novelty in philosophy or religion. It is a means of bringing into operation certain inherent capacities at present virtually unused—the inward eye, the inward ear, the inward understanding—capacities giving direct access to the realm of experience the other side of consciousness. . . .

Third, there is the possibility of placing this whole field of experience upon a scientific basis. In the past, science was forced to destroy the mystical concepts and terminology in which the religious insights of mankind were expressed. It has now the opportunity of rediscovering the reality behind these myths. If and when the creative contact can be set before all men in all lands as an empirically established psychological fact; a fact that it would be as absurd to ignore as it would be to ignore everything we know about health and disease. . . . Then a new situation arises. In such conditions, the progressive extension of technology, instead of destroying the age-old beliefs and putting nothing adequate in their place, carries with it a developing fund of spiritual discovery, as much a part of the scientific heritage of mankind as technology itself.

Finally there is the latent creative element in totalitarianism. As an essential part of its political action, the totalitarian technique invokes the archetypal forces. It arouses in men the religious spirit, the spirit of self-abnegation, the spirit of sacrifice. . . . Admittedly, it involves these forces in their demonic and disintegrative aspect, for purposes of domination and power. But, rightly taken, the archetypes are part of the wholeness of man, a step towards the creative contact we have lost. All unwittingly, totalitarianism brings in the "different spiritual dimension". . . . Behind the Iron Curtain a creative minority could come into existence, of which there is no mention in the Marxist textbooks. And, in a fashion unforeseen by its prophets, the totalitarian state could, in truth, "wither away."

The second point of outstanding interest is that when Mr Martin looks for an indication of how the reintegration of man's conscious and unconscious life can be brought about he finds it in a religious body. He quotes Jung's hope that the day will come when analytical psychology will be "freed from its clinical origins and cease to be a mere method for treating the sick." "But," says Jung, "between the realization of this hope and the actual present there lies an abyss over which no bridge is to be found. We have yet to build it stone by stone."

The author goes on: "As it happens, a quarry for these stones does perhaps exist. Over the last three hundred years the Society of Friends—the Quakers as they are usually called—have been consistently practising their own version of the experiment in depth. Beginning in the "time of troubles" of the Commonwealth period in England, this body of devoted men and women used the psycho-perceptive methods—dreams, visions, voices—to such good effect that they came upon most of the principal discoveries. . . . These ten generations of Quaker experiences do furnish certain indicia of how responsible men and women, in good psychological health, can effectively make the experiment in depth without the help of a professional analyst."

Thus we see that those who are trying to map out the experiment in depth begin by reconciling the two interior antagonists, religious feeling and scientific reasoning, and also the two exterior antagonists, totalitarianism and the "free" world and that to do this they seek a greater knowledge of human nature and its possibilities. This knowledge is sought with the working hypothesis that the critical conscious and the creative unconscious are as yet out of balance, and that the balance must be redressed if man is to approach the human phase of evolution with any chance of success.

§10. *Mescaline*

The Experiment in Depth will not appeal to every mind but it will be as well for those who find it repugnant to consider how far their attitude is caused merely by dislike of a certain vocabulary.

Another approach to the same problem, the redressing of the balance between the various parts of human nature, is being attempted by a few people in England, Canada and the USA through the use of a number of drugs commonly described as hallucinogenic or psychodetic. The brilliant though perhaps misleading books of Aldous Huxley were the first to call the attention of the general intelligent public to mescaline. Unfortunately much that has been written by literary-minded amateur experimenters has tended to obscure the really important implications of these drugs and their effects.

Just as Mr Martin and his friends carrying out a scientific experiment found themselves impelled towards certain religious experiences, so too those who approach the problem of human nature and its future development through the hallucinogenic drugs begin with a religious experience and find themselves impelled towards another of higher quality.

The Peyotl Indians of central America use a certain cactus as part of their sacramental rituals. It produces visions, a sense of group solidarity, a heightened regard for life, and, it is believed, various forms of extra-sensory perception including precognitive powers. A number of writers have experimented with peyotl, and the chemical responsible for these effects has recently been synthesized and its physiological effects studied. It is thought that it interferes with an enyzme concerned with the production of glucose in the brain. The chemical is a comparatively simple one and closely related to some of the normal products of the animal endocrine system. Mescaline has no direct effect on the brain tissues; its action takes place in the liver, the body's chief chemical laboratory.

There is a very practical reason for studying mescaline. The psychological effects are very like those which are to be seen in schizophrenics, and the working hypothesis to be tested is that schizophrenia may be caused by the patient's adrenal gland producing some mescaline-like chemical instead of the normal product. If this can be substantiated a step will have been taken towards the prevention and cure of one of the most devastating of human ailments.

Another practical reason has been emphasized by Dr Humphprey Osmond and others. By taking a hallucinogenic drug doctors can give themselves an artificial and temporary schizophrenic

condition and thereby from the personal experience learn greater sympathy and understanding for their patients.

However the hallucinogenic drugs may well have an even more important use than the therapeutic. The visions they produce suggest philosophical and psychological problems of the greatest interest and, once more, may be a bridge between the critical conscious and the creative unconscious.

In brief the philosophical problem is this: our brain chooses out for our attention only those features of the world around us which are of value in the struggle for existence, and among these gives preference to those of value in the animal phase of evolution. Is it not possible that under the influence of a drug which alters the habits of the brain we may come upon facts and experiences hidden in our normal state, but of the greatest importance to us as human beings rather than simply to us as one species of animal life?

In any case the "mescaline experience" must undermine any idea we have that our normal sensory experiences are the only ones entitled to be considered as based on "reality." For it would indeed be odd if reality was that which was perceived only if the right amount of glucose was produced in the human brain, or precisely the right chemical compound was secreted by the adrenal gland.

It must not be thought that the mescaline experience is necessarily schizophrenic or insane. The schizophrenic state is only one of a class of experiences induced by mescaline, and it depends on the mental make-up of the human guinea pig whether his experience should be classed as schizophrenic, or mystical, or metaphysical, or aesthetic, of or some heightened intellectual type. Nor are these drugs intoxicants or narcotics. They do not impair any of the higher functions of the mind; one is as logical, as critical, as wide awake, or more so, as in ordinary life. It is the outside world which changes and the efficiency of physical reflexes to deal with it.

In my own mescaline experience what impressed me most was the clarity of thought and the clearness of expression with which I faced a completely hallucinatory world and described it to my companions. I floated amid slowly revolving pink spheres covered with brightly-polished pewter points and exquisitely detailed objects looking like the slightly enlarged parts of insects, each

catching the rays of some vividly coloured sun. Time stood still, my body changed its shape, but the intellect remained alert and communicative. Some of my friends discovered the meaning of the universe under mescaline, others visited heaven or hell, other floated beneath vast primeval religious symbols, others in terror had to be put out of their agony with a narcotic injection, one became homicidal. None of these experiences came my way, not even a noteworthy aesthetic experience—indeed the general feeling was that the colours and patterns were rather like the tawdry Christmas decorations of a popular shop.

What was remarkable however was that certain experiments, too few to be conclusive, suggested that unusual powers had been let loose within me. Thus I guessed correctly thirteen out of twenty-five ESP cards. Dr S. G. Soal offered for many years a prize to the first person to guess twelve cards right and nobody claimed it. A cautious experimenter asked me to go to a house that I had never seen and describe it. He assured me that at least fifty per cent of my detailed description was correct. Certainly this "travelling clairvoyance" as it is called is not one of my normal attainments. My time sense suggested interesting questions, for although time seemed to my conscious mind to have come almost to a stop as I floated for months amid the pink spheres, when I was asked to estimate a thirty second interval without counting or listening to my pulse, after what seemed to me days and weeks, I gave an estimate correct to within half a second.

These personal experiences were trivial and their mention can only be excused because so little has been done along this line of research. They agree however with other work done elsewhere. There seems little doubt that the hallucinatory drugs do more than upset our usual experience of the world about us. They add positive and important experiences and they release unexpected mental abilities.

The most important effect from our point of view would seem to be the breaking down of the barriers which exist on the conscious level, at least between one mind and another, so that private knowledge is conveyed from one person to another by means as yet unknown to scientific thought. We shall discuss this possibility further in the next chapter, but one consequence of any such phenomenon is relevant here. The Peyotl Indians

claim a heightened sense of communion as a result of their taking peyotl; it is not without the bounds of reasonable surmise that when we know more about the hallucinogenic drugs we shall find that they have valuable effects on groups of people taking them. We are all too familiar with mass emotions on the lowest level gripping a number of people and causing evil actions, panics, mass possessions, war fevers, sadistic outbursts, lynchings, mass religious manias. If we could find a way of conveying an epidemic of exalted conduct from one person to another we should increase the chances of mankind weathering the storms and trials of this incipient human phase of evolution.

There are a few groups of highly intelligent people attempting precisely this experiment. Their results have not been published and the difficulties have not yet been surmounted, but already there is good scientific evidence that here too there is a method of redressing unbalanced human nature.

At least it can be claimed that those who have embarked on the mescaline experience have helped to save mankind from the illusion that a brain fashioned during the long prehuman phase of evolution as a weapon in the struggle for survival can be trusted uncritically to give us a fair picture of "reality." This research firmly based on biochemical and physiological principles may well lead to the fashioning of the type of brain needed as a weapon in the forthcoming human phase.

CHAPTER SIX

"TELEPATHY"

§1. *A Misleading Word*

I HAVE USED a dangerous word as the heading of this chapter. To most people telepathy is "thought reading" which is supposed to take place by means of "thought waves" which no doubt are sent by a transmitter in one person's brain and are received by a receiver in the other's.

There is no evidence whatever to justify such a theory. There has never been found the rudiments of receiving or transmitting apparatus in the brain or anywhere else. It is not even certain that in what we call telepathy knowledge passes from one person to another. The most we can say is that private knowledge seems to be found in a mind which has not received it by any known sensory channel. Let us stick to facts. There are an unlimited number of duly authenticated events the important feature of which is that knowledge can be shown to be possessed by an individual who cannot possibly have obtained it through any normal channel or process. To say more is to embark on mere speculation, but the authentic fact as stated is quite enough to show that there are errors in the very basis of orthodox psychological thought.

What does it imply, this fact that knowledge exists in an individual's mind which did not get there by "normal" means?

It implies that it is not true to say that nothing can exist in the intelligence which has not previously existed in the senses—and that is a time-honoured axiom of scientific thought.

It implies that the individual mind is by no means as "watertight" as we thought. Information can leak out and in. Private knowledge is not so private after all.

It implies that communication can take place without the use

of symbols—words, physical gestures, morse and so on—and that involves reconsideration of the structure of biological science.

It may also imply that information can pass from one person to another without energy-exchanges, and that is tantamount to driving another nail into the coffin of mechanistic metaphysics.

But what are the facts which involve such a revolution in thought? One is handicapped in discussing this subject by the fact that most people who say they "believe in" telepathy do so on quite insufficient grounds while those who deny that telepathy has been scientifically verified, refuse to examine the relevant experiments and other evidence.

I confess that my own certainty in this matter is of comparatively recent growth and I am therefore well able to appreciate the emotional difficulty of a scientist who will not accept telepathy unless he has experienced it himself. But after all it is only an *emotional* difficulty and one which is not very creditable to a trained but open mind.

As my own researches into the problems of human nature have been chiefly concerned with the experimental approach to the study of extra-sensory perception, I shall not hesitate to make a large part of this chapter autobiographical. Having described my own experiences and experiments it will be easier to generalize, and to show that they fit into a pattern of ascertained facts which can leave nobody doubtful that the human mind possesses some faculty for acquiring knowledge by other means than those which are at present known to science.

§2. *The Nature of ESP Experiments*

For the benefit of those who have not studied the question, a short preliminary description of how "telepathy" and similar things are tested will be necessary.

We saw in Chapter Two that a scientist who designs an experiment always asks a question. He usually has an answer in his mind. He gets a result. Does that result justify him in supposing that his answer is correct? Not unless he can rule out the "null hypothesis" that the result is due merely to chance—and not always even then.

The trouble with supposed examples of telepathy in everyday

life is that you can seldom rule out chance as an explanation. People who are determined not to believe in telepathy can always shrug their shoulders and tell you that it is a mere coincidence.

Now to invoke coincidence is not unlike exercising the veto in the Security Council: it can stop almost anything. One can certainly give examples of coincidence from everyday life that are more startling than any unexpected result in a scientific experiment. Here are two examples that I have noted while writing this book.

Listening to the police-car radio late at night, I heard on consecutive nights a car sent to two addresses *A* and *B*. Now thirty-five years ago an uncle and aunt of mine lived at address *A*, and another uncle and aunt of mine lived at address *B*.

The second example was reported in a Sunday paper. On the previous day Mr Shirley Chaplin (or some such not very common name), an artist, had holed out in one on a Richmond golf course, two hours later Mr Shirley Chaplin, an accountant, also holed out in one on the same golf course. In both cases nobody could doubt that the incident was a coincidence, that there was no causal relationship between the twin events.

Probably the proper way to consider such things is against the background of the infinite number of events that happen all over the world all the time, and then there is no great mystery about two of all these events having arresting similarities of some sort. You might have found that the number of your bus ticket and the number of your telephone were the same—or that on a visit to Canada you saw your next door neighbour in London entering the same hotel at which you were staying; or that you were dealt the same hand of cards twice running. All these would have been miracles if they had happened after you had imagined them happening, for they have a very small probability expectation. However, if you cared to take the trouble, you could calculate the probability in each case. You could, for example, calculate the probability of your having the same cards dealt to you twice. But though in each case you would have had a right to be astonished, and to look for an explanation, *if you had prophesied the result*, this is not so if you had not so prophesied. Then the event is a simple coincidence, amusing or surprising no doubt, but not astonishing.

However, even if "coincidence" is an unsatisfactory reply to a

person who has recounted a supposed telepathetic experience, it is as well that we can find an answer to the sceptical scientist of the sort which he accepts when it is applied to his own work.

The way out of the difficulty is to arrange an experiment in such a way that you can calculate how likely or unlikely it is that chance is the explanation of your result. Let us take a simple example.

You have called "tails" and lost the toss with the same coin five times running and you ask yourself whether the coin is weighted unequally or whether it is just bad luck. You know that in the long run a coin comes up heads and tails an equal number of times, or, more accurately, that the odds are even as to whether it will come up heads or tails at any one throw. But you also know that it is quite possible that one side or the other will come uppermost several times running.

A simple statistical formula will show you that you cannot rule out the null hypothesis, i.e. "bad luck" or chance, from the result of five throws. But the same formula will give you a measure of the degree of unlikelihood that there will be 60 or 70 or 80 or 90 heads in a hundred throws. Cutting out all technicalities, your "statistical analysis" will suggest that if, when you test the coin by tossing it a hundred times, 60 heads and 40 tails come up, your five wrong calls were probably just "bad luck," but if 90 heads and 10 tails come up then bad luck is probably not the explanation.

Note carefully two things: it is always a case of probability, not certainty, because sooner or later mere chance might result in one hundred heads coming up in one hundred times; secondly, it does not prove that the coin is ill-balanced but only that the result is not likely to be a chance result. It may be that the method of tossing is peculiar; it may be that through carelessness you are using a two-headed coin; it may be that you are so poor sighted that you are taking the tails to be heads.

Such an experiment cannot tell you the cause unless you rule out all possible causes except the one you are looking for, namely that the coin is ill-balanced, and chance. If you have been careful to do that, then you can safely say, as it is unlikely to be due to chance once in 50 or 500 times, then it is to that degree probable that the coin is ill-balanced. Statistical analysis will give you an estimate of the unlikelihood of chance being the explanation,

but only our skill and reliability as an experimenter will allow you to determine the real explanation.

Almost from the start of scientific interest in telepathy careful experimenters have used statistical methods in an effort to make a belief in telepathy scientifically respectable, and the credit of perfecting the technique must go to Professor Rhine of Duke University, though others, notably Dr S. G. Soal of London University, profiting from his experience, have in some respects improved on his earlier methods.

If you have a well-shuffled pack of twenty-five cards consisting of five cards each of five different suits or symbols and if you ask a person to guess each card in turn without seeing it, the expectation is that he will guess *on the average* five cards right and twenty wrong.

If you conduct the experiment in such a way that there is no possible doubt that the subject cannot see the cards, or get any information about them through normal means, and if over a fairly long series of guesses a number considerably in excess of five per twenty-five is rightly guessed, then statistical analysis will tell you how unlikely it is that chance is the explanation. If, and only if you have ruled out cheating, normal sensory leakage, errors in scoring etc., you are entitled to claim that there is a very high probability that something which may be described as extra-sensory perception has been manifested by the subject.

In ordinary scientific experiments, physical, chemical, biological, the experimenter "rules out chance" if his result is one that would only be expected were chance alone involved once in twenty times. In ESP experiments, owing to the special difficulties—the unwillingness of scientists in general to accept ESP, the difficulty of devising an experiment that can be repeated, the difficulty of fitting ESP into the current scientific picture and perhaps the greater possibility of fraud, conscious or unconscious—the odds are usually lengthened to about 1 in 370 times. However, there are many well-authenticated experiments which produce odds millions of times steeper even than this.

So much by way of introduction to what follows. Those who want further and more technical information can find it in the publications of Dr Rhine and Dr Soal.

§3. *The Spanish Experiment*

On[1] November 27th, 1954, Dr E. J. Dingwall and I were working together in my study at the bottom of my Spanish garden. My wife (P. L.-D). came in and asked if I had a pack of ESP cards handy, as she thought it might be interesting to give a trial to A., our cook, and her sister, E., who had both been given a month's notice which was about to expire. Her reason for wanting to experiment was the same as our reason for dispensing with their services, namely, that we felt A. to be psychologically unstable and her influence on her sister E. bad. The third member of our staff, M., was quite another story. Aged 15¾ she was healthy, cheerful, reliable, and incidentally, very fond of us.

The cards were found and ten minutes later P. L.-D. returned to say that A. had guessed sixteen cards correctly out of twenty-five, and that E. and M. had then asked to try, and had made sixteen and fifteen correct guesses out of twenty-five respectively. The "mean chance expectation" was five right guesses in each case and Dr Soal had for years offered a substantial prize to the first person able to guess twelve correctly without any claimant. This result, therefore, was altogether exceptional and inexplicable. E. J. D. and I hurried to the kitchen.

A series of runs were made under the eyes of the three of us until E. J. D. left on the 29th, and were continued for the remaining period of A. and E.'s residence, by P. L.-D. and myself. In every case, except a few runs made for control purposes, both subject and agent were Spanish.

The results are recorded in the following table.

Agent	*Subject*	*No. of runs*	*Correct*	*Expected*	*Average*
A.	E.	16	185	80	11·5
A.	M.	7	113	35	16·1
E.	M.	16	159	80	9·9
E.	A.	14	127	70	9·0

[1] The following pages are quoted from the report published by the Ciba Foundation with a few alterations and omissions, c.f. Ciba Foundation Symposium on Extra-Sensory Perception, 1956.

Agent	*Subject*	*No. of runs*	*Correct*	*Expected*	*Average*
M.	E.	14	151	70	10·8
M.	A.	9	120	45	13·3
J. L.-D.	M.	21	196	105	9·3
J. L.-D.	A.	6	27	30	4·5
P. L.-D.	M.	21	157	105	7·5
P. L.-D.	E.	4	24	20	6·0
P. L.-D.	A.	3	11	15	3·7
Spanish only					
	A.	23	247	115	10·7
	E.	30	336	150	11·2
	M.	23	272	115	11·8

From this table it will be seen that for tests when both agent and subject were Spanish:

1. The principal subject of P. L.-D's original interest, A., completed 575 guesses with an average of 10·7 correct guesses per run and a "critical ratio"[1] of 14.

2. E. and M. both exceeded this result by a small margin and had critical ratios of 14–15.

3. Three subjects, the only ones tested, made between them 1,900 guesses with correct guesses in 855 cases, an average of over 11 per pack.

4. The critical ratio for such a result is over 27, giving astronomical odds against a chance explanation.

The most remarkable result was the short series with A. as agent and M. as subject, where the score of correct guesses was: 15, 18, 12, 22, 14, 14, 18—giving a c.r. of nearly 13.

It must be emphasized that these preliminary results were

[1] For the reader unacquainted with the technical terms of simple statistical work, it should be explained that critical ratio is a measure of unlikelihood of a result arising by chance. A critical rate of 3 would be considered sufficient to make a result highly significant and one of 14 is so unusual that the ordinary statistical tables do not give it. It is sufficient to say that the results given here would only be expected to occur as a result of chance if the experiment were repeated very many millions of times. Probably the whole human race would have had to guess cards several hours a day for thousands of years before chance would have produced them.

made with bare cards, handled by the subjects; on the other hand, E. J. D., J. L.-D. and P. L.-D. all watched with the utmost care for signs of normal sensory leakages and were unable to detect any. Moreover, these were unsophisticated peasant girls scarcely able to understand what they were doing and not likely to be even potentially frauds or conjurors. A's frame of mind can be judged from her reply when I asked her how she was able to guess so many cards correctly: "I don't know. Oughtn't I? I don't know what I'm supposed to be doing, but I suppose it's fortune telling, so I'm thinking of my boy friend all the time." We were completely unprepared for experimenting and had nothing but two ESP packs to work with, otherwise we would have used rigorous conditions from the beginning. Subsequent statistical analysis, however, does not suggest any serious normal sensory leakage.

After the departure of A. and E., M. became the subject of a large number of tests. The technique used was card matching. A specimen of each "suit" was placed in front of M. and when the agent had looked at each card in the hidden pack she took it and laid it face down against the card which she guessed was the correct one. After a few trials every card was enclosed in an opaque, doubled, index card; M. never saw what card was in any particular cover, except on the rarest occasions when she might be shown two or three good results to encourage her, and when this happened she did not see the exterior of the covers in any way which might enable her to identify any cover with any card.

Moreover, the covers were removed and shuffled from time to time.

In these conditions the following results were obtained:

Guesses	*Expected*	*Correct*	*Excess of Correct Guesses*
20,250	4,050	5,848	1,798

This gives a critical ratio of somewhat over thirty, with, of course, astronomical odds against a chance explanation.

Through the interest of Dr Dingwall and the Parapsychology Foundation of America it was arranged that Dr Soal and Mr Bateman should come to Spain in order to form some opinion on

M's results. She had been at home for two months while my wife and I were in England. On my return and before the arrival of Dr Soal and Mr Bateman, I carried out a further experiment. M. began with purely chance results but gradually built up a significant though comparatively modest critical ratio. Dr Soal and Mr Bateman watched the final sets of this and agreed that the only possibility of sensory clues was that the agent might be unconsciously indicating the right key card by glancing in its direction, although they agreed that there was no noticeable indication whatever that this occurred.

It was decided therefore to carry out an experiment with Mr Bateman as agent, P. L.-D. as scorer, and J. L.-D. and Dr Soal out of the room. The agent was concealed from the subject by a screen, and the cards were covered in opaque covers. If the results were comparable with those of J. L.-D's last experiment, natural sensory leakages from an unconcealed agent might be considered as ruled out.

Maria began, as in all previous experiments, with chance results, and gradually built up a significant critical ratio. This did not reach the heights of previous figures but was sufficient to convince Dr Soal and Mr Bateman that the phenomena observed in M. were due to ESP. But perhaps the most valuable result of this experiment, in which sensory leakage was eliminated, was the added weight it afforded to the belief that sensory leakage was not responsible for earlier results.

But that was not the most important finding. It must be remembered that M. was one of three girls, all of whom showed precisely the same very remarkable ability to guess the cards correctly. To discover one M. was important, but to find three in one kitchen was even more interesting.

I hope that this description of our Spanish work will help the reader who has not studied such things to see how experiments in "telepathy" are carried out today. Naturally the work of Rhine, Soal and others is far more important and their accounts must be read by any serious student, but I think the relative simplicity of this experiment makes it a useful introduction. What does it show? It shows that in the case of these three Spanish girls in conditions which, though not perfect, were good enough to exclude cheating as an explanation and assuming

the good faith of the experimenters, the correct guesses were so much beyond "mean chance expectation" that a chance explanation must be ruled out.

Indeed, whereas the experimenter in chemistry, physics or biology, is usually satisfied with a result which would only be expected to occur by chance once in twenty repetitions of his experiment, Asuncion, Eusebia and Maria (to immortalize them under their real names) produced a result which you would only expect to happen as a result of chance once in one-with-fifty-noughts after it times; and, as I have said, if the entire human race had guessed cards since the Garden of Eden until now twelve hours a day the probability is that they would not have obtained such a result if nothing but chance was involved!

In short, such an experiment gives us the right, indeed *obliges* us to believe that there is such a thing as extra-sensory perception, an inclusive term which, though not very satisfactory, is probably better than "telepathy." But that is all. Such experiments can never tell us what ESP is, or how it works, or why it works at some times; and, unfortunately, we can never learn from such experiments how to produce ESP when we want it. For the last three years I have carried out many such card-guessing experiments, many of them successful, a few even suggestive of what lies underneath it all; but really I know as little about how and why some human minds obtain knowledge by means which are not the normal sensory means as I did when my wife's remarkable discovery summoned me to our kitchen.

There is another limitation of usefulness and of interest inherent in such card-guessing experiments. They are carried out in conditions that are totally unlike those which seem to evoke spontaneous examples of telepathy, clairvoyance, psychometry, precognition, veridical hallucination and all the strange inexplicable experiences of the human mind of which such a mass of evidence exists. Indeed, their only value is that they give us courage to investigate these really interesting phenomena in spite of the contempt for them exhibited by a certain type of sceptical mind. They give the same repeatable statistical backing as is considered sufficient for their results by scientists working in other fields.

In my own case they gave me courage to do what I had never dreamed of doing before, namely to go and have a sitting with

a medium, that is, a person claiming to be able to gather information which cannot have been gathered by normal means. However in the event the experience was thrust upon me.

§4. *Experiences with Mediums*

On a cold snowy afternoon in February 1955 a friend called on me and told me that he had a car outside and could take me anywhere I wished to go. He explained that the car was not his own but lent him by a friend whom he called "my witch-woman."

Asked why he gave her this name, he explained that she was a very odd character; that she had had great experience as a medium when younger and that she was always producing evidence of very unusual gifts, although she had long refused to act as a medium, professional or otherwise. This lady turned out to be Miss X and I found that the record of her work at the Society for Psychical Research had been very favourable to her. I naturally determined to meet her as soon as possible, but my friend assured me that, although this could be arranged, it would be quite impossible to get her to use her mediumistic powers. She had, he told me, the strongest repulsion for the very idea.

Shortly afterwards he rang me up and said he was meeting Miss X for a drink at a club in Whitehall and would I join them. When I reached the club at about nine in the evening I found him with a most striking-looking woman. Her very close black curly hair and her piercing dark eyes were immediately arresting. After a simple introduction we sat down to drink and I at once turned to Miss X and told her that I knew all about her as a medium and that I had wanted to meet her and to beg her to contribute her talents to the very necessary scientific study of mediumship. I said that there were few, if any, good mediums at the present moment and that it was a crying necessity to find any that existed, because the study of mediumship along with the study of other paranormal phenomena was the sole way in which one could hope to break the stranglehold of the mechanistic philosophy which was destroying our age. She met my arguments with a very firm No! saying that she had been dreadfully ex-

ploited in her youth by the Spiritualist Movement and that she had turned her back for ever on any such activities.

After a few moments I noticed that Miss X was looking at me very fixedly and then she turned to my friend and asked, "Is there anywhere where we can be alone, we three? I must be alone with you for a short time." He said that probably the smoking-room would be empty and we went there and found that it was.

Miss X immediately turned on me and said, "I am doing this against my will. I don't want to do it. I am being forced. There are so many people wanting to speak to you through me that I cannot help myself, but I don't want to do it." I hasten to explain that in what follows I report the events in Miss X's spiritualistic language, but that I am in no way intending to suggest that I agree with the explanation that came natural to her.

She said that it was just like a telephone exchange with lines crossed. One person coming forward, then another interrupting, so that it was very difficult for her to keep the various personalities apart. In the succeeding account I do not claim that her words were exactly as quoted but nothing has been altered as far as balance is concerned.

She said, "Now here is somebody who I think is your mother. Was your mother a short woman? Had she a very irritable, abrupt way of talking? Did she wear two gold rings on her wedding finger? Because she is holding it up to me by way of identification"

My mother's height was 5 feet $2\frac{3}{4}$ inches, she was noted for her very abrupt and, indeed, irritable way of talking and she wore two gold rings on her wedding finger; the second gold ring being a guard between her wedding ring and her engagement ring which had been cutting into the wedding ring.

After a brief remark that my mother understood things better now, or some such rather conventional phrase of which I took little notice, knowing that such phrases are the common stock of all mediums, Miss X said, "Now here is another person who died a very long time ago. I think it is your father. Was your father a very disillusioned man when he died? An idealist who felt that he had not contributed what he wished to the world in general?"

My father died as long ago as 1901. He was a clergyman, very uneasy in his profession, of Tolstoyan sympathies and regarded

as most unorthodox and rather "difficult" in his ideals and ideas. Not liking the common tasks of a Clerk in Holy Orders, he had at marriage gone out to South Africa to start life anew in the wilds of Zululand where he was the headmaster of the first Government School. He had almost at once contracted consumption and had died within four years of starting life in Africa, leaving his wife and child virtually unprovided for. Therefore I think one may say that Miss X's question could be answered affirmatively.

However, she did not say very much about this entity, and again repeated that it was very difficult to get hold of any one person as so many were jostling to be heard.

Then Miss X went on, "Now there is somebody in your family named Edward." This I denied, but she was insistent. There must be somebody named Edward.

When I continued to deny it she said, "There is somebody in your family whether you say so or not called Edward and somebody to do with them has met with or is going to meet their death by suffocation. There is nothing to be done about it, it can't be helped."

At this point I began to be a little uneasy and this uneasy feeling was increased when Miss X said, "I am sure the name is Edward, he repeated it several times, Edward, Edward or something very like it. It sounds like Edward." Now I have a close relative named Edmund. Miss X continued and said, "This person connected with this Edward has either been drowned or is going to be drowned." At this point Miss X. turned to my friend and said, "I must be got out of this at once, I am in danger of falling into trance and that I cannot possibly allow." We both took her arm and helped her out of the club. By the time we got outside she was completely recovered and drove us in her car through the snowy streets of London.

About a week later the Working Group of the SPR were having an evening with a clairvoyant medium for instructional purposes and invited me to come along. The medium was Mr Y. There were about a dozen people seated round the table and for some time Mr Y seemed to have little success. Then quite suddenly he swung right round and looked at me and said, "Now I have something for you Sir, does the name Butterworth mean anything to you?"

I replied that there was the publisher Butterworth but that was all I could think of. He said that he did not know anything about a publisher but that he was getting the name Butterworth very strongly in connection with me. He went on to say that this name Butterworth had a connection with a relative of mine named Edward. I told him that I had no relative named Edward but that nevertheless what he was saying was very interesting and would he continue.

He told me that the person Edward was a relative and that somebody to do with him either had or was going to meet their death by drowning or suffocation. He said he wasn't sure whether it was drowning but he was getting a suffocating sensation round his neck.

A few minutes later when Mr Y was talking of someone else I suddenly realized that Butterworth was very significant in this connection. Indeed I had been to Butterworths the first and only time in my life a few days previously under rather special circumstances from the present point of view. I had telephoned a friend of mine who had said, "Oh, I am going out to lunch with a friend at Butterworth's, come along and see him and have a drink. He will be very interested to meet you because he is a great friend of Edmund and does folk-dancing with him." Assuming that the Edward mentioned by both Miss X and Mr Y is Edmund it is clear that the very uncommon name Butterworth in this association is highly significant, the more so when I add that Edmund's first child was in fact accidentally strangled at birth!

Naturally I was considerably impressed by Mr Y and decided to have a professional sitting with him. This I had a few days later. The appointment was, of course, made anonymously and Mr Y did not hear my name either at the SPR or before this sitting.

Mr Y began with a certain amount of material which although not startling was on the whole quite significant. His first statements were concerned with the initials C and G. "I am getting the initial C or G and I think it is either your father or your grandfather. Whoever it was, wore a beard. Did either your father or your grandfather wear a beard?" Now my grandfather's name was Charles and my father's name was Guy and both of them wore beards.

This was my first sitting with a professional medium and like

all beginners I was over-cautious. I knew that I must safeguard the sitting against the effects of fishing and, as a result, I was too cold and unco-operative. Mr Y said that I was a difficult sitter and that he found it hard to work as a result. In fact at the end of the session he said he thought that it was an unsatisfactory one and offered me his fee back. His feeling of failure was entirely due to my unco-operativeness for, apart from various minor successes such as the one mentioned above, there was one very startling and significant one.

Mr Y suddenly said, "Now I am getting somebody who has committed suicide. Has any friend of yours committed suicide —it's a man?" I replied, "Oh yes, I have known at least five men who have committed suicide."

Mr Y then went on, "Was one of them by any chance a chemist?" I replied, "No, I can't think of a chemist who I have known who committed suicide." He went on, "That is only just a guess. I'll tell you why I made it. I am getting the sensation of a very bad smell. That is the chief thing that I get and I, therefore, rather naturally thought that perhaps the person in question had been a chemist and that the smell was something to do with a chemical lab. It may not have been, but I still get this idea of a bad smell, it's very strong."

Now for the following reasons I regard this as exceedingly significant. Some six or seven years before this we had had a friend who was in a very bad way. He was drinking and taking drugs and was becoming a prey to other even more serious practices. As he was an old friend and in spite of the fact that there was every danger that he would scrounge on us for money, we decided to have him down for a weekend and see what we could do for him. The weekend was not at all happy; he was obviously dissatisfied with the amount of drink he was given and showed every sign of deep depression. I took him to the station and saw him off and as he went I told him that he must pull himself together.

When I got back to the house I sat down and wrote a very strong letter to him. I told him that unless he pulled himself together something very serious would happen to him. I told him we were willing to do everything we could to help, but that the only help possible must come from himself and I advised him to take professional advice about the state of his mind.

A few days later I received a pencilled scrawl of a type which could only be written by a dirty-minded schoolboy, or somebody definitely insane. The entire four pages consisted of repetitions of the words, "You stink, you filthy smelling swine etc. etc." Within a week he had committed suicide by taking an over-dose of barbiturates. Mr Y's remark about a "friend who had committed suicide" with whom he associated a very nasty smell, was therefore, very striking.

My fourth experience of a clairvoyant medium was again in a public place. I was invited by Mrs A to go with her to a meeting where Mr Z was to lecture on clairvoyance and give a demonstration. As my book written jointly with Dr Dingwall, *The Unknown, Is It Nearer?*, had quite recently been published and as the guests were likely to know it, it is more than possible that Mr Z may have had me pointed out to him before he began his demonstration, but I have no evidence of this. Mr Z began by pointing over our heads, right to the back of the room and by saying that there was somebody there at the back of the room who had lived at Tonbridge for a long period. Nobody replied and when he asked definite people they denied any knowledge of Tonbridge. He said, "It is very strange because I am getting it strongly. It is Tonbridge. It might be Tunbridge Wells, I suppose, but I don't think so, I am getting Tonbridge very strong," and he persisted in asking people in the back row whether they had ever lived there, with negative results. He said, "Well, we will leave that, but I am feeling that this person who lives at Tonbridge has a great friend there and that his name is Hugh or Hugo. Does that bring anything to anybody at the back of the room there?" There was still no response.

Mr Z then said, "Well, I had better give this up but I don't understand it, I am getting it so strongly." He tried various other people with fairly good but not startling results. After about twenty minutes he turned to our table and said, "I am now getting the name Davies, is there anybody named Davies here?" I replied, "My name is Langdon-Davies and perhaps I should now say that I lived in Tonbridge for thirteen years and that my best, in fact, my only friend there is called Hugh or Hugo."

It is of some importance to note that the phrase "Hugh or Hugo" has more significance than the normal choice of two names so often given by mediums. May or Mabel, Mary or

Margaret. The individual in question was the sole person with whom I kept up after I left Tonbridge and I used to write to him beginning my letters with his initials. He wrote to me and said, "By the way don't begin your letters to me with my initials, call me Hugh or Hugo, whichever you prefer, for my friends call me either."

Mr Z then began to ask questions about Hugh or Hugo. "Had he written books?" "Yes." "Is he engaged in some kind of research because I see him in a library with a lot of dusty old books and I feel he must be doing some research."

Now, my last letter from this friend, received perhaps three or four weeks before this occasion, has in it the sentence, "You may be surprised to hear that I have a new interest. I am studying the pre-Reformation movements in Britain, notably the Wyclifite one. This involves a good deal of research and I am spending a great deal of time in the book stacks of the London Library."

Finally Mr Z asked me if my friend was going on a long journey in about twelve days time. I replied that he had only just returned from a long journey to New Zealand and that I didn't think he would be going off so soon. This seemed to puzzle Mr Z and he asked me several times if I was sure. He also asked if I was going down to see my friend soon and advised me to do so. He then dropped the subject and turned to somebody else.

After the meeting I went up to him and congratulated him and he asked me to have a word with him in private. We went aside and he said there was something that he had not liked to say publicly but that if I wanted to see my friend I must go very quickly because he was suffering from a fatal disease. I told him that I was very surprised to hear this, that it was true that he was seventy years old, but that as far as I knew there was nothing the matter with him. "Yes," said Mr Z, "you will find that he will be dead in a very few days."

On my return home I looked up my friend's last letter and found that I had not noticed or not remembered a sentence. It was to the effect that I would be surprised to hear that he was contemplating another journey; that he might start shortly for a trip up the Amazon.

It seems to me very possible that this had been clairvoyantly perceived by Mr Z and that when I denied that my friend was

going on a long journey Mr Z immediately assumed that "journey" was symbolical of death. Thus he was mistaken in this particular, for my friend, I am glad to say, is still very much alive; but even his mistake was in a sense a significant success.

I have purposely given these personal experiences because I have had in mind a paragraph in G. N. M. Tyrrell's *Science and Psychical Phenomena* (Methuen, 1938): "Some people say that they are wanting far more evidence to appear before they can make up their minds whether or not telepathy exists. These people, if they are really anxious to have their minds made up, have only to attend four or five sittings with a first-class medium, taking adequate precautions to prevent normal leakage of knowledge, and they are fairly sure to get information which cannot reasonably be explained except by telepathy." The reader who is unwilling to accept my experiences as evidence of telepathy, is invited to "go and do likewise."[1]

It should not be necessary to say that, after all proper precautions have been taken, good manners and friendliness are also needed. Little of interest is likely to come from a sitting approached in a mood of suspicion, contempt, or incredulity. And, of course, a medium must be forgiven a vocabulary full of spiritualist phraseology. She may annoy you by saying that she can see your dead mother standing by your side, but if she can tell you something significant about your mother that she could not possibly have learned normally, she has given you the evidence of telepathy for which you were looking.

I was once told by a medium that a great naked Zulu was standing by me to protect me and that he had been with me since childhood. It was not a very significant remark, as mediums are apt to give tall people a Red Indian protector and short ones a Chinese protector, but still there was no possible means of that medium having learned that I was born in Zululand and carried about in childhood by a virtually naked Zulu, nor, for that matter, that my most frequent repetitive nightmare is of a great naked Zulu leading me away to be sacrificed. Certainly the medium's remarks need not be taken literally; I hardly believe in the Zulu's presence even "in the spirit"; nor is the incident very strong

[1] Instructions in how to approach a medium usefully from Dr E. J. Dingwall's *How to Go to a Medium.*

evidence by itself of telepathy, but one must tolerate this dramatic form of talking, if one is to get good results from a person whose whole life is spent in a spiritualist, unscientific atmosphere.

§5. *Historical and Scientific Evidence*

If we compare the quantitative statistical experiments with ESP cards and the experiences with mediums we see that both have grave disadvantages, but that the two together furnish us with important information about the human mind. Our mind is not as hermetically sealed away from other minds as is commonly assumed. Either there is leakage of information through undiscovered channels, or there is a level of mind common to more than one person where information, thought to be private to one mind, is held in common.

ESP card experiments rule out a chance explanation in terms which can be mathematically expressed, but, apart from this important result, they are not very interesting. The experiences with mediums are richer, indeed too rich to be reduced to the requirements of a quantitative formula. There will always be someone, therefore, who will discount the evidence they afford as being due to mere coincidence.

ESP card experiments do not provide us with any of the other requirements believed by certain scientists, ignorant of any science but their own, to be necessary for all valid scientific experimentation. The results cannot be repeated by *any* competent experimenter, however closely the technique of the experiment is repeated. One person seems to get results from a number of subjects and another to be unable to get any results at all. This is something that must be repugnant to anybody used to experiment, for example, with rats or chemicals. A subject will give significant results for a time and then fail. In short an ESP experiment is not repeatable. It cannot be demonstrated at will in the presence of others. It cannot be verified by another experimenter. And it tells us nothing except that the result we get can hardly be due to chance.

Experiences with mediums possess most of these disadvantages with many others. It is harder to exclude fraud, or the leakage of information from the sitter or some other source; and it is

harder to assess the degree of unlikelihood that the information is the result of a guess, or of coincidence. Moreover not everybody can get results from mediums and the medium will often have an off day.

There is the further source of prejudice against mediums that their information is almost always framed in spiritualist jargon and has constantly been used, with no justification whatever, as evidence of survival after death. Thus in the experiences which I have related the mediums assumed a spiritualist explanation, although there was not a single fact given which was not well known to me. It is true that I had not thought of my mother's two gold rings perhaps for thirty years but I had certainly known of them. It need hardly be emphasized that no event mentioned by a medium which is known to the sitter can be regarded as evidence of communication with the dead. Whether any such evidence exists we shall discuss in a later chapter but here we are dealing only with the problem of extra-sensory perception between living minds.

It will be seen that there is a certain superficial justification for the orthodox scientific mind fighting shy of such phenomena as telepathy. It is unfortunate that these faculties cannot be studied by the same technique as can produce adequate results with rat-behaviour or chemical analysis, but every branch of science has to invent its own technique to fit the range of facts which it wishes to study. You do not expect a geologist to bring a precipice into the laboratory, nor an astronomer to repeat a Transit of Venus at will; and as for the inability of some people to obtain results in ESP experiments, it is as foolish to make that a complaint against other people's results as it would be to deny the findings of colour optics because a colour-blind person would not be able to carry out the experiments.

The truth is that all human beings tend to fight shy of these subjects as if a natural censor existed to prevent the mind turning its attention in their direction. Indeed the actual existence of such a censoring force would well be explained as a result of the evolutionary forces responsible for man's brain; for ESP commonly practised would militate against efficiency in the human struggle for survival, depending as men do for success in escaping from the animal into the human phase on developing their logical and discursive powers of thought. It is this censor which

forces intelligent men to deny the fact of ESP in spite of overwhelming evidence of its reality and to demand its proof by the use of inappropriate techniques or to deny it on false *a priori* principles. And it is this censor, perhaps, which is man's greatest enemy since it forces on him that over-specialization which has always in the end been deadly to all living species—in his case an over-specialization in precisely that faculty which made him a man, namely the power of logical and discursive thought.

At present serious psychical researchers have become almost exclusively interested in applying to their studies quantitative analysis under experimental conditions and this, I believe, to be a serious error. Indeed much that has been done with ESP card experiments is merely a cardboard facade set up to make the subject look respectable. The mere fact that you cannot control the essentials of these experiments limits the value of analysing them statistically. Sooner or later we shall have to turn back to Bergson's point of view: "I am led to believe in telepathy" he said, "in the same way that I believe, for example, in the defeat of the Invincible Armada." Commenting on this G. N. M. Tyrrell wrote, "the investigation of psychical phenomena which occur spontaneously does not lie strictly within the field of science. Since the evidence depends on the testimony of witnesses, of written records and of attendant circumstances, the methods employed are partly those of the historian and partly those of the law-courts." In brief we must examine the credentials of psychical experiences, such as I have described above, in the same way as we examine the credentials of any other allegedly historical fact.

§6. *Some Telepathic Events*

We pass now to a number of historic events which illustrate telepathic or other paranormal powers in operation. Each of them is set out as a historian would set out any event which he was wishing to use as illustration of some theory. Naturally full details cannot be given and for these the reader must refer to the sources given.

1. March 23rd and April 6th, 1914. Paris
Mme Morel.

On March 18th, 1914, the manager of some French forestry estates wrote to Dr Eugene Osty asking help in tracing an old man who had disappeared on the previous March 2nd. Dr Osty was well-known for his experiments with Mme Morel who, under hypnosis, had shown remarkable ability for acquiring information by extra-sensory means.

The manager sent a neck-wrap from the old man's wardrobe and the information that the missing man was 82 years old and walked with a stoop. That was all the information normally possessed by Mme Morel, who had never been to the part of France where the missing man lived.

Mme Morel, the garment in her hand and in deep hypnotic trance, gave apt descriptions of people who had handled the scarf; first of Dr Osty, then of the manager, then of a woman unknown to Dr Osty, then of the old man of whom information was sought, thus:

"I see a man lying at full length, his eyes are closed, as if sleeping, but he does not breathe . . . he is dead. . . . He is not in bed but on the ground. . . . There is water not far off . . . a large tree . . . some very big thing quite near . . . something very bushy, a wood."

She was told to follow the man on the day he went out and to describe the way he went. She gave many details but only after three sessions were her indications sufficiently exact to result in the discovery of the corpse. Meanwhile a large number of people had been combing the woods for nearly a month. They denied that the old man could have taken the itinerary described by Mme Morel and were nonplussed by her repeated statement that the body lay near some large stones, since the district was devoid of any. However, her detailed description of the man was so explicit that they persisted in following her instructions. "I see a man of ordinary height . . . white hair . . . rather bald . . . long face . . . long nose . . . toothless . . . pendant lips . . . dead . . . lying on his right side . . . black face . . . one leg bent . . . very wet . . . water on his face . . . a large stone near him. . . . He has a flannel shirt in two colours . . . open collar."

At the third seance a path was so minutely described that five men were ordered to comb the restricted area served by it.

"Soon one of them cried out: 'There is the stone she saw . . . there is water close by: the body might be there.'"

A few yards further on he saw the body. It was stretched out in the middle of the thicket. Ten yards away what looked like a moss-covered rock, really a huge tree stump. . . . On the further bank other moss-grown masses, smaller than the other, but also resembling stones.

The surroundings were exactly as described by Mme Morel, also the face, the garments, the corpse generally. Authority: Dr Eugene Osty, *Supernormal Faculties in Man*, English translation, 1923, pp. 104 *et. seq.*

In describing this and other similar cases Dr Osty says that "the foregoing . . . have been chosen only as examples out of many which would make several volumes."

Thus again we have here an historic event which is one of a numerous class where information is possessed by a mind which has apparently reached it through the agency of an associated object.

This class has led to a theory that objects have a "sort of a something" attached to them which induces knowledge of people previously associated with them. This is a most unsatisfactory theory, but a general theory of telepathy must explain these extraordinary "psychometry" cases. One thing is certain, there is hardly any possibility of explaining the fact by a mind to mind exchange of information, with or without energy exchange.

2. March 25th, 1880. Belle Isle en Terre, France.
Mr Frederick Wingfield.

Letter from Mr Wingfield dated (abbreviated)
20th Dec. 1883. . . .

On the night of March 25, 1880, I dreamed that I was lying on my sofa reading, when, on looking up, I saw distinctly the figure of my brother Richard Wingfield-Baker, sitting on the chair before me. I dreamed that I spoke to him, but that he simply bent his head in reply, rose and left the room. When I awoke, I found myself standing with one foot on the ground by my bedside, and the other on the bed, trying to speak and to pronounce my brother's name. So strong was the impression as to the reality of his presence and so vivid the whole scene as dreamt, that I left my bedroom to search for my brother

in the sitting-room. My sense of impending evil was so strong that I at once made a note in my memorandum book of this "appearance" and added the words "God forbid."

Three days afterwards I received the news that my brother, Richard Wingfield-Baker, had died on Thursday evening, the 25th March, 1880, at 5.30 p.m. from the effects of terrible injuries received in a fall while hunting with the Blackmore Vale hounds.

This signed letter is supported by the following documents:

1. Mr Wingfield's note-book with the entry "Appearance—Thursday night 25th of March 1880. R.B.W.B. God forbid!"

2. Letter dated February 2nd, 1884, from a friend, Prince Lucinge, corroborating that he had been told this story on April 4th, 1880.

3. *Times* obituary March 30th, 1880, confirms date.

4. Essex *Independent* gives date and hour of death.

Authority: Phantasms of the Living, Sidgwick Edition 1918, pp. 143–4. For our purpose the important fact is not the vision, but that knowledge was in Mr Wingfield's mind not obtained according to the dogmas of classical information theory.

Thousands of cases of such historic events, many very well-authenticated, are known. In this type, we find that the information is inferred from an event, namely a hallucination, which does not symbolically or otherwise imply the information. Why should the appearance of a person imply that person's death? Yet we know that in thousands of cases this is both the spontaneous inference and the veridical implication.

This example again might mislead us into imagining that an essential factor of telepathy must be a strong emotional link between the possessor of information and the person with whom the information is concerned. Any theory assuming that this is an essential factor will be insufficiently broad, as the next example confirms.

3. June 27th, 1928. Guildford, Surrey.
Mr Dudley F. Walker.

The first published account was written on the evening of June 28th, 1928, and appeared as a letter in the *Surrey Advertiser*:

I write this letter with extremely mixed feelings. I have just read in tonight's evening papers details of the terrible train smash at Darlington.

Judge my emotion when I tell you that I actually dreamed of the whole of this disaster, substantially accurate in all details, last night, at approximately the same time it happened. (between 11 and 12 p.m.). So impressed was I with the dream that when I came down this morning, I told my mother that had I been leaving immediately for a railway journey I should not have travelled, as it seemed like a premonition. Little did I imagine it had actually taken place.

I then related the details to my mother, for they were as clear, and true to life as a cinema film.

These were the significant features of the dream (omitting details):

I was in an overhead signal box, extending over a railway line I had never seen before. It was night, and I saw approaching what I knew was an excursion train, full of people, returning from some big function. I knew it was my duty to signal this train through, which I did, but at the same time I had a feeling that the train was doomed. (I have nothing to do with railway work).

In my dream I seemed to hover in the air, and follow the express, as it slowed to round a loop line. As it approached a station I saw, to my horror, another small train on the same line. Although they seemed both travelling slowly, they met with terrible impact. I saw the express and its coaches pitch and twist in the air, and the noise was terrible. Afterwards, I walked beside the wreckage in the dim light of dawn, viewing with a feeling of terror the huge overturned engine and smashed coaches, I was now amid an indescribable scene of horror, with dead and injured people, and rescue workers everywhere.

Most of the bodies lying by the side of the track were those of women and girls. As I passed with some unknown person leading me I saw one man's body in a ghastly state, lifted out and laid on the side of an overturned coach.

I distinctly heard a doctor say: "Poor chap, he's dead." Some other voice said: "I believe I saw his eyelids move." Then the doctor said: "It is only your nerves; he has been dead some time."

I was quite upset on getting up, and felt too unwell to eat

any breakfast. All day at business I have been thinking about this dream.

On coming home, you can imagine my feelings when I beheld the placards!

Supporting documents include an affidavit signed by Mr Walker's mother that he related this dream to her early on the morning of June 28th, long before any account of the accident had been published; an affidavit signed by his sister stating that her mother had repeated the story to her before any knowledge of the accident had arrived; signed statement of the dreamer that he had written in his pocket-diary that morning, "Thursday June 28th, 1928. Dreamed of train smash," and on reading evening papers had entered "Wrote to *Mail and Surrey Advertiser* re dream." (Page of diary sent to S.P.R. for verification.)

Examined by S.P.R. representatives, Mr Walker stated he had never dreamed of an accident, had never been near scene of accident, had made a sketch immediately after waking, showing how two trains met and perspective at which he witnessed the accident, had never had anything to do with railways, but was always interested in them although nothing special had made him think of them in the days previous to the dream. Here we have a historic event typical of hundreds in which knowledge is obtained contrary to the Information Theory dogmas, even when there is no emotional reason whatever for the recipient to be "chosen out" to receive it. This is a point that must not be forgotten—the haphazardness with which the phenomena occur. There is no apparent reason why Mr Walker should have received this impression. He had no overruling interest in railways and was in no way emotionally concerned with the event.

The evidence for telepathy derived from various types of medium is enormous in quantity and sometimes susceptible to scientific checks and statistical analysis. One class of evidence is that given by "book-tests." The medium or her "control" specifies a volume clearly unknown to them by normal means and refers to a definite passage which will be found on a certain page.

The most remarkable series of these we owe to Mrs Osborne Leonard who, in 1917–18, frequently showed by this means her possession of information not normally acquired. It was and is

generally supposed that in these cases she was obtaining knowledge via the minds of her sitters. However, in 1936, a book-test was devised which makes this theory difficult to hold without further amplification.

4. London, 1936.

Dr V. S. Woolley, Rev. C. Drayton Thomas, Mrs Osborne Leonard.

For this test a book was chosen in a way that made it quite certain that nobody connected with the experiment could know its identity. Several packets of books collected from various sources were placed in a sack, and in a dark room their packing was removed. A small sack was introduced into the big one and a book chosen at random, pushed into it, the sack sealed up with special marks and the larger sack containing the residue of books also sealed up. All this was done in the dark.

The unknown book was placed in a shelf which could be described to the medium and the medium's "control" was asked to give information about it at a subsequent sitting.

Five statements were taken down and handed by Mr Thomas to Dr Woolley, who then broke the seals of the sack and revealed the book.

The five statements were compared with the book, with the following results:

1. "not complete, should have other book with it, though it appears like a complete volume."

The book's dust-jacket reads No. 457, *Everyman's Library*, and the final words of the book are "End Vol. 2."

2. "There is a person's name beginning with G . . . like the writer or owner of the book."

On the fly-leaf was written a quotation with the author's name, Glanvill.

3. "The outside of the book would suggest things of the old world and of the new world, the old style and the new, old days and present days."

The title reads "Socratic Discourses by Plato and Xenophon." Introduction by A. D. Lindsay M.A. Classical. *Everyman's Library*. J. M. Dent and Sons Ltd. E. P. Dutton.

4. "Old style print right at the beginning . . . when you look

at it you would say they don't put it like that nowadays. This was at the very beginning of the book."

Entirely correct. Title page is surrounded by heavy black conventional design and the printing imitates ancient wood type. The whole thing aims to look antique.

5. "Counting from the commencement on the 13th page find something to do with geometry."

Page XIII begins "For if we learnt geometry and house-building, we are in having done so housebuilders and geometers" and goes on to repeat the word "geometry" which does not occur elsewhere in the book.

Authority: *Journal S.P.R.* Vol. XXIX, p. 204. Dec. 1936. The reader will agree that the medium possessed knowledge of the book which was sufficiently detailed to eliminate coincidence, which she could not have obtained directly from any other mind. Whereas most book-tests could be explained by a theory of mind to mind telepathy between medium and sitter or some other person involved, this does not explain the present case. The only immediately possible attempt at a theory would have to involve precognition; that is, she obtained her information in advance by "perceiving" the moment when the book was unpacked, at which moment she would have to have universal knowledge of it in order to choose out at least the fifth item.

As my final example of a historic event involving telepathy I shall take a remarkable sitting given by Mrs Osborne Leonard in June–September 1936 and reported by the Rev. C. Drayton Thomas in Part 159, *Proc. S.P.R.*, Vol. XLV, p. 257.

My choice of this from the almost numberless well-reported cases is governed by the excellence of the experimental methods involved and the outstanding quality of those responsible for carrying them out and reporting on them.

Mr Thomas was, of course, a spiritualist and to him the results of the experiment seemed to be more simply explained in terms of a communication of information from the mind of a dead person or persons. On the other hand Professor E. R. Dodds who initiated the experiment and sums up his opinions of its results is by conviction a disbeliever in any form of survival. Unlike Mr Thomas he does not argue for the alternative explanation of telepathy from living persons, since he regards

both explanations as equally incredible while affirming that no third explanation is possible.

The dispute between these two explanations vital as it is in its own place does not concern us here since our sole present interest is in telepathy and whether it comes from the living or the dead is of secondary importance. It will however seem to most readers that the historic facts to be described must lead either to a belief in telepathy of the widest possible nature or to spiritualism. Those who shy at the first hurdle, will have to jump over the second!

It will of course be quite impossible to do more than hint at the nature of this pre-eminent case and all interested readers must refer to the Proceedings or, better still, to the full report presented at the S.P.R. headquarters.

Lewis—Macaulay—Leonard
London. June—Sept. 1936

Mr Thomas was in the habit of conducting sittings with Mrs Leonard in which he asked for messages from dead people on behalf of people not known personally or by name to her and not present. These are called Proxy Sittings and were desired to strengthen the evidence that what came from Mrs Leonard must be knowledge obtained otherwise than through normal channels. In the opinion of spiritualists like Mr Thomas it was felt that the exclusion of any possibility of telepathy from the sitter strengthened the case for the source of information being a dead person.

Professor E. R. Dodds, unsympathetic with any form of spiritualism but a friend and admirer of Mr Thomas, suggested to him that Mrs Leonard should be asked to get a communication from Frederick William Macaulay who died on May 20th, 1933, on behalf of his daughter Emma, wife of William Stanley Lewis, a scientist.

All that Mr Thomas knew at the beginning of the sitting was that Macaulay was associated most of his life with Birmingham and it was suggested that if a communicator purporting to be the desired person manifested he should be asked "Can you tell me anything of the two men with whom you were so closely associated in your unfinished piece of work?"

Mrs Leonard was not informed of the nature of the experiment in any way. Mr Thomas in accordance with his usual method

before seances with Mrs Leonard made "an appeal to the desired communicator in my study at home."

At the succeeding sitting Mrs Leonard's "control" Feda without prompting of any sort announced a new communicator and it was not until after the stenographer had taken down fourteen items of apparently evidential character that the name Frederick William Macaulay was mentioned by Mr Thomas for the first time, with a request to be told if that was the communicator's name. This was done, says Mr Thomas, to make sure they were not wasting time with the wrong man, or rather spirit. Feda at once assured him that that was the name.

In all, ninety-four items were given about Macaulay of which seventy were considered by Professor Dodds and Mr Thomas either right, good, or fair and the rest poor, doubtful, and three only, wrong. These items were most of them intimate, and all known to Mrs Lewis. Reference to the original authority will probably astonish the sceptical reader. Professor Dodds sums up: "It appears to me that the hypothesis of fraud, rational influence from disclosed facts, telepathy from the actual sitter, and coincidence cannot either singly or in combination account for the results obtained . . . the experiment seems to present to us (and this is its importance) with a clear-cut "either—or": Mrs Leonard had supernormal access on this occasion *either* (*a*) to some of the thoughts of a living person or persons who had never held any communication with her or with the sitter, or *else* (*b*) to some of the thoughts of a mind or minds other than that of a living person. I see at present no plausible means of escape from this staggering dilemma."

Only those who have read the whole evidence and have some knowledge of Professor Dodds' sceptical and objective approach to these problems will realize the astonishing implications of the particular case. To many people it may well be the classical example of the absurdity of attributing universal and quite haphazard scope to telepathy in order to avoid believing in survival; but for those who do not believe in survival it demands acceptance of the widest possible telepathic faculties.

§7. *The Present Position*

To sum up, the fact of "Telepathy" cannot be explained in accordance with known laws of energy, motion and matter, any more than it would be possible to explain a flower suddenly appearing in a hermetically sealed hitherto empty glass jar, in accordance with the known properties of matter, one of which is that solid matter cannot pass through solid matter.

If a flower did so appear we should have to revise dogmas about solid matter, and there are many people who believe they have evidence of "apports" as such phenomena are called. The present writer does not feel that the evidence is good enough to support any conclusions, but if there was any such evidence it would be the dogma about solid matter which would have to go and not the facts.

I simply mention the hypothetical flower in the jar to emphasize that when telepathy is claimed we are claiming something quite as revolutionary as it would be if we claimed that matter could penetrate matter on the macroscopic scale of flowers and jars. It is no good soft-pedalling this matter; we cannot shelter behind unknown senses or unknown electro-magnetic waves; we are as far from fitting in a few recalcitrant facts into an unchanged system as Einstein was when he explained the movements of the planet Mercury.

In the case of telepathy, though not I think in the case of the flower and the jar, the facts are unavoidable. We know with absolute certainty that such things have happened on a given day and we have all the necessary witnesses and documentary evidence to satisfy a historian that they are historic events. Strip the events of everything else, of the spiritualistic assumption that a spirit was involved in the conveying of the information, or even of the telepathic assumption that the information must have been derived from another living mind; it remains certain that on a given date people have known things which they could never have learned "normally."

Next add that there are a large number of such authenticated historic events, that is, duly authenticated events involving knowledge not normally obtained, and you have a scientific

fact, abstracted from a number of historic events, which must be investigated by any open-minded scientist.

It is worth while being thus careful in choice of words because, in the light of facts carefully investigated by modern experimenters, the original idea of telepathy has been abandoned by them, but not by the general public, so that unless we are careful we are likely to distort our observation of telepathy with crippling misapprehensions. We are not imagining a telepathy involving "thought waves" and we are not thinking in terms of transference of information between two finite minds *A* and *B*. We do not look for a transmitting apparatus and a receiving apparatus interchanging energy nor for a recognized system of symbols by means of which information can be conveyed.

Such fruitless searches were only attempted because the pioneers in telepathy-research instinctively tried to work within the assumptions of what is now called information theory. When F. W. H. Myers invented the word telepathy he defined it thus (1882): "the communication of impressions of any kind from one mind to another, independently of the recognized channels of sense." This was jumping to conclusions which fitted "normal" methods of communication *dependent* on recognized channels of sense, but which have to be justified all over again for the new sort of facts which are *independent* of them.

An example will make this clear: an experiment is set up under careful conditions which rule out leakage of information from *A* to *B* by normal sensory channels. *A* then looks at a series of cards and *B* guesses the card looked at. Statistical analysis shows that *B* is guessing far more cards correctly than would be exexpected according to probability theory. We jump to the conclusion that information is being conveyed to *B* from *A*, indeed from the mind of *A* to the mind of *B*, just as it would be if *A* was disturbing the circumambient air in a way to produce recognized symbols. But we have no evidence that this is so, and, as we shall see, plenty of evidence from which it can be inferred that it is not so. Something much more strange may be happening, but all we know from the experiment is that *B* is guessing a surprising number of cards right.

It is because something much more strange may be happening that the facts about telepathy are of vital theoretical importance to humanity. They cannot, at least at present, be turned to

practical use in everyday life, though it would be rash to assume that they never will be. (Einstein's new theories of matter and energy did not look very useful when they were first announced, but they very soon led to Hiroshima and on to thermo-nuclear weapons.)

And what is this "something much more strange" that may be happening? I do not know. Nobody knows. We have as yet nothing but awkward facts; but they are sufficiently well-authenticated for us to realize that our knowledge of human nature may at any moment be revolutionized in the same way as Einstein revolutionized our knowledge of time and space.

Meanwhile the field is open for anyone well-trained and open-minded to make their contribution. We need not wait for the orthodox ostriches to take their heads out of the sand.

CHAPTER SEVEN

PRAYER AND COMMUNION

§1. *ESP and Prayer*

THOSE OF US who have carried out a number of ESP card experiments are often met with a shrug of the shoulders and a request to explain why such efforts to obtain proof of extra-sensory perception are important. "I am perfectly prepared to believe that there is such a thing as telepathy; but it is uncontrollable, sporadic and rare; and therefore perfectly useless. Even if telepathy exists it does not seem to make any difference to life. Why get excited about it?"

I have discussed the revolutionary scientific consequences, if we establish that there are means of communicating or acquiring knowledge not yet known to science. Most of us who have devoted time to this research have done so chiefly with this in mind; but there is another reason why the search for a definite proof of ESP, and a solution of the various problems involved, is of supreme practical importance.

If people can and do communicate with one another otherwise than through known sensory channels and without the use of any known symbols; if people acquire knowledge private to other minds without those minds deliberately or unconsciously using the normal sensory channels of information; then *prayer* in its various forms cannot be dismissed out of hand as a superstitious practise or, at most, a mere variety of auto-suggestion; for it may involve communion with other minds, and possibly with "Mind" itself, whatever that may be found to mean. At any rate prayer becomes something that must be scientifically investigated.

I think that this is one of the reasons why so many of us have an unconscious desire that the reality of ESP should be disproved; for, once it has to be accepted, the door is open to a flood

of ill-digested ideas and unreasonable practices, litter which the Age of Reason swept away and hoped had been finally burned. Once more we have the dangerous will to disbelieve combining with the equally dangerous will to believe making level-headed judgment of facts difficult.

Let us begin by assuming as a working hypothesis that a practice which has been universally adopted by all except a very small "enlightened" minority of the human race throughout recorded time must have some practical effect. Prayer is almost as universal as breathing. Why?

There are three possible directions in which an authentic effect of prayer may conceivably be found:

1. Prayer may have an effect on the person who prays.
2. Prayer may affect other people directly.
3. Prayer may induce the unknown X, or God, or Universal Mind, or Common Unconscious to affect the person who prays or those about whom the prayer is concerned.

Hitherto scientists have been quite safe in ignoring the second and third possibility, and have done no more than agree that prayer, like any other form of auto-suggestion, can have an effect on the person who prays, or on the person prayed for, provided he has been informed through the normal channel. If ESP does not exist, if all communication must be through the senses, then there is no more to be said. Unless you tell the other fellow, you pray for him in vain. Prayer affects the praying individual and no one else. Any other form of "answer," any imagined effect on other people is an illusion, to be explained away in terms of fraud, deliberate or otherwise, mal-observation, or coincidence. Millions of anecdotes accepted by millions of people as historic facts must be thrown out. But if ESP is proved to exist, these millions of historic facts will have to be re-examined, and, if the evidence for them has not been properly preserved, no time must be lost in collecting other facts for which sound evidence can still be collected.

More important by far than this: those of us who have hitherto neglected the techniques involved in successful praying, should such a thing exist, and who realize what a sad mess the world is in, must ask ourselves a very serious question, namely: may not our neglect of prayer be a contributing factor to world chaos, a factor in the aggregate as important as the existence of

thermo-nuclear weapons? Are we not in part to blame for the probable approaching triumph of evil? If only the person who prays is affected by prayer, then we can laugh the whole thing off and say: by all means let the Russians start praying for peace. But if prayer has an effect on other people—what then? I say nothing of *answers*, I simply suggest that if ESP is proved, the *question* is legitimate.

§2. *Prayer, Christian and Buddhist*

It is a hard question in any case, since, even if man is, or could be, a successfully praying animal, we should not necessarily be at the end of our troubles, for what would happen if a powerful community were to pray for war? With such questions however, we are not at present called upon to deal; but plainly if we wish to arrive at a true picture of the nature of man we must study the possibility of prayer as carefully and as scientifically as we study our physiological functions or any of our better observed psychological functions. Many parapsychologists will be surprised no doubt to be told that one of the best accounts of telepathic experimental techniques is to be found in a standard Jesuit textbook, *The Graces of Interior Prayer*, by Father Poulain. It is not suggested that the whole of this treatise will appeal to the scientific investigator, for there is certainly much that can be accepted only by those who have faith, and Father Poulain's faith at that. But not only does the mystical theologian know more about ESP than the average academic psychologist, but his treatment of facts is more scrupulous and more philosophically valid than that of many parapsychologists.

Naturally Father Poulain is not concerned with the kind of petition sent out by gullible or despairing people for a change in their material conditions or for forgiveness of their own shortcomings. Interior prayer in his sense asks for nothing directly. Its object is to put the person praying in a suitable frame of mind to feel *en rapport* with a source of energy outside himself. Father Poulain considers this rapport as being between the individual and the Roman Catholic God. We should remember however, that in this context "God" is part of a theory which must be tested and accepted or rejected on quite other grounds. There

are other theories which fit Father Poulain's facts and we are not called upon to discuss the pros and cons of them, but only to consider the facts. Indeed his observations from the history of mystics and his technical instructions may well be relevant to an extra-sensory rapport between two or more human beings. Thus his description of the frame of mind most conducive to prayer is precisely the same as that found by many parapsychologists as conducive to high scores in ESP card guessing.

Father Poulain distinguishes between four states or grades of "natural" prayer. There is vocal prayer as when the congregation recites the Lord's Prayer; next there is meditation, as when a man goes through the Lord's Prayer to himself, pausing to meditate on each clause in turn; there is affective prayer, which is a kind of mental prayer "in which the affections are numerous or occupy much more space than the considerations and the arguments. . . . The deduction of truth is partly replaced by intuition." This is a meditation with more emotion and less thought. Finally there is the prayer of simple regard.

In this last, we are told, the state of consciousness involved is much the same as that of a mother who, watching her child, can "think of him lovingly for hours together . . . and she does this without any interruptions." It is the same as when two friends "can remain in one another's company for long periods of time enjoying the happiness of being together in tranquillity and *silence*." It is as when "the artist remains before some beautiful spectacle in Nature." All that is required for the experiencing of this "prayer of simplicity," is that its content should be the contemplation, the companionship, the love of God and of course so far as Father Poulain is concerned, of God as defined by Roman Catholic theology. As with the other three grades of prayer, this is quite possible for anyone by their own effort alone and without the help of any outside energy or force and therefore it is still *natural* prayer and not mystical prayer. What then is the difference between natural and mystical prayer?

In these natural forms of prayer God "does not intervene, like a professor, to teach us new truths. . . . And so with those whose knowledge of spiritual things is not of a high order, these prayers will be a means of progress with regard to the will, not with regard to instruction." They will not add to the private knowledge already possessed by the person who prays.

The individual who knows how to lose himself in the prayer of simple regard has reached a state of mind-harmony in which discursive thought and attention to perceived objects are ruled out; and in short, he knows how to "make his mind a blank." When we remember that in this act he has probably fixed his gaze on a bright object, a candle, a cross, rather above the level of his eyes, we see that he has assembled many of the elements desirable for inducing a condition of auto-hypnosis, or for leaving the conscious mind open to receive suggestions from the mind's hidden strata. The Christian lost in the prayer of simple regard is in the same psychological condition as a Buddhist who by mindfulness has emptied himself of external hindrances and is in a listening condition ready to receive wisdom. He is in the same condition as a medium composed to become entranced.

At this point to any of the three there may happen something quite new. The mind is in a receptive mood; hitherto from the unconscious levels there may have been flowing into the consciousness a mass of wisdom and folly, but now something else may be added. So long as all can be accounted for in terms of already existing private knowledge, the prayer and its results are natural—normal and not para-normal. But the limits of private knowledge are sometimes transcended. The Christian has a mystical revelation, the Buddhist has a fresh enlightenment, the medium learns something which most certainly was not part of her previous knowledge. In Father Poulain's philosophy God is now taking a part in the experience and producing results that could not be achieved in the slightest degree by the human being unaided.

Thus from the natural prayer of simplicity there is born the lowest grade of mystical prayer, in which experience outside private knowledge is given by an outside energy. "We apply the word mystic," writes Father Poulain, "to those supernatural acts or states which our own industry is powerless to produce, *even in a low degree, even momentarily*. . . . Strive as I may to make energetic acts of the will in order to prophecy or to see God or my Guardian Angel or Satan; and nothing, absolutely nothing will result. Unless God intervenes in a special manner I shall not even as the above definition says, succeed in a low degree or momentarily. . . . This is what we call a mystical state. . . . We give the name of mystic to supernatural states containing a

knowledge of a kind that our own efforts and our own exertions could never succeed in producing."

Christian interior prayer, Buddhist meditation and mediumistic trance are all techniques for enabling the individual human mind to try to obtain knowledge outside that already privately possessed, by means not involving the simple energy exchanges known to science. Faced with the vast body of evidence suggesting that from time to time they succeed, how can we afford to deny them scientific examination?

There is, however, a very great difference in the objects of the three experiences. They all involve the same sort of physiological and psychological approach and they all aim at getting knowledge that the human mind, manipulated in the normal way, cannot get; it is the type of knowledge that is different. The Christian learns to train his mind to be acted on by God, who vouchsafes him experience, either cognitive or sensitive, not otherwise obtainable. Nor can this experience be conveyed to another mind, since only that which can be formulated in an agreed symbolism in obedience to a common logic can be thus conveyed. Our consideration of the importance or otherwise of the Christian mystical contribution, if we have no analogous experiences ourselves, will be based upon such things as the consistency, or otherwise, of the various accounts given to us. As far as descriptions of another life or of the nature of God, the unknown X, are concerned, experience proves that there is no consistency; but there is great consistency in the increase of mental happiness and peace vouchsafed to the mystic by these experiences. If the scientist, especially the psychologist, is convinced that it is no business of his to explore the techniques leading to the peaceful mind he is not likely to be impressed. If he feels that just as the mechanical sciences aim at producing efficient machines so the psychological sciences should aim at producing minds at peace, he may care to look further.

The Buddhist is not concerned with a personal relationship, as is the Christian, but with philosophical enlightenments, and, like the dialectical materialists, he believes that theory and practice cannot be divorced from one another. He seeks the explanation of Being in order to put an end to the mental discomfort which derives from ignorance of its nature. It is not so much his philosophical conclusions that are significant as his

insistence that discursive thought and reason are not sufficient research tools in themselves for this type of exploration. Like the Christian he strives and trains to develop mental powers which are not used in normal daily life, or at least not consciously used, because they are useless in the struggle for existence. Like the Christian he finds his doorway to further knowledge only when he has learned to keep the conscious mind quiet and inactive where it is usually most active and most agitated. Like the Christian also his discoveries cannot be enjoyed vicariously; each man must earn them by his own self-discipline. If we compare the average trance medium with these two we will hardly be surprised at the superficiality, the flippancy of whatever fragmentary knowledge may result from her trance. The mystic has to begin by being an ascetic; freedom for higher knowledge has to be vested in intellectual discipline—the normal man's indulgence in the seven deadly sins or merely in the careless flippancy of everyday behaviour is no preparation for meaningful revelation. But the medium with all her trivialities and lack of intellectual and moral preparation has one claim to superiority over the other two. They are content with what must always be private knowledge; she attempts to obtain communicable knowledge. Surely the thing to be desired is a medium who is also a saint whose powers of communicating has been heightened and refined in the fires of self-discipline.

§3. *Scientific Approach to Prayer*

If we now put together the available evidence suggesting that human beings can usefully transcend their usual condition of reliance on discursive thought and logic and the evidence that in some cases knowledge, thought to be private and therefore imprisoned within individual minds, turns out to be communicable, or at least to be common property of several minds, we have a startling possibility for human development.

We know that human beings often descend to the animal, and communicate with one another at a level below that of intelligent thought—we have panics, mass hates, epidemics of superstition and the rest. Why cannot we hope for communication

at this other level, little understood, which would seem to be above intelligent thought? A non-logical sense of community undoubtedly exists, but we tend to regard this as fed from our sub-human functions. Cannot it be stimulated on a higher level? Is not the universal practice of prayer an attempt to bring this about? True, prayer has often been degraded. It is a prey to the normal vices of human nature. We pray to confound their politics, and frustrate their knavish tricks. We pray for assistance in keeping up with the Joneses. We pray for rain and for the dislocation in our favour of the ordinary run of life. For this, apart from human nature, our spiritual teachers and masters are directly to blame. Not one in a thousand in Christian England is ever taught how to pray. But in spite of all, there is formidable evidence that a power of mental transcendence exists and that by its exercise we can enter into communion with our neighbour. As to this the climate of opinion has changed significantly.

Writing in 1903 F. W. H. Myers tried to reconcile the predominantly Christian culture of his day to psychical research thus: "To the Christian we can speak with an even more direct appeal. . . . To believe that prayer is heard is to believe in telepathy—in the direct influence of mind on mind. To believe that prayer is answered is to believe that unembodied spirit does actually modify (even if not storm-cloud or plague-germs) at least the minds, and therefore the brains, of living men." Today when most educated people have ceased to "believe in prayer" or to practise it, the argument is differently worded and addressed to different people—to believe in telepathy is to believe that prayer *may* be heard. Whether it is or not is another question and if we want to raise belief in it to the level of public knowledge the task involves much scientific research; to thrust it on one side however, involves obscurantism and intellectual cowardice.

If we exclude such deep matters as the beatific vision and the like, the results of mystical prayer involve, to use Myers' definition, "an attempt to obtain benefits from unseen beings by an inward disposition of our minds." It is, I suspect, because psychical researchers have paid little or no attention to the right disposition of their minds that their efforts to control manifestations of ESP have been so unsuccessful.

Almost the only voice suggesting that religious processes should be studied from this point of view has been that of Pro-

fessor H. H. Price who, in his presidential address to the Society for Psychical Research in 1939, called attention to the effect of fasting on the human mind. Now the study of fasting, like all other forms of spiritual training, does not belong to mystical but to ascetic theology, that is to say to the study of the virtues and the means whereby they may be attained by human effort alone. Ascetic theology teaches that by fasting and other acts within human power, the virtues of self-abnegation and humility can be achieved, and mystical theology shows that a man possessing these virtues is in a right disposition of mind to obtain mystical "superhuman" knowledge. Besides ascetic theology there is another approach to the study of the relationship between fasting and ESP, namely physiology.

That the scientist will approach the recorded facts from the direction of physiology rather than theology does not involve him necessarily in any conflict with the theologian. "It is surely significant," said Professor Price, "that a number of religious traditions, Christian and non-Christian, lay great stress on the importance of fasting, and hint very strongly that there is a close connection between fasting and 'visions' of one sort or another. . . . Can we suppose that a practice which is so utterly repugnant to ordinary human nature would have been adopted so widely, and persisted in for so long, if it had not led to some pretty striking experiences? . . . The Reformation did many disservices to mankind. Perhaps one of the greatest was this, that it made fasting unfashionable among the more scientifically-minded people of Europe."

It may well be that fasting has physiological effects which interfere with the normal blood supply of the brain and thereby with the brain's normal task of interpreting "reality" in a way helpful for the struggle for survival. Fasting may make the brain porous to other perceptions usually stopped by some cerebral filter. The person may then be open to notice or observe or perceive the paranormal contents of mystical states. If so, parapsychologists should supplement their working efforts to eliminate from their experiments all suspicion of fraud, which is almost the sole problem at present engrossing them, with attention to the physiological means of obtaining the appropriate state of mind. Perhaps they should starve not only their guinea pigs but themselves, since in psychical research there can be no doubt

that the experimenter's state of mind influences the results of the experiment.

Why psychical researchers should expect to achieve uniform, predictable, frequent evidence of extra-sensory perception without any physical and mental preparation is strange, seeing that the one form of ESP most successful hitherto, namely "answer" to mystical prayer, demands an even more careful physiological preparation than is required for rowers in a university boat-race. Starvation is not the only technique found relevant to these manifestations.

The control of breathing is regarded as of first importance in most non-Christian mysticisms. With apologies for his rashness Professor Price suggested to the members of the S.P.R. that we should not "be too proud to take any hints we can get from the mystical and occult traditions of the Far East, particularly of India. I am not suggesting for a moment that we should accept their conclusions—unless and until we succeed in verifying them for ourselves. What I have in mind is their methods, the assemblage of physiological and psychological exercises which are roughly included under the name "Yoga" and the corresponding ones which are practised in China and Tibet. . . . These methods may appear to us peculiar, or even repellant. Nevertheless, it is claimed that their effectiveness can be empirically verified by anyone who is prepared to take the requisite trouble."[1] In short, those who are seriously interested in contributing new light to the problem What is Man? may well consider a careful physiological approach to the validity or otherwise of the claims made by both Christian and non-Christian mystics that certain practices likely to interfere with the normal working of the brain produce tangible evidence of answers to mystical prayer. This may be the means whereby we break out of the vicious circle of limited mental experience drawn by our necessary struggle, as animals, to survive. What claims are made by mystical theologians of new knowledge obtained in the mystical state?

Father Poulain devotes Part IV, p. 299–319 to their description and follows this with a very valuable discussion of the dangers

[1] In this context I should add that experiments, inadequate in themselves, which I have made in the effects of breathing-control and card guessing sensitivity suggest that this is a promising direction for further research.

of illusion, of misunderstanding and of wrong interpretation of such things as visual and auditory hallucinations, pre-cognitions, physical mediumistic phenomena such as levitation and so forth. While his suggestions for precautions against fraud and misunderstanding will be sympathized with by all pure psychologists, his criteria for what we call the *veridical* are quite unacceptable to anyone except Catholics. For him and for his Church paranormal experiences, when they are certainly so, may come from either of two sources, God or the devil, and you canknow which by asking if they contain anything contrary to the Faith, or good morals, and whether they are "useful for our eternal salvation."

Father Poulain considers a revelation particularly worthy of credence if it leads to the propagation of good works or the foundation of a religious institution whose subsequent history proves meritorious. Even here we can perhaps meet him halfway: it is quite probable that paranormal research succeeds best when it is designed consciously to assist the progress of human happiness. Certainly it is found sterile if the prime motive of the researcher is personal delight in exploding a fraud. Thus we are tempted to believe that the best approach to the study of paranormal phenomena should involve not only scientific sense and historic sense but ethical sense as well. Not that such a necessity is confined to this study since all sciences of the spirit, as the Germans call them, that is non-mechanistic sciences not orientated towards the making of a perfect machine, must be orientated towards making life more perfect.

Prayer therefore involves extra-sensory perception and indeed is the form of ESP which has been most practised empirically: and yet we have scarcely begun to consider it as a subject for scientific investigation. This has partly been because the various religions use non-scientific criteria for assessing the results, as that the results are "good" or "genuine" only if they fit in with the particular religion involved. So long as a Roman Catholic denies that the identical experiences of Quakers or yogis or anyone else are valid for no better reason than that they are not "Catholic," and so on, we cannot have a scientific investigation of how far answer to prayer, or mystical experiences, are a part of human experience transcending mere auto-suggestion; and until we can have this the answer to What is Man? cannot be anything but incomplete.

§4. *A False Approach to the Problem*

Now there are various groups of research-minded people attempting to study prayer as a part of psychology rather than of some limited theology. One such group draws its inspiration from the experiences in Hawaii of Mr Max Freedom Long. It is to be regretted that these methods both of study and of publication are unlikely to impress scientifically-minded readers. Mr Long tells us that, in the course of his studies in that island, he was able to verify empirically that by following a certain technique based on a certain psychological theory exceptional men could learn to pray effectively. He describes the technique and the theory and gives instructions for his readers who wish to carry out effective prayer. They are of course very different from those of Father Poulain, and, if valid, more interesting because the results claimed concern man's life on this earth and have little to do with his eternal salvation except incidentally.

Unfortunately Mr Long's method of enlightening us is the very opposite of that which has been found essential for the publishing of scientific research. Thus it is a rule in all scientific work that new researches should first be published in scientific journals or at least written in a scientific form. What would we think of Newton if he had introduced us to the gravitational constant as "Willie" or of Madame Curie had she first described radium as "Jemima." Mr Long calls one of the three parts into which, so he tells us, the Hawaiians divided the human "Self," George. George turns out to be indistinguishable from the Freudian "Id." The rather infantile habit of giving proper names to parts of the human body, usually to "improper" ones, has nothing to recommend it. If Mr Long desires serious thought to be given to his discoveries he should at the start at least use the common language of science.

More important is his tendency to support his theories by grossly inaccurate descriptions of analogous scientific work. For example, his description of Dr Rhine's ESP work and of his own imitation of it is quite unacceptable.

He describes how he put six different objects in six "identical" pill-boxes and shuffled them with his eyes closed. He then guessed which box contained which article and "anything

beyond one successful identification of an object out of six tries, was set down as above chance." At first the score was low, but improved over a period of six months until he was guessing six out of six right.[1] Now this may have been a valid experiment, but nobody can possibly tell that it was so from the description. There is a complete misunderstanding of statistical method and there is serious ignorance of the steps necessary to avoid normal sensory leakage. The pill-boxes may have been identical to the conscious eye at first, but they certainly would accumulate small differences as time went on, so that Mr Long's increasing success could be more easily explained by normal, though possibly unconscious, perception of little differences. A properly carried out experiment, properly described, would include such obvious precautions as a screen to avoid any sight of the boxes at any time, witnesses, adequate methods of shuffling the boxes and so forth. As for the statistics: Mr Long says that guessing improves steadily, but with off days "when George is not interested" the scores may be "far below chance." He does not say how often he guesses before claiming that the score is above or below chance and does not seem to have heard of a standard deviation. He does not tell us that he is careful to add the 'below chance' scores to the 'above chance' scores before assessing his result, or whether, having done this, the observed deviation is found to be two or three more times the standard deviation, which alone would entitle him to claim significance for his experiment.

Therefore this experiment, so-called, is worthless, and by its incompetence is likely to prejudice trained minds against anything else he has to say. Yet Mr Long claims to know what happens when he guesses the contents of a large number of boxes.

"The low self is then asked to project an aka finger through the cardboard (aka fingers go easily through porous substances) to discover what trinket is in each box. Or, one can tell George in a simple explanation, that he has already fastened an aka thread to each trinket by the simple process of handling and boxing them and that he can follow the aka threads into the box with his projected aka finger and find them easily. Once found, he is to sense the trinkets in any way he wishes, and send back to

[1] *The Secret Science at Work*, by Max Freedom Long, Watkins, 1953.

you along the aka cord to the body and middle self the "impression of what is touched."

It will not be surprising if the reader feels no inclination to hear what Mr Long means by the aka cord or the low and middle selves; but this would be a pity: Mr Long sets great store on them and attributes to *the model he constructs of invisible, intangible things* the explanation of his success at ESP.

Now here is a crucial error commonly made by orthodox and "wild" psychologists alike. The error consists in believing that, just as a mechanical scientist makes up a working machine out of parts which he can see or construct, so we should attempt to explain the workings of the human mind by making a model of materially non-existent things. You cannot do this because anything immaterial—mind, subconscious, id, is only an artificial label stuck near something which happens for no better reason than the mere prejudice that if something is happening there must be something material involved. You cannot make a model out of such labels.

Certainly the mechanical scientist may want to make a model which works, which produces an observed or desired effect, for sooner or later the mechanical, or electrical, or magnetic, or thermic effect he has observed is to be repeated, by an appropriate machine in a useful and controlled manner. But nobody wants to make an id or a subconscious or even an aka thread in order to repeat an observed effect—which is just as well, as it cannot be done. You can manufacture copper wire but not aka threads, batteries but not ids, and whereas an electric circuit will not exist without the former, prayer will work, or not, whether ids and aka threads are thought to exist, or not.

The only use for all the phantom apparatus Mr Long got from Hawaii is that it may in some cases satisfy the suggestibility of some people and thereby enable them to exercise some natural but neglected power. Another may get the same result by touching his left nostril and putting a finger in his navel.

Nobody except a remarkably simple-minded person is going to believe that the *content* of a vision of the Trinity reveals knowledge which can be translated into practical or mundane forms. It will not, for example, enable the painter to paint a more accurate naturalistic portrait of the triune God. But it may be the source of the transfiguration of the whole personality of the

visionary. In the same way the only excuse for believing in aka fingers is that the belief frees you to be yourself in some way otherwise closed to you. We can all walk on a six-inch board a foot above the floor, but not on the same board over a thousand foot abyss. In the same way some of us need symbols of the unknowable, but it seems hardly necessary to go for them to Hawaii.

In what way do these considerations throw light on Prayer? Since every race and every religion prays, and since all alike are equally successful or unsuccessful, it cannot greatly matter what the nature of the recipient of the prayer may be. It will always be X, and you will give X whatever value suits your temperament. What is far more important is that evidence exists in quantity that the human brain can be altered by any one of many processes so that it behaves otherwise than as a useful tool for survival in the struggle for existence. One of these ways would seem to involve the influencing of other individuals, and possibly of events in the external world, by the disciplined, highly sophisticated practise which we call praying. To study prayer we do not have to imagine and label intangibles; we are only concerned with the fact that prayer seems to produce an effect on people other than the person praying, even when they are unaware of what is happening. If we satisfy ourselves that there is thus something to investigate, we study what empirical methods are used in individual cases to bring about this interchange of feeling, will or knowledge.

It would appear that the release of this force which is able to communicate with others is best achieved when the mind is not busied with specific wishes or petitions. It may well be that there is no validity in our praying for somebody to be healed from an illness, but rather that, if we get into an appropriate mental state, the result will be a good effect on the sick person. In short it is not what we ask for, but what we are that counts. And this may be equally true of such mundane things as ESP card tests. It may well be that success depends not on conscious desire and effort to guess cards right, but on the percipient and agent and all others concerned being in the appropriate state of mind.

§5. *The Present Position*

However, I am not wishing to suggest that we are near a solution to any of these questions, but rather to show that certain vital probabilities are now demanding scientific investigation. We must not let open the floodgates for a return of the flotsam and jetsam of the Age of Superstition, but we can no longer be satisfied with the negations accepted by the Age of Reason. We can sum up the situation as follows:

1. Since prayer is common to nearly all religions it is variously defined according to the theology of each religion. We must therefore avoid all definitions or descriptions which are based on a special idea of God. In our scientific approach to prayer we must always consider God as the unknown X which may have any value, including O. The value of the unknown X should not be taken into account in a scientific study of prayer for the idea of prayer must be valid for all values of X.

2. Prayer becomes a subject for scientific investigation now that we have had to abandon the idea that each human mind is hermetically sealed from all others or that there is inviolable private knowledge only to be exchanged from one individual to another through sensory channels.

3. The scientific mind will also be influenced by the growing realization that although the perceptions of the brain are normally limited to what is of value in the struggle for survival in an animal phase, the censorship may be lifted to admit perceptions normally shut out.

4. We are finding that there are techniques for liberating the brain from its normal task of struggling to survive and that these are often like those used for centuries as adjuncts to prayer. Prayer therefore may be one way in which information can pass from one individual to another, and one way in which information not associated with the struggle for survival can be received.

5. There is a growing belief that the solution of certain psychological problems may involve the working hypothesis of a universal mind, or at least some basic mental structure having different and wider boundaries than those given to the conscious, individual mind.

6. We can therefore legitimately experiment with the tech-

niques, physiological and otherwise, which seem to liberate the mind and see if they release pent-up energies as yet unstudied by science, which energies penetrate other minds or make contact with "universal mind" and produce tangible results.

7. Present evidence suggests that such experiments require a special training of the experimenter, who must dedicate himself to his task in an appropriate way. The way cannot be formulated *a priori* but must be discovered empirically. It can, however, be assumed that powers of discursive thought, reasoning, and scientific curiosity, essential in themselves, will not be found adequate without other qualifications hitherto confined to the practises of religious mysticism.

8. It goes without saying that all ideas of prayer which assume that it is a force which can contradict natural law are primitive and invalid. But there is ground for believing that prayer may lead to a release of an unknown energy which supplements as well as obeys known natural law. This can only be accepted as proved if its results are communicable as public knowledge or if its results bring about recognizable and predictable changes in other people.

9. The content of such communion between minds may not take the form of knowledge as normally defined. It may be intuitional in its impact or it may be emotional rather than cognitive. In short the effect of prayer may be to alter the mood of other individuals rather than to increase their information.

10. There is no evidence at all that prayer can only be motivated by love. There may be prayer motivated by hate—black prayer as well as white. We are dealing with an energy which may be used for evil as well as for good. We do not know. Therefore its discovery may be even more dangerous than the discovery of how to release thermo-nuclear energy.

CHAPTER EIGHT

CHANGING VIEWS OF HEALTH AND DISEASE

§1. *Unorthodox Medicine*

IF THE READER finds that his convictions or prejudices make it impossible for him to regard prayer as a fit subject for scientific research, he must nevertheless pay some attention to certain problems affecting the art of healing now that extra-sensory perception cannot be ignored.

Faith healing has always been endemic in every culture however enlightened, and recently its presence in our own has reached epidemic proportions. Medicine has one great advantage over other branches of knowledge; the only criterion of truth in medicine is that it should work. If a man is healed by Lourdes water, by Harry Edwards, by radiaesthesia, by animal magnetism, by prayer, by a gipsy, by Christian Science, then one thing is certain: the therapy has been successful. Most grateful patients will feel that there is no more to be said. Others think that all has been said if the cure is described as another case of suggestion—probably the most overused and underdefined word in contemporary vocabulary. You cannot close the subject of faith healing by murmuring "suggestion"; and less so now that we have to admit that minds affect one another in ways still little understood, but certainly transcending what orthodox science has hitherto accepted.

When the human being is sick, to what does he attribute his misfortune? There are, there always have been, two possible points of view.

Monsieur Bouteiller, the French anthropologist, defines them clearly. You may attribute your ills to natural physical causes and in that case you go to the doctor in whom you put your trust

or, in England now, to the doctor on whose panel you are more or less forced to be. He treats you, according to what he has learned, with the appropriate remedy. All this is within the circumference of the natural order. As Monsieur Bouteiller adds, this does not prevent you from praying, or in some other way calling the divine attention to your plight. I myself have never yet opened my mouth to the dentist without silently uttering the truly heartfelt petition: "Oh Lord may he not hurt."

The other attitude is dictated by the feeling that our ills have paranormal causes outside what we regard as the natural order; that material remedies are by themselves useless, and cure primarily a matter of prayer and particularly of a magico-religious gift possessed by certain rare persons. By this magico-religious gift the sick man can be put *en rapport* with the underlying forces of life and the universe, for his ill is itself a symptom that that rapport has been broken.

Now it is possible that both these points of view are right, and that the only fault of the orthodox view of medicine is that it has usually neglected the second attitude and frowned on paranormal medicine. By thus banishing all unorthodox forms of medicine it has left us open to the attacks of charlatans of all sorts, a state of affairs which will continue until there is an orthodoxy of paranormal medicine established on the same sound basis as the only orthodoxy we now possess.

Why do I think that paranormal medicine is necessary? Because where there is smoke there is a fire. Orthodox medicine has done marvels and you might think that everyone would be satisfied by it. Yet in France, according to Noel Bayon, while there are 38,000 orthodox doctors, there are 40,000 curanderos, quacks, paranormal doctors—whatever you prefer to call them. If a cultured country requires more paranormal doctors than normal ones then surely there must be a territory into which ordinary doctors do not know how to penetrate. These 40,000 include homeopathists, naturists, acuepuncturists, radiesthesists, humorists, neohipocratics, herbalists, cheiropractors, medical astrologers and others, none of whom agree with the rest as to working hypotheses, some of whom would disclaim paranormality, all of whom are apt to think ill of orthodox medicine and of all other remedies but their own. But, with few exceptions, they all cure a percentage of patients, possibly as large a

percentage as cured by members of the B.M.A. There are also, of course, Christian Scientists, and others even farther removed than these from medical orthodoxy, and in England healing bees have become as popular as spelling bees once were, and a large number when sick put their trust in prayer and the laying-on of hands. When we consider that although this is no new thing, it is still on the increase, it is childish to suppose that mankind would tolerate the often most distasteful attentions of paranormal doctors unless cures result, and unless, in certain fields, orthodoxy had been found wanting.

Or consider too statistics in England. One hour out of every three lost in industrial concerns through illness is lost through a mysterious entity called anxiety neurosis. Only the common cold exceeds it in deadly ubiquity. These are figures among trades unionists, a fact which should be remembered by those who tend to regard nerves as an occupational disease of the leisured classes. Now no doctor can treat nerves by physical medicine although, of course, he is forced to pretend that he can. Moreover, he may often be handicapped in healing a sick soul by not believing that any such entity exists. Fortunately all that many sick souls require by way of therapeutics is a reassuring manner and coloured water. For more serious cases there is phenobarbitone, since nerves are probably better asleep than awake.

Then there is the advance into popular favour of the term psychosomatic, a part confession that natural physical medicine is by itself insufficient in a large number of human ills. Another useful word often implying a partial confession of powerlessness on the part of the doctor is *allergic*. The cloven hoof of histamine is often invoked when the real trouble is one only curable by paranormal medicine.

Let us take a look at three episodes in the history of the healing art, the primitive or shamanistic episode, the medieval or Catholic theocratic episode and the episode of animal magnetism and its allies from the end of the eighteenth century to our own time. These together throw light on the problem of contemporary paranormal medicine.

§2. *Primitive and Shamanistic Medicine*

Let us consider medicine in South America at the time of the Spanish conquest. Stout Cortès himself wrote home to Spain in 1522 saying it was not necessary to send out doctors from Europe as the Indians knew all that was needed and much more than their Spanish confrères; while as late as 1637 the setting up of chairs of medicine at the University of Lima in Peru was opposed on the ground that they would be useless as the Indians knew more than the Spanish doctors.

Now what did the Indians know? For one thing they knew the virtues of hundreds of plants and their correct applications. They had herbal gardens many acres in extent long before the first European herbal gardens were started. These remedies, or many of them, *worked*, that is the point. How did the Indians find out that they worked? By chance? It is not a satisfactory answer. How can you find out by chance that one out of thousands of plants has one part, sap, seed, root, leaf with remedial powers in one out of many human diseases? By experiment? But experimental method came late and from Europe. There is only one likely hypothesis and it is one which will frighten a number of people. The Indians knew how to cure with plants because they lived in close affinity with the plants and knew instinctively what a given plant could do. This power is lost to us, though there may be ways of regaining its advantages. If so, it will not be by recovering the instinct but by scientific research.

But before there can be scientific research, scientists must be convinced that there is something real to research into. Can we achieve a scientific conviction that in some stages of development humanity has possessed a rapport with other forms of life leading to useful knowledge possessed instinctively? I believe we can. Let me refer back to the experiments with rats on p. 94.

Is there not at least a possibility that the discovery of medicinal and poisonous plants by human beings came about through the possession of the same sort of affinity with them as rats have been proved to possess towards their food? There is nothing unscientific or irrational about such an hypothesis. It is indeed more reasonable than to suppose that this learning came by trial and error.

Moreover, we know that human nature changes according to social and cultural conditions. This instinctive knowledge about plants which is the origin of most that is good in our modern pharmacopoeia would seem to exist only when man is in an agricultural state. Hunting tribes never achieved it, nor have industrial communities. You have to be living a life of co-operation with nature if you are not to be divorced from such natural knowledge. The hunter fights nature, modern industrial man feels himself outside nature altogether; neither can share nature's secrets.

In short, I suggest that normal medicine came into existence thanks to a rapport with nature possessed by agricultural people. Their knowledge which seems paranormal to us, though in the case of rats we are content to describe it as instinctive, is the basis of our modern pharmacology; but since we have lost the rapport, the intuitive knowledge, by standing apart from nature, we can only increase that knowledge by discursive thought and scientific experimentation.

At the same time there came into existence quite another kind of medicine—Shamanism. Shamanism appears in parts of the world so remote from one another as to make dispersal from a single centre, Egypt, Atlantis or whatnot, a tortuous and improbable explanation. The Shaman in Siberia, in the Aleutians, in Tierra del Fuego, in Mexico, in the Pacific was a dedicated man with magico-religious gifts of healing. In every district of the wide world particularly in those communities most subjected to the brute forces of nature—cold, heat, drought—he exercised therapeutic rituals varying greatly in details, but fundamentally identical. His is a totally different healing cult.

His art does not depend on rapport with plants and animals, but on rapport with other minds or mind itself. He is a man able to put himself into communication with spirits without being possessed by them. In trance or similar states of dissociation he finds out what is wrong with the sick man and how he may be cured. He prescribes no material remedies. His sphere of operations is with the invisible, the intangible, with force or energy rather than the natural products of force or energy. The definitive sign that a man is born a Shaman is that he has discernment of spirits and manipulates them or, forces, or energies, or gods, to bring back health. These speaking through him advise on

cause and cure. Almost all over the world there are two causes of the diseases with which a Shaman deals; either an enemy or evil spirit has placed a noxious substance in the patient's body or they have stolen his soul perhaps during sleep.

Two points perhaps have practical application. The Shaman was usually, as a child, a neurotic or epileptic, but when once he has become a practising Shaman, so it is reported, he is seldom neurotic or epileptic. By becoming a Shaman he cures himself. Whatever seizures, fits, trances he has are under his control.

Now we tend to imagine mystics and odd people with paranormal faculties as being pathological.

I suggest that the unfortunates whom we put into mental homes are our failures, people whom society ought to have known how to turn into Shamans of one sort or another. Naturally I do not refer to unfortunates such as microcephalic idiots and mongoloids, but perhaps especially to schizophrenics among the psychotics, and hysterics among the lower hierarchies.

This is not sentimentality, it is a point of view in favour of which the evidence is piling up. Alienists are paying more and more attention to their patients' fantasies. There are psychiatrists of imagination who have found that they can help people with infantile regressions if they take them in their arms and nurse them as a baby. There are others who take the demon tormenting a possessed person at face value and talk to it man to demon with excellent results. It is instructive here that early Christian manuals of exorcism lay it down that the exorcist must talk to the devil, never to the possessed person; since he usually carried out his work in Latin which the sick person scarcely ever understood, while all devils are excellent Latinists, this was highly practical; but it has theoretical advantages also.

Then there is the immensely important knowledge of the mind derived from mescalin and L.S.D. 25 where we find hallucinations of marvellous beauty, insight into life and sometimes the release of paranormal faculties along with the occasional schizophrenic episode even in normal people. All of which goes to suggest that the lunatic is really a lover, a poet, or a healer *manqué*. Perhaps one day we shall empty our asylums and fill the earthly choirs with singing birds, the academic chairs with imagination as well as intellect, our medical consulting rooms with Shamans as well as surgeons and orthodox doctors.

The other point about the Shaman is that from the frozen poles to the equator he tends to carry out his functions naked. Now this nakedness has nothing to do with the curious antics of our nudist societies where, so I have been told, the exchange of clothes for a medicine ball induces a frigidity and an impotence reassuring to many people. The Shaman removes his clothes because the naked body is in closer connection with the energies involved in life and he is thus charged with a higher potential. Of course this high potential energy is the same as that which produces sexual passion, but the Shaman abstains from this direct outlet and uses the energy for magical healing.

Now nearly all great modern mediums have found that their powers are in some way allied to their sexual energies and periodicities. Some like Eusapio Palladino have been frankly nymphomaniac, others on the contrary have shown signs of a repression of this passion which suggests that they have learnt how to expend in paranormal pursuits what others satisfy in a more normal way.

Please do not misunderstand me. The starlet in a bikini on a Mediterranean beach is not likely to stir the paranormal into action, though we do talk of her as a sight for sore eyes, but it is time that more careful study was made of the relationship between sexual energy and mediumship and other paranormal faculties, such as healing, perhaps particularly healing. Also we should find out what of value we have lost by banishing nakedness, for the gradual and partial return from banishment of the naked human body, once we can face the sexual reactions in comfort, may well lead to higher standards of health both physical and mental.

In primitive medicine then there were two orthodoxies. One was that which through affinity with nature could diagnose the disease and ascribe the true remedy. The other used magic and religious gifts to make contact between the sick individual and the healing potential of life. From America through Spain there came to Europe from the first orthodoxy a number of drugs from quinine to curare, but shamanistic medicine never came because it fell foul of theological dogma, and was labelled heresy and witchcraft. Because we never accepted Shamanism owing to theological prejudices, psychological medicine has lagged behind to this day.

§3. *Classical and Christian Medicine*

It is a very unorthodox point of view, but one which can be defended, that the medicine derived from classical sources and filtered through Christianity was disastrous and that our salvation has been the infiltration of primitive agricultural medicine into the medicine derived from classical sources.

Take the primitive orthodoxy based on affinity with nature and compare it with the teachings of the medical pope, Galen. Galen and his commentators for far more than a thousand years based their pharmacology not on living things but upon intellectual abstractions—thus the four humours, phlegm, blood, choleric and black bile with their several attributes of hot, cold, dry, wet, were synthetic abstractions and indeed ample evidence in themselves of man's self-detachment from the living universe.

Long after the Indians had their herb gardens Europe had little but four chief nostrums: triaca or theriac, made of viper's blood and seventy-three other ingredients, bezoar stones from the stomachs of Persian goats, pulverized Egyptian mummies and unicorns' horns for those wealthy enough to pay for the genuine article. It could hardly be claimed that these were based on instinctive knowledge due to a rapport with nature; rather they were the product of reason using discursive thought wrongly; instinct is never wrong, reason, alas, often is; so that, for example, not a single doctor who was forty years old when Harvey announced the circulation of the blood accepted it to the day of his death.

Even in Galen's medicine we find two of the principles found in primitive agricultural medicine. The plant indicated by its form what its secret value was: thus a heart-shaped leaf indicated value as a cardiac stimulent; kidney-shaped flowers and bulbs of orchidaceous form were good for the uro-genital system and so forth. Second, an elaborate system of sympathies and similarities was invoked. Unfortunately these principles were worked out rationalistically, since the instinctive rapport did not exist. Thus our own medicine was based on intellect without intuition and therefore often proves less satisfactory than primitive medicine, even though the primitive intellect was insufficiently developed to balance intuition.

And what about the Shamanistic form of medicine? It should never be forgotten that Christianity derives from the slums, the human warrens of Rome and other overgrown cities, where humanity had lost its contact with nature and regarded it as something to be fought and beaten, not as something of which humanity is a part.

The result is that the Christian successor to the Shaman was not the exorcist who put demoniacal ills right, but the Christian mystic and sensitive who was more likely to be himself exorcised as being possessed of the devil. Even St John of the Cross and St Teresa herself very nearly fell foul of the Inquisition. The sort of diseases which the Shaman treated by using his libido were now treated by priests according to rules derived from the use, right or wrong, of reason. Shamanism nearly won through however: in 1477 Ferdinand and Isabella recognized the *ensalmadero* professionally along with physicians, surgeons, and apothecaries. Now the *ensalmadero*, so-called because he chose as his spells verses from the psalms, was undoubtedly a closer spiritual descendant of Shamanism than the exorcis, and the Church recognized the enemy within the gates and punished the *ensalmadero* with major excommunication.

Medicine can only be judged empirically and pragmatically. In medicine, certainly, a truth is a truth if it works and particularly so in psychological medicine. Christianity however, substituted quite a different criterion of medical truth. Whether it worked or not, if it was heretical it was of the devil. Bezoar stones and pulverized mummies were good medicine because there was nothing heretical about them; but all magic, that is therapeutic and other phenomena not understood, however successful in healing, was black magic, and involved a pact with the devil. And also all rapport with nature tended towards that bugbear of the Catholic theologian, pantheism.

In Christian pseudo-Shamanism the forces of nature, the spirits, the life forces, were transmuted into the devil. Guazzo's Compendium Maleficorum 1608, a standard Catholic demonology, gives forty-seven probable signs that the patient is possessed of the devil and twenty that he is simply bewitched. They range from xenoglossia, the speaking of languages unknown to him, to the commonest hysterical tic and even pins and needles and a feeling of ants under the skin. The chief symptom however, was

the inability of orthodox medicine to affect a cure, a common enough symptom in those days, since bleeding and purging, two savage attacks on nature, were usually all that orthodox medicine had to offer.

Since Shamanism requires doctors of a certain psychic quality the witchcraft persecutions impoverished our therapeutic heritage. Most witches were no doubt deluded and often insane unfortunates harried by societies which needed scapegoats to keep themselves going emotionally. It should not be forgotten in this context that whereas Catholics burned witches by the dozen, Protestants burned them by the thousand. In Spain, for example, less than a hundred witches were executed by the Inquisition largely because there were enough Jews and Moors to supply the scapegoats. Indeed Spanish Inquisitors were remarkably enlightened about witchcraft compared with Lutherans and Calvinists. They were far quicker to recognize that witchcraft was usually nervous illness and to be treated as such.

Now who were the witches? Nearly all came from remote mountain districts, the Alps, the Pyrenees, the Massif Central, the Scots Highlands, the Black Forest. By definition they were heretics in league with the devil practising black magic. If they did a tenth of what they confessed to, not always under torture, they almost deserved what they got; but we can quite certainly assume we do not know the whole truth. Some of the witches were the sensitives of the community, Shamans *manqués*, people whose spiritual or paranormal gifts had gone bad because their social *milieu* did not know how to use them; for we must take it as an empirical fact that spiritual or paranormal gifts do go bad if not properly used by society. By weeding these people out, the witchcraft persecutions deprived us of a rich leaven of sensitives, since these abilities seem to be to some extent hereditary.

Having lost our rapport with nature with the coming of the machine age and most of our sensitives thanks to religious persecution, we have to rely today on the synthetic laboratory production of what we once got from nature and indeed sometimes on mere accident. Thus penicillin floated in at the window and spoiled a chemical experiment before man learned to make use of it.

In short, there were originally two sorts of medicines: one a medicine which functions by the use of medical remedies derived

from instinctive discoveries of agricultural peoples having rapport with nature, and not dependent upon the paranormal gifts of the doctor. It works whoever administers it and cures malfunctions of a purely physical or material type: the other, a medicine which functions by re-establishing a lost rapport between the sick person and the forces or energy involved in the living universe through the mediation of a doctor with special gifts of a spiritual or paranormal nature. Here we have an interplay between one mind and another, or possibly between the mind of the sick person and mind in general. This medicine does *not* work whoever administers it but only when administered by a man with the right gifts. These gifts cannot be acquired with money or even with good will, unless they are there as part of the doctor's heritage.

The first type of medicine involves the use of conscious mind with its power of discursive reasoning, experimental method, logical deduction. The second type involves the use of the unconscious mind with its intuitive ability, its drawing on some as yet unknown source for inspiration which produces what the theologians call infused knowledge.[1]

The first type of medicine does not involve the emotions of the doctor. You can successfully take aspirin on the prescription of a man who hates you. The second type involves love or loving kindness or charity, or at least some undefined and unconscious transference or rapport.

§4. *Animal Magnetism and Diagnostic Boxes*

Now let us look at the history of the second type of medicine since its escape from the shackles of Catholic and indeed Christian orthodoxy. Doubtless it had lingered on in obscure mountain districts only interrupted by an occasional witch hunt, and an occasional learned man hit on it by intuition or even sometimes

[1] I may illustrate the meaning of infused by a question discussed by Roman Catholic theologians: Did the Virgin Mary know all scientific truth, for example astronomy, by infused knowledge? The answer to which is: Yes. It would, I think, be correct to say that the primitive knowledge of the value of a certain herb would be infused knowledge.

by reasoning. These learned men, children of their environment, attempted to systematize this intuitive art. Thus we have the remarkable seventeenth-century writer, Maxwell, who in his *De Medicina Magnetica* (1769) taught that the soul is not only inside the body but functions outside it, that from every body, human or animal, and from every part of the body, corporeal rays escape which give the soul its power of action and have an affinity with the vital Spirit; that excreta and detached parts of the body (e.g. blood spots, finger-nail parings) retain this vital force and also rapport with the body however far from it they may be detached. That all parts of the body including detached parts are affected by illness in any one part or by the healing or reinforcement of any one part.

On this basis a hundred years later Mesmer founded his system of healing by animal magnetism. What Shamanism was in the agricultural age, animal magnetism was in the machine and scientific age. Whatever the truth behind it, the metaphors in which it had to be clothed were conditioned by the cultural climate of the age. That there was truth behind animal magnetism, behind the belief in a fundamental ray, in corporeal rays emanating from parts of bodies and so forth must be accepted since this truth worked. Nobody reading the great treatises on animal magnetism from Mesmer on can explain all phenomena away simply by invoking suggestion.

Here we have a medicine paranormal in its nature, constantly recurring and constantly explained, justified, made respectable, in terms of the most romantic scientific discovery of the moment —electricity, magnetism, rays, vibrations, and also constantly associated by its practitioners, or its parasites, with a machine, which alas could always be sold for money. No longer are spirits and gods invoked in trance through a Shaman, but vibrations and rays through a machine. And we have two wrongs that do not make a right. We have the orthodox scientist, insulted by the mechanical claptrap, saying that there can be nothing in it; and we have the deluded user of the machine which he bought for cash imagining that any results he may get, and he gets results, are due to the machine.

We may very well believe that the Shaman and his followers were deluded when they attributed their successful therapeutics to spirits of plant or animal, or dead men or gods. But we have

merely altered the names and the metaphors to suit our mechanistic civilization, if we allow ourselves to attribute our successes to mechanical devices. How strange too that those who do this should think they are fighting against the very mechanistic philosophy which is holding them in its grip. I shall dogmatize: in every form of paranormal medicine, whatever rays, vibrations, machines are invoked, any success is due to somebody having paranormal, Shamanistic qualities that incidentally cannot be bought or sold. In normal medicine you may do well to look up the practitioner's academic qualifications, in this medicine it is virtue that counts, and that sensitivity without which there can be no discernment of spirits.

Now we come to the crux of the matter. Paranormal medicine, that is the healing of one man by another because of the healer's special rapport with the forces involved in life in general, has always existed. Sometimes our sickness can be cured thanks to discoveries made by men long ago who were in rapport with the material emanations of those forces, whether animal, vegetable or mineral. Sometimes we can only be healed by the other kind of rapport binding the individual mind to the universal mind with the aid of people with paranormal gifts. As things are at present we are in a perilous dilemma. On the one side we have an orthodoxy which, partly on good trades union principles, refuses all contact with paranormal methods of healing, except when they can be disguised and used by orthodoxy itself: on the other we have a ridiculous chaos of contradictory sects with no discipline and very little of the training without which the greatest intuitive genius cannot make use of his gifts. Of all the schools of unorthodox healing hardly any except the Lourdes authorities make any attempt to lay their claims before an instructed jury of medical men. Thus the art of healing is cleft in twain by the lightning of prejudice.

Yet although it is necessary that men should die, it is not necessary that they should be so sick, either in body, in mind or in heart. But what is the way out of the dilemma? It will not come, I think, from the quarrelsome, opinionated, emotional paranormal healers but from the heart of orthodoxy itself. The really great advances in unorthodox medicine are nearly all due to normally trained doctors of experience with the necessary touch of genius which looks beyond the certain and the approved

and which is not afraid of a new idea, where new ideas are badly needed, simply because it seems absurd.

In a recent book[1] by a highly qualified doctor, we read,

> In other professions such as the Church, the Law, and the fighting services, the capacity of individuals to instil confidence and to bring relief to those subject to their charge is recognized as notoriously variable. But what is axiomatic outside medicine may be accepted only with difficulty by the more mechanistic schools of thought prevailing in our profession. One should, however, allow that other explanations are possible and we may in future be obliged to accept the fact that some doctors are endowed with greater powers of healing than others. (When I say healing I mean powers special to the doctor and integral with his personality. I am not referring especially to his diagnostic capacity, power of judgment, or skill in treatment.) Patients have long accepted this point of view which to me seems self evident. But certainly any doctor subscribing to the view that individual members of his profession have variable powers of healing would do well to provide himself with the highest orthodox qualifications in order to escape being dubbed a quack.

Here we have no less than the acceptance of the necessity of Shamanism, that is of a healing service that gets its efficiency from paranormal qualities found in some men and not in others. We need not merely a physician but a beloved physician, one who not only knows his stuff, but can inspire confidence, whose approach therefore is not only to the disease and its symptoms, but to the personality which may well have collaborated with material agents to cause the disease. It may well be that our increased realization of this need is due to our having so recently lost the family doctor in whom the need was at least partially fulfilled.

It is obvious that only a minority of trained and qualified doctors are likely to have this gift for contacting the whole man behind the disease. In consequence many technically able doctors may be disease carriers without realizing it. Dr Guirdham says elsewhere in his book: "I feel that when the medical history of epoch comes to be written posterity may well decide that diseases

[1] *A Theory of Disease* by Arthur Guirdham, M.A. D.M., B.Sc. Oxon., D.P.M., 1957.

iatrogenic in causation (i.e. diseases produced by the influence of the doctor in charge) outnumbered in our time those in any other category." That is the inevitable risk we are exposed to by the mechanistically excellent technique of our day. This and the huge increase of population has made the personal approach of Shamanistic medicine well nigh impossible.

This is perhaps only one part of the practise of healing in which the alliance between technique and personal rapport has reached a high standard of excellence and that is Nursing. The nurse may not have what is usually meant by the words an emotional approach to the patient but she seldom ceases to see him as a person. She can give him something of that sense of security which he has probably not enjoyed since childhood, when a mother put him in bed. Moreover nursing is the one part of the profession in which the consideration of money-making can never be a primary factor. Even in surgery nursing is half the battle; elsewhere in the field of medicine it is a good deal more than half.

If we look at unorthodox medicine we may find that some sort of Shamanistic rapport is not rare; but here the action on the sick personality of the would-be healing personality is made difficult by ignorance. The primitive shaman was fortunate in living in a community where a pre-scientific ignorance of material things saved him from many erroneous assumptions. Our would-be Shamans clutch at all sorts of half knowledge in their efforts to become scientifically respectable. They talk of rays, vibrations, ether, magnetism, electronic forces—anything which is in the air, until we long for pre-scientific ignorance in the place of their pseudo-scientific half-knowledge. They stick to their partial gods and we hear a milling crowd of half-educated egoists crying out: I am a Steinerite, I am a Hunaite, I am a Subite, I am a member of the School of Ageless Wisdom, I am a fundamental raydiator, I am a naturo-homeo-bloodspot-dynamic-bio-sophist, believe in me and all things shall be added unto you. They cannot all be right all the time, though some of them may be right some of the time. What we want is an orthodoxy of paranormal medicine based on the modicum of truth in all these warring sects.

The reason why all the petty schools of paranormal healing will not subject themselves to experiment, statistical assessment

of results, rigorous conditions and accurate recording, is not because these things destroy the spirit, or render paranormal power impotent, not because orthodox scientists are often so stupid that they will not play fair with unorthodox processes, but because they are afraid. They know they are relying on half-truths and dressing them up as The Truth and they don't want to find out The Truth, because they don't want to be themselves found out.

What must be done? We must have a Paranormal Medical Research Council formed of trained men, without an axe to grind, willing to try all, to find out what works, and then why it works. They will deal with the unproved, unexplained practices of the fifty or so sects offering us release from pain and disease. We know there is something in most of them, but what with the blinkers of mechanism, the distractions of sectarianism, the fears of clingers to metaphysical straws, we are getting nowhere. If we are to impress enlightened intelligent opinion, we must get rid of the arrogance and dogmatism so common in paranormal medicine and substitute humility, and not the false humility which claims that it is not I but God working through me. There is nothing more arrogant than a Mahomet. Let us by all means say: There is one Truth, but let us beware of the man who adds: And I, Mahomet, am its prophet. Above all let us look into the past and learn its lessons. Paranormal medicine as practised today has contributed not one new idea. It is all as old as the hills. There is nothing so old as New Thought. Let us base our beliefs on what has happened. We shall find plenty to strengthen our belief in the paranormal. There is an ancient wisdom but it depends on an ancient discipline of the mind.

§6. *The Best of Both Philosophies*

What makes the present situation in the healing arts so interesting is that there is a certain amount of common ground between the orthodox tradition and those brought up within it and some at least of the unorthodox and possibly paranormal schools. Let us try to map out this common ground.

1. There is acceptance of the fact that most diseases can only

be understood if we treat the mind-body as a unity, or as so close a knit duality that one interplays with the other. The "cause" of a skin complaint may be in the mind, or mental, or psychological as you may prefer to say. The "cause" of schizophrenia may be a biochemical fault in the endocrine system. The "cause" of a duodenal ulcer may be an overdrawn bank account due to an extravagant wife. The "cause" of arrogant exhibitionistic behaviour may be that a man is only five foot one in his socks. The "cause" of coronary thrombosis may be over-conscientiousness in the doctor who suffers from it.

2. There is greater realization that emotions can alter almost every physiological action in the body. Not only does the modest maiden blush, but the hardened criminal gives himself away by minute changes in the nervous control of the sweat glands in the palm of his hand as an incriminating word is whispered to him. The soldier reminded under narcosis of the horrors of the Japanese concentration camp not only feels the pains again but reproduces in his skin and flesh the wheals and wounds of the ropes. A door banging somewhere sends up the blood pressure even of a sleeping man. The desire for a child may produce all the external signs of pregnancy and so may a young girl's sense of guilt after her first ardent kiss.

3. Experiment has shown that all sorts of autonomic actions, that is reflex actions which take place without the participation of will or consciousness, can be induced by auto-suggestion started by a command received under hypnosis. Thus the change of size of the pupil, usually a reflex of changing brightness of light, can be induced by conditioning the subject to respond to some stimulus suggested under hypnosis.

4. It has been shown that almost all the mind-body participates in the natural healing of injuries or the natural defeat of disease. The total personality comes to the rescue of each part, or increases the difficulties under which that part is labouring. This means more than the old adage that the healing power belongs to nature rather than to the physician; it means that the physician's effort to help should be addressed to the personality as a whole and only in a secondary way to the injured part.

5. This has meant that the whole emphasis in pharmacology has shifted from specifics that will act on the local condition to drugs which will aid the total mind-body to react in aid of the

part affected. Noteworthy among these is the use of sedatives. Dr Guirdham writes:[1]

> Sedatives are now commonly used, either with or without other drugs, in migraine, Meniere's disease, the various dyspepsias, fibrositis, asthma, skin diseases, peripheral vascular spasm etc. where, twenty years ago, their employment would have been rare and where more reliance would have been placed on hypothetical and, to a large extent, ephemeral specifics.
>
> The vastly increased range of application of sedatives is of interest because it well exemplifies the current tendency away from treatments introduced especially for their local effect and towards those with a general action, where the local effect is secondary. . . . More and more often we see how a treatment, directed primarily at the individual's ruffled psyche or over-stressed nervous system, is of considerable efficiency in clearing up other ailments, some apparently not related to the principal malady, but happening to be coexistent at the time when the particular treatment is applied.

In short, it is the total personality which is sick and the total personality which must be treated.

6. An important observation affecting the interplay of mind and body is that very often a person afflicted with a mental disease becomes right-minded if he becomes a victim of a physical illness. In the same way a person cured of some neurosis by psychiatric treatment is found to develop a physical disability, as it were, in exchange. It may well be that a neurodermatitis is a prophylactic against a severe mental breakdown. This is not so strange when we remember that the skin is the end organ of the central nervous system. The stress which might have been revealed by trouble in the cerebral cortex has been discharged and relieved through the far-off nerve ends embedded in the skin.

7. Now that infectious diseases are almost conquered, so that man has less to fear, in Europe at least, from the predatory attacks of the lower animals, his main source of illness is his fellow man. The sick man is an individual at strife with his social environment though the fault may lie in him or in society. Disease varies with the social environment. People do not die,

[1] Op. cit., p. 300.

and more important are not handicapped in life, by the same diseases in every land. Even types of mental trouble vary. For example, hysteria is not a common trouble in England today and though it is declining in France also it is still more common there, than here. One of the most difficult problems to be solved by thoughtful parents is how far they must educate their children to conform to a society which they may condemn as immoral. Yet moral man floundering in immoral society is almost bound to be ill.

I have now given a brief historical survey of paranormal medicine and an analysis of some of the ways in which contemporary orthodox medical thought is finding it necessary to revise its conceptions of disease. Can we fit the two together and draw conclusions for the future?

I think the main proposition will be that two services to mankind which have tended to draw apart will come closer together —the cure of bodies and the cure of souls, in other words medicine and religion. There is nothing anti-scientific about this; in particular it is not intended to suggest that the magnificent structure of mechanistic medicine, the hospitals, surgery, nursing technique, modern pharmacology and materia medica, based on the physico-chemical approach to human problems, can not go on to further triumphs. But something else will be added.

This may be described as a recovery in purified form of the Shamanistic element in the art of healing, which fell out of our tradition, because it was branded as heresy by the rationalist-materialistic orthodoxy forged by medieval Christianity out of classical medicine.

Shamanism is essentially paranormal in that it presupposes that its practitioners must have certain paranormal gifts whereby they can bring their dedicated personalities to bear on the suffering personality of the patient. There can be no doubt that these gifts exist and are to be found among the faith healers of today, but they are obscured by ill-digested pseudo-sciences, by superstition that should have been purged long ago and also by debasement of the hidden and little understood truth for the usual worldly purposes of gain, both monetary and emotional.

All we know is that here and there a man lays on his hands and suffering disappears, that groups met together in prayer feel that their prayers are answered and a sick man relieved, that there

is more in the vast accumulation of facts than can be covered by the lazy word suggestion. But we do not know more.

Our ignorance cannot be reduced until the many contending voices accept the discipline which is based on suitable scientific method and, remembering that the proof of the pudding is in the eating, are willing to subject their results to the sort of scrutiny needed to divide truth from wishful thinking.

CHAPTER NINE

SURVIVAL

§1. *Is Survival Important?*

MAN'S ATTITUDE TOWARDS the question of whether he survives death or not is one of the strangest elements of his emotional make-up. One would have thought that almost everybody would consider the question of very great interest, and indeed perhaps the most important question of all. Yet very few people are seriously concerned with wringing from nature this particular secret.

A large number of people have, of course, had their minds made up for them one way or the other. Some religions, including the Christian, set the certainty of personal survival in the forefront of their teachings; others, like Buddhism, teach that personal survival is a punishment which only great virtue can avoid; others, like the official religion of Russia, deny survival of any sort. Few people seem to feel a need of studying the question in a scientific manner as part of human psychology. Nor is this indifference always the result of religious conviction; more often perhaps it is part of the inhibition which prevents us thinking of death except when the thought is forced upon us. It is hard to decide how much difference belief in survival or denial of survival makes to the ordinary man's behaviour. The people who imagine that without a belief in survival a man must lead a selfish, immoral existence are proved wrong by almost every agnostic's biography; nor does fear of Hell seem to have turned bad kings, bad popes, bad men generally into anything good. It is of course not easy to know whether, for example, a Borgia prince or pope believed in survival, but, if so, it certainly did not make a saint of him; while many men have been saints, or martyrs to causes in which they believed, without any

sustaining hope of heaven. If Russia and America come to grips in a Third World War, there is no reason to suppose that either side will be appreciably more valiant than the other, although one army will go, officially at least, to death and annihilation, and the other to death and glory.

It is at least certain that the sceptic who wishes to rule out the evidence or to condemn further research into the question of survival on the *a priori* assertion that all such things are mere wishful thinking has no ground to stand on. Probably as many people desire annihilation at death as desire continuation of any sort.

I do not know, therefore, whether my readers will agree with me when I say that we cannot make any final decisions about human nature, cannot even begin to sum up our answer to the question What is Man? unless we have made at least a provisional guess as to what happens to man after death. Is it a problem for science? Of course it is: all problems must sooner or later be submitted to the arbitrament of human reason. But that is not to say that human reason has yet grown wise enough, or that the whole man knows as yet how to use reason as a tool deftly enough to answer the question.

Survival is one of the few problems still considered a matter for religious instruction rather than for scientific investigation. Let us remember that a few hundred years ago almost everything was so considered. The movements of the solar system, the physiology of the body, the relationship of plants and animals to man, the behaviour of the weather—questions about any of these could not safely be answered without keeping a watchful eye on the probable opinion of the Church; they were all in part theological questions and theologians claimed a right at least to be consulted about them. Nor did this extra safeguard prevent most of the given answers from being wrong. Today we do not bother about the theological implications of, say, meteorological problems. We may still pray for rain, but we consult the weather bureau if we want a rather more reliable answer.

But if we consult any authority at all on what happens to us after death, it is not likely to be a scientific or even any human one. Why? Perhaps because until recently there has not seemed to be any reasonable way of approaching the problem by scientific means. Yet we might expect to find some kind of evidence,

however deeply concealed within the night of ignorance, of what an existence after death might be, supposing such an existence to be a fact. And indeed such evidence does exist. The question of survival has been tackled scientifically by well-trained, scientific minds who have devoted themselves to this branch of the science of psychical research.

As long ago as 1872 the great Professor Sidgwick, writing to his friend F. W. H. Myers, said: "I sometimes feel with somewhat of a profound hope and enthusiasm, that the function of the English mind, with its uncompromising matter-of-factness, will be to put the final question to the Universe with a solid passionate determination to be answered which *must* come to something."

It was this profound hope and enthusiasm which led him to found the Society for Psychical Research and for many years to direct its cold, logical activities towards putting the final question to the Universe.

Sixty years later his equally remarkable widow, Mrs Henry Sidgwick, as honorary president of the Society, wrote an account of its fifty years' work which was read for her to the Society by Lord Balfour. When he had ended, he added the following words: "Some of you may have felt that the note of caution and reserve has possibly been over-emphasized in Mrs Sidgwick's paper. If so, they may be glad to hear what I am about to say. Conclusive proof of survival is notoriously difficult to obtain. But the evidence may be such as to produce belief, even though it fall short of conclusive *proof*. I have Mrs Sidgwick's assurance —an assurance which I am permitted to convey to the meeting— that, upon the evidence before her, she herself is a firm believer both in survival and in the reality of communication between the living and the dead."

The sensation caused by these words was very great. The audience contained some of the finest minds in England, the speaker was brother of a famous Prime Minister and a philosopher of importance in his own right, and Mrs Sidgwick in the fifty years of the Society's work had proved herself unswervingly scientific in her numerous researches and papers on human survival and other problems.

What was the evidence upon which this solemn statement was based? In due course I shall answer this question.

§2. *Private versus Public Knowledge*

I have emphasized the fact that safe knowledge about anything at all can only be gained by the use of the proper scientific method in seeking it. The *proper* scientific method will vary according to the subject matter. Some true knowledge can be gained by carrying out laboratory experiments; but often your subject matter cannot be got into a laboratory. You must study the sun and the stars where they are. If you can weigh and measure with balance and foot-rule so much the better; but ordinary measurements will be out of place in some branches of science, and there is great danger of obscuring the truth if pseudo-measuring is brought in to make inquiry seem respectable to those whose only idea of a scientific method is one that includes measurement.

In the case of human survival there is the difficulty that many people believe in survival after death because they accept the truth of some religious revelation. Such people will be apt to deny outright that scientists have anything to contribute to the question.

As far as they are concerned, they are perfectly right. They *believe* and need no further proof. They should, however, be charitable and understand those who are in doubt and who prefer to try and resolve their doubts scientifically. Scientific method in such a case can be invaluable because it can turn what is otherwise only private knowledge for some into public knowledge for all.

There are certain kinds of private knowledge which cannot be thus turned into public knowledge, certain kinds indeed which a man had better not try to turn into public knowledge. Thus a man in love may know beyond possible contradiction that his girl is the most beautiful girl in the world. He should be thankful that he cannot prove it, because, if everyone thought as he did, his problems would be much complicated. He is wiser to accept the fact that there is no accounting for tastes and that he need not try to get the rest of the world to agree with his. But belief in survival is in a rather different category from the lover's private knowledge. It is not a matter of personal taste; either we survive death or we do not—which?

Since the problem is not a mere question of individual taste we can attack it by inquiring into four problems:

1. Are there observable facts against it?
2. Are there observable facts for it?
3. Are there *a priori* reasons against a belief in survival?
4. Are there *a priori* reasons for a belief in survival?

Let us remember that one fact duly ascertained and verified for or against survival upsets anything we have reasoned to the contrary *a priori* and since facts are so much more important than *a priori* reasoning let us begin with them. Are there any facts which suggest that we must believe in survival; and are there any which force us to refuse to believe in it?

Even so we have left out what some people must evidently, I think, suppose is the first necessity of tidy thinking; we have not defined what we mean by survival. Surely we should begin with a definition? No, almost always in scientific research the definition comes last. We shall not define survival, we shall see if the facts suggests some sort of continuity of something after death, and if so, it will be the facts which will give us our definition of what that something is.

There is, however, an admission which ought perhaps to be made at the beginning of our research: the climate of opinion today is so strongly against the idea that survival can be scientifically demonstrated that even if we can find facts which satisfy some people, it may well be that they will never satisfy those who have not experienced them personally. In this case the change-over from private to public knowledge may take a very long time, but that the effort to settle the matter one way or the other is necessary to answer the question What is Man? no one can dispute. Nor can there be any doubt that nearly everyone who has made up their mind one way or the other on human survival of death has done so on evidence insufficient to establish their conclusion as public knowledge.

§3. *A Personal Experience*

I begin with a personal experience therefore, but I must first say that I do not myself believe that adequate scientific evidence exists to settle the question of survival; and most certainly what

evidence there is gives us very little help in defining what, if anything, survives. My experience is typical of the trivial, yet inexplicable events which can occur if you are fortunate when you have a sitting with a medium. It is "a poor thing but mine own" but I chose it rather than the more spectacular examples to be found in the literature for the very reason that it is mine own; and it has the advantage too that it presents us fair and square with the ever-recurring issue: Are we to regard such experiences as evidence of communication with the dead, or of telepathy between the living? *If* we decide on the latter, we must admit that telepathy must be on occasion so indirect, so far-fetched, that it is as hard to believe in as survival itself.

My wife and I run a house in Spain as a Guest House during the summer months. On July 16th, 1956, we had been discussing ESP with some of our guests. At 11.30 p.m. the others having retired, Mr and Mrs M. asked us to continue the conversation. I knew only their surnames, but not their Christian names, not having seen their passports and all correspondence having been carried on by my wife.

Mr M. explained that his wife was very much concerned with the question of survival as she had been deeply grieved at the death of her father-in-law on March 10th, 1955.

I promised that if ever I consulted a good medium I would try for a message, but I explained that I was by no means convinced of survival, and that my research in such questions had so far reached no conclusions.

On the following day I left for France to meet for the first time and to stay with, a lady well known to have mediumistic gifts. On Sunday July 22nd I had a sitting with her in trance, during which her control, who I will call X, took over.

Towards the end of a not very interesting sitting I asked for permission to request a message for a third party. X gave permission. I then said: "Could a message be got from John William M. who died March 10th, 1955. It is his daughter-in-law who asks." I was told by X that I should receive a message in writing "through my instrument" before I left for Spain.

I was leaving on the Wednesday, and on Tuesday afternoon I asked the medium if she had found herself writing anything lately. She looked surprised and said, "No, why? Were you expecting anything?" I answered: "I was told by X to expect

a written message before I left." She said: "Oh, wait a minute, I did find myself scribbling, 'My dear Dorothy' or something this morning, but it meant nothing to me and I said, Oh! what the hell, I've got a lot of letters to write, and I threw the paper away. Might that have been of interest to you?"

I said: "I haven't the slightest idea as I don't know the enquirer's name." She said, "Well of course, I didn't know about this, but now I know you are expecting something, I'll see what I can do."

On Wednesday morning July 25th, just as I was leaving, my friend handed me a sheet of paper which I put away and read in the aeroplane after I had left.

On my return to my house in the evening after dinner my wife and I went to Mr and Mrs M.'s table and I said: "Is your name Dorothy?" She said: "No, Doris on my passport but my friends call me Jane. My father-in-law always called me Dorrie." Then, and only then, I read the following words out of the medium's message: "I wonder if the pet name Dorrie has anything to do with a lady now living. Could be about 40, any age between 30 and 40 . . . (the dead man) is interested in the very attractive lady to whom I have referred . . . she was such a comfort to him when the light failed." Mrs M. had helped her father-in-law throughout his last illness and she was about 40 and attractive. How had the medium become aware of "the pet name, Dorrie?"

There was a good deal more that was evidential in the message, as well as some definite mistakes, but I wish to focus all attention on this one fact. The medium could not have obtained this specific information, viz: "the pet name Dorrie," by any normal channel. It was information that I did not possess and no one who possessed it had any idea that a medium was then trying for a message from a dead man—unless it was known to the dead man himself!

What explanations of this experience can be suggested? There are five, which we shall consider in turn.

1. That the episode never happened and that either I made it up to deceive people, or dreamed it and was myself deceived.

2. That the episode can be explained as pure coincidence.

3. That without knowing it I had heard the husband call his wife Doris, or had read the name in passport or letters; that I

had then unconsciously inferred the pet name Dorrie; that possessing this knowledge I had passed it on unwittingly by word of mouth or telepathically to the medium.

4. That as it was known to Mr and Mrs M. and no doubt to many others that the dead man used the pet name, the episode must be explained as an example, however indirect, of telepathy between some living person and the medium.

5. That the information came from the dead man himself.

The first explanation cannot be held, since there are carefully preserved documents proving each step in the occurrence. Unless a conspiracy involving all concerned is to be predicated, with a dossier of forged documents, we can rule out explanation one. The explanation of chance is in this case not likely to be seriously put forward by many people, although we are not dealing with an experimental situation in which the null hypothesis can be ruled out by statistical analysis. The third explanation must be rejected, since I have the signed statement of the husband that he had never used the name Doris but always Jane, so that I could not have heard him use the name Doris before departing for France, a signed statement from my wife that I had never seen Mrs M's passport, and the correspondence from which it can be seen that no Christian name was mentioned in it, so that even if I had seen the letters, which I had not, I would not have obtained the information from them. We are left therefore with a choice between the fourth and fifth explanations.

Now there is a school of thought which says that, if any living person can be shown to possess a given piece of information, we are bound to explain mediumistic possession of that information by telepathy between the living, since Occam's razor demands that the simpler of two explanations must be accepted, and communication with the dead is a less simple explanation than telepathy between the living. This point of view is put forward by many people who would probably not accept the existence of telepathy at all if it were not that to deny it would involve a belief in survival. There is a good deal to be said before it can be accepted as a final rule.

To begin with it involves a circular argument. If the question at issue is communication with the dead, we have no right to assume as part of the argument that this is less or more likely

than telepathy between the living, or to claim that evidence which, *a priori*, might be used to prove either, cannot be evidence of survival because we have assumed that this is less likely than the alternative. It is only less likely because we insist on using all the evidence to make it seem so.

If we are to accept telepathy between the living as the explanation we are faced with a situation almost if not quite as incredible as any theory of communication with the dead. It is certain that neither the medium nor I had the knowledge, and it is certain that Mr and Mrs M. had no idea that I was going to have a sitting with a medium at that time or any known time. If in these circumstances there can nevertheless be communication, we may well be at a loss to suggest from what individual the information proceeded. It should be noted that there are hundreds of cases recorded with care where we have the same dilemma; indeed the only difference between this and the other cases is that this case happened to me, and therefore as far as I am concerned stands in a different category. For the reader this difference does not hold good, so that he can go for confirmation or fortification to the very considerable literature all of which may be as convincing or more so than my personal experience.

We are left with the duty of facing the fifth possibility. How must we frame it? Must we suppose that the dead man returned and stood by the medium and indicated in some way or other the significance of the name Dorrie? By no means. We are only at the beginning of our troubles. One of the reasons why the trained mind recoils from this subject is that the facts are so often combined by spiritualists and others with extremely naive theories. There is no reason to accept uncritically a spiritualist explanation any more than there is reason to suppose that the clairvoyant reader of tea leaves or crystals or palms really gets her information from those external objects.

Those who lean towards a survival explanation will be able to point out that the piece of information chosen for the communication is precisely the sort of trivial detail which might be chosen by an entity wanting to prove not only its persistence but its identity. For consider, Mrs M. grieving for the death of her father-in-law has become interested in survival not as an abstract problem, but in *his* survival. I have said that I will try to get a message from him. The medium has been told that such a mes-

sage from a definite person is wanted. A message seems to come from that person, and it is a message of precisely the sort which is most personal between the living woman and the dead man.

I have concentrated on one part of the medium's message, because the item, "Dorrie," is so outstanding and so obviously not to be explained by chance that there could not be any point in trying to subject it to statistical quantitative experiment. Such an experiment, it cannot be too often repeated, has only one value, namely, that it may rule out the null hypothesis. If the evidence is such that nobody is likely to imagine a chance explanation there is no point in seeking to rule it out mathematically, or in regretting that such a procedure cannot be devised.

But "Dorrie" was not by any means the only remarkable item in the "message." There were other items which contributed in a secondary manner to its significance as a whole. These include the following: (on the left-hand are the items given by the medium, on the right Mr M's comments later).

1. A grave man	Yes
2. Clipped moustache	Yes
3. Blue eyes	Yes
4. Aged at death about 68	69
5. The name Ross in connection	Ross was the name of his steward when he was master of the S.S. *Harlow*
6. Daughter-in-law could be about 40, or any age from 30–40	37
7. Despondency over his son, who is cold but brilliant and somewhat reckless	Yes. He was upset a month before he died when his eldest son emigrated without telling him his plans
8. He walked upright	Yes
9. But I note there was a limp which later may have caused him much pain.	He had a limp caused through being blown up with his ship during the First World War. He suffered bouts of pain, due to the effects of exposure, during the whole of his life after being blown up.

Here are nine items of varying significance but all right. There was one item definitely wrong, one uncertain, ten trivial or unverifiable *and the pet name Dorrie.* Which of the five explanatory theories possible does the reader prefer?

I repeat, I give this episode because it happened to me personally and therefore it must have for me a particular significance. Yet I confess that in spite of all the thousands of equally convincing and even more convincing evidential reports in the literature in addition to my experience I am still unhappy about choosing between the fourth and fifth of the possible theories. I am too much the victim of my intellectual environment to find survival an easy explanation and universal telepathy is almost if not quite as offensive to my presuppositions.

If this is true of me though I have had personal experience of a fact which suggests the probability of survival and of communication with the dead, how much more true will it be of anyone who has not had such an experience?

§4. *Arguments againt Survival*

For those who have had no experience which affords scientific evidence of survival, it is probably best to begin by reading two papers both of which in their different ways argue against the possibility of survival. If the reader wants to prepare his mind for an honest acceptance of fact, or rejection of pseudo fact, he had better know first whether there are strong *a priori* reasons for believing that no such facts can or could exist. If after reading these two authors he can still feel that there are no such *a priori* reasons he will be the more open to recognize facts and his final judgment will be based on scientific principles which no one can claim are mere wish-fulfilment.

The first paper is by Professor E. R. Dodds: "Why I do not believe in Survival," published in the *Proceedings of the S.P.R.*, vol. XLII, p. 147. Here we can read the *a priori* arguments which lead its author to range himself intellectually against survival. Anybody who believes or wishes to believe in survival should know these and be able to answer them. I preface my analysis of this paper by saying that though I cannot accept personal sur-

vival on the strength of facts known to me, I cannot see the force of Professor Dodds' objections.

Professor Dodds' first argument is founded on his difficulty in imagining pre-existence. If there is life after death, he says, then there must also be the influence of prenatal experience working to fashion the new-born babe. This Professor Dodds does not find, but we simply do not know anything about pre-natal life and its relations with this life, or indeed whether it exists, and there is no good to be derived from using one unknown to discredit another unknown.

Professor Dodds' second argument is that an infant should be born with a mature mind if it has had a pre-natal existence. But again there does not seem to be any over-riding necessity for this. There are many ways in which the infantile nature of an infant's mind could be explained even if in any earlier existence it had been omniscient. For instance, the infant's brain is certainly infantile and if all that we know of its mind is what can be manifested through its brain, the fact, if it is a fact and if it needs an explanation, is sufficiently explained.

His third argument is that he cannot envisage an "act of incarnation" which could incorporate a pre-existing mind in the embryonic body. But once more it is hard to see why our ignorance of one hypothetical possibility can throw any light on another, nor yet be used as an *a priori* argument against another. Surely Professor Dodds' argument from the incomprehensibility of this "act of incarnation" could be used to invalidate almost any biological event. Do we *understand* how the fertilizing of a single cell can give rise to a mature human being? Do we *understand* how a mind can interact with a body? Only in so far as we can get evidence in general consistent terms. If we could find some fragmentary evidence for pre-natal existence we would understand it that far and no further. And, for all we know, we shall get such evidence in time when we have learned where to look for it. And if the evidence for such existence is forthcoming we shall have to accept the "act of incarnation" whether we understand it or not.

Supposing there is a pre-natal life, the only difference between the change from it to this one and the change from a chrysalis to a butterfly is that we have visual evidence of the latter, but not of the former. Therefore we say we "understand"

the metamorphosis of insects, meaning we can trace a succession of causal relationships. If we have no facts about the change from a pre-existence to this, and no facts about pre-existence itself, then these are not subject matter for scientific speculation; and still more they are certainly not material for *a priori* judgment. "Because I know nothing of pre-natal existence I can deny *a priori* alleged facts of post-mortem existence" is certainly an invalid way of reasoning.

Moreover, there are reasonable hypotheses by which Professor Dodds' objection can be met. Professor Broad himself in another context suggests one such way. For reasons we shall later consider, he favours a theory that what survives is not a mind, but a "psychic factor" which in combination with a living brain makes up a mind. He calls this the Compound Theory and says that the theory "has certain advantages for those who favour the theory of metempsychosis" or reincarnation.

"Instead of a single mind which animates a successive series of organisms we should have a single psychic factor which combines with a series of organisms to form a successive series of minds. There might be intervals during which a psychic factor has become dissociated from an organism which has died and has not yet entered into combination with an organism which is about to be born. During such intervals this psychic factor might produce these abnormal phenomena which the ordinary Spiritualist takes as evidence for the survival of a certain human mind. I do not know of any facts which strongly suggest metempsychosis; but it is a possible theory and it has the advantage of dealing with the "origin" of the mind at conception as well as with the 'end' of the mind at death."

We note that these last words sufficiently deal with Professor Dodds' *a priori* argument; but we also note that none of this sort of reasoning gets us very far until we have *facts* on which to base our conclusion.

Professor Dodds' next argument looks at first to be more substantial. If the dead live and want to communicate with the living why have they not done so until very recently? It seems strange, assuming that the universe, and life in it, have a "plan," that so important, so essential a factor as communication between dead and living should be confined to the last moment of history.

But there is an easy answer to this. French has existed as a

language for hundreds of years; my son learned to understand it about fifteen years ago. If we have not had communication with the dead until recently, and if we are now having it, the reason could be that we have only just learned the symbols in which that communication has to be clothed. Alternately, the dead have only just begun to be interested in communicating with us. Apart from these there is quite a possibility that Professor Dodds is mistaken and that there has been communication with the dead for far longer than he suggests.

If it takes time to learn two living languages, it is surely not surprising if it turns out to be even more time-consuming for the living to learn how to converse with the dead. Perhaps, too, it is only recently that a greater sense of responsibility, leading to a desire to help us in our increasing mess, has led the more charitable of the dead to bother to try and help us. One could doubtless think of a dozen reasons which would dispose of this argument for the simple reason that it is really no argument at all.

A similar argument advanced by Professor Dodds is that in earlier days exactly the same kind of mediumistic experiences were attributed to gods or devils; why should we now with any greater grounds for certainty attribute them to the spirits of the dead? Once more the ignorances of the past or the mistakes in interpretation, if such there were, are no *a priori* reason for rejecting the interpretations of today. This is a matter for factual analysis and not for *a priori* speculation.

Finally Professor Dodds, referring to the phenomena of the ageing mind, suggests this may be due to the wearing out of the brain, in which case we have, he thinks, proof that the mind is so dependent on the body that it is unlikely to have a separate existence; or alternately there may be an ageless mind which does not grow old, in which case it is unlikely to bother much about communicating with what it knows to be transitory.

It is probable that such *a priori* reasons will have no effect on anybody except on those who have already made up their minds, either on the facts themselves or for emotional and temperamental reasons, that survival is not a fact. To anyone with an open mind there is not likely to seem anything compelling about them. They are the sort of opinions, however, which may perform a useful function if they encourage us to examine the facts themselves with considerable care.

It is only fair to add that Professor Dodds has examined the facts with great care and that his attitude in no way resembles the average orthodox scientists' attitude which arrives at a decision on survival without examining the facts at all.

If we now turn to Professor Broad's treatise *The Mind and Its Place in Nature*, we find that he does not mention any of Professor Dodds' *a priori* reasons for denying survival. Broad is quite certain that there is not a shred of evidence *for* survival in everyday experience. He analyses both the ethical reasons and the empirical reasons on which most people base their belief in it and denies any value to any of them. When, however, he turns to consider the opposite side of the question, he can only suggest two *a priori* reasons for denying survival and neither of them seem to him very strong.

The first is "the haphazard way in which men are born and die. Human beings are constantly brought into the world thoughtlessly and by mistake; many children live for a few minutes or hours and then die; many are born idiotic. The general impression produced is that the claim to permanence for creatures whose earthly lives begin and end in these trivial ways is somewhat ridiculous. An unwanted child is produced, let us say, in a drunken orgy; and in six weeks dies of neglect or is killed by its mother. Does it seem likely that a being whose earthly career is started and stopped by such causes is a permanent and indestructible part of the universe, or indeed that it survives the death of its body at all?"

This argument must have been heard repeatedly by most of my readers, but Dr Broad rejects it absolutely. It introduces what may be a very superficial value judgment into a question of fact; superficial because nobody can be sure that "the complete conditions of so singular an event as the manifestation of a new mind through a new body are contained in the material world."

It is of a piece with the argument which has seemed very strong in my own mind against *personal* survival. In early childhood I was made miserable by the hymn, "On the Resurrection Morning." It speaks of father, mother, sister, brother meeting once more. I took it very personally and I still do. I find it hard to imagine the meaningful meeting of a father who died at thirty when I was three, a brother who died at nine months, and a mother who died fifty years after her husband, at eighty-six. It

is of no use saying that these age differences are irrelevant; that the personalities will meet without hindrance from such mundane differences. A man of thirty, his wife of eighty-six, and an infant of nine months meeting without their age differences may be survival, but it is not in my mind *personal* survival. The three will not recognize one another by their personalities. However, there are excellent answers to such *a priori* doubts as these, one of them blessed with the *nihil obstat* of orthodox religion. But all this is outside our present subject.

The second argument is that since man is continuous with the animal creation why stop at human survival? Of course many believe implicitly in the survival of their pet dogs and cats, but what about, say, earwigs?

Dr Broad says that this argument presupposes that obviously earwigs are mortal and it can therefore be met in two ways. On examining the question of the mortality of earwigs we may find that our reasons for assuming it are invalid. Or we may find that our reasons for assuming the mortality of earwigs are in no way appropriate to the question of man's mortality or survival.

"Now", continues Dr Broad:

> "The argument from continuity makes against the probability of human survival, only on two conditions: (1) There must be some reason (and not a mere prejudice) for thinking that the survival of the lower animals is very improbable. And (2) this reason must not be the presence of some characteristic in the lower animals which differentiates them sharply from human beings. For, if our only reason for thinking it very unlikely that earwigs will survive be some characteristic in which earwigs differ profoundly from men, it will be perfectly consistent to think it likely that men will survive and that earwigs will not. The existence of a continuous series of intermediate forms between earwigs and men will prove nothing except that there are certain intermediate cases in which the probabilities for and against survival are about equally balanced. And there would not be the least trace of inconsistency in the position of a man who should be practically certain that earwigs are mortal and human beings immortal but should be quite unable to make up his mind about cats or kangaroos. Now, so far as I can see, these two conditions are never both fulfilled. The alleged reasons for thinking it very unlikely that earwigs are immortal either are no reasons at all or they

obviously depend on characteristics in which human beings and earwigs differ profoundly. Hence I doubt whether the argument against the probability of human survival, drawn from the continuous series of living forms between man and the lowest animals, has any logical validity."

So much then for the *a priori* arguments for and against survival. As we have seen, they leave the matter an open question to be settled by facts alone. I have not discussed one type of *a priori* argument, the so-called ethical argument for survival because it seems to have even less to be said for it than the others. Some people believe that there must be "another life" since otherwise the unequal lot of people in this world would be so unjust. But there is neither factual evidence nor compelling reason for supposing that life or the universe is "just." All forms of this argument may not be as vulgarly shallow as the "pie-in-the-sky-by-and-by" form, but one feels about it as the rich man did who, when the beggar protested that, after all, he must live, replied that he did not see the necessity.

"The world then," Dr Broad sums up, "as it presents itself to commonsense and everyday experience, offers no positive reasons against human survival. The only reason against it is the utter absence of all reasons for it; and we have seen that this is not a strong argument in the present case."

§5. *Survival is an Open Question*

To sum up then: there are no compelling reasons for or against a belief in survival and so we must pass to the field of scientific research proper: that is, to the discovery, collection and interpretation of facts. Are there any facts which give us grounds for deciding the question one way or the other?

And first let us pause to consider the semantics of the problem; though, as I have said, definition comes at the end rather than at the beginning of most scientific inquiry. What do we mean by survival? There are three quite separate things which the reader may have read into that word, but which should be carefully distinguished and given separate names. Let us call them persistence, survival and immortality. There are then three

quite different questions: Does the human being persist after death? Does he survive? Is he immortal?

I rule out the last question at once. Science cannot deal with anything that involves any kind of infinity. It deals of course with such things, as the indestructibility of matter, or the conservation of energy, but only so far as these are equated to a fixed and ascertainable time scale. We may say indeed that immortality, like infinity, is a fiction useful for certain purposes just as the $\sqrt{-1}$ is useful; but nothing very valuable can be said about them by scientists, or indeed, I think, by anyone else. And certainly even if evidence could be found for a future life, it would be quite impossible to find evidence as to whether its duration would be only as long as, or longer, or infinitely longer than this life.

Persistence on the other hand is something that we know exists physically at least. The body persists after death; does the mind persist apart from and in a way different from the body? If we find facts suggesting that something mental continues after death, but not a complete mind or a personality, we might call this persistence, and retain the word survival for the continuance of the individual consciousness. There are then two possibilities for which facts may be found, persistence and survival, and, as we shall see, it is important to distinguish carefully between the two.

And now what are the facts? For the most part they consist of supposed evidence of mental intercourse between a living person and a dead person. Usually this evidence is derived from a medium or sensitive person, either in a normal state or a state, of trance. As we have seen, there is overwhelming evidence that telepathy between two living people exists, and therefore, in order to obtain evidence of persistence or survival, all possibility that such telepathy is the explanation of a given fact must be ruled out. This is the most difficult problem in the whole scientific study of survival and it is at present not absolutely certain that it can be successfully surmounted. We saw the difficulty in deciding between explanations four and five in my introductory example of this type of evidence.

However, we must be careful to avoid the logical error of supposing that since much of the evidence obtained through these sensitives can be shown to be telepathy between living minds, therefore all the evidence must be this. We must not be

tempted into this error even by the fact that credulous spiritualists will always claim as evidence for survival matter which can quite obviously be more easily explained by telepathy, and indeed matter which can be explained quite easily by something very different from either telepathy or survival.

There is an economic law which says that debased coinage always drives sound coinage out of circulation. I am afraid that much the same kind of law affects the evidence for survival. Those of my readers who have ever been offered evidence for survival have most probably encountered evidence which could only satisfy gullible but, no doubt, kind-hearted and sincere nit-wits. This sort of thing has driven the rare good evidence out of circulation, because anyone with high intellectual standards who is subjected to it, will refuse to take further interest in the subject, leaving only those who will swallow anything to circulate the debased evidence.

I will give a few examples, prefacing them by saying that it is not isolated examples but the accumulated weight of thousands of cases that really carries conviction to those who are convinced.

§6. *Mrs Piper*

Let us first look at the evidence which convinced Mr Richard Hodgson, one of the most careful and sceptical of psychical researchers. Hodgson had done good work exposing Madame Blavatsky's frauds in India and the frauds of several mediums elsewhere. When, in America, he was given the task of investigating the celebrated Mrs Piper, he began in a mood of complete scepticism and intending to find out the fraud and expose it. He had Mrs Piper followed by detectives to see if she made a practise of gathering information about sitters which could later be used in her séances. He took every possible precaution to avoid any kind of leakage of information about sitters by normal means. Sitters came anonymously and were trained not to give away information when Mrs Piper's trance controls "fished," as they often did.

In 1888 a young man, known in the records as G. P., had a sitting with Mrs Piper. As always, complete anonymity was

maintained. At that time Mrs Piper used to go into a trance during which she was "possessed" by a spirit which claimed to have been a French doctor named Phinuit. Whether we suppose Phinuit to be a real spirit or a "secondary personality" of Mrs Piper's does not matter. He would speak to the sitter and, amid a good deal of nonsense, and some dishonesty, produced information which certainly Mrs Piper herself in her waking moments could not possess. Whence it came is anybody's guess, but Phinuit was a most conspicuous character, who had forgotten his French and knew nothing about medicine.

Let me say at once that all this might obviously be a mere piece of play acting. Careful observation had established the scrupulous honesty of Mrs Piper herself and also that she was quite unaware of everything that happened during the trance state. The reader may assume, if he prefers, as most of us do, that Dr Phinuit was a detached piece of her own mentality with as little objective reality as a figure in a dream. This makes no difference to the essential question: did the *soi-disant* Phinuit provide any evidence of a paranormal nature, whether involving telepathy from another living person or from a dead person?

G. P. was not at all impressed with his sitting with Mrs Piper. He put down any apparently correct information to some kind of hyperaesthesia. He thought Mrs Piper might be able to hear unconscious whispering or gather information from him through her senses in some such way.

Four years later G. P. was killed in an accident. Mrs Piper did not know of this and would not have been interested if she had known, as she had never heard G.P.'s name and saw him only on that one occasion.

A few weeks later Hodgson accompanied a friend of G. P.'s to a sitting which, as usual, was held anonymously. Mrs Piper neither knew the friend's name, which we will call John Hart, nor that he was a friend of anyone who had ever visited her. Mr Hart had brought some articles belonging to the dead G. P. with him. After some of his usual mixture of right and wrong statements, Dr Phinuit said there was a spirit named George wanting to speak to the sitter. George then began to speak. He gave his name as G. P., he gave the Christian names and surname of the sitter, John Hart, and the names of several of their friends.

John Hart handed Phinuit (or Mrs Piper entranced) a stud he

was wearing which had been given him by G. P. "That's mine," said the voice, "I gave you that part of it. I sent that to you."

"When?"

"Before I came here. That's mine. Mother gave you that."

"No!"

"Well, father then, father and mother together. Mother took them. Gave them to father, and father gave them to you. . . ."

Mr Hart noted afterwards: "The studs were sent me by Mr P. in remembrance of his son. I knew at the time that they had been taken from G'.s body, and afterwards ascertained that his stepmother had taken them from the body and suggested that they would do to send to me, I having previously written to ask that some little memento be sent to me."

Thus began a series of happenings which lasted some years. Very soon G. P. ousted Phinuit as Mrs Piper's control and took over directly and from that moment the quality of Mrs Piper's work improved immeasurably. Out of one hundred and fifty people coming to Mrs Piper (all anonymously) G. P. recognized and gave the correct names of thirty personal friends and never once gave a false recognition. "Of a large number of sitters who went as strangers to Mrs Piper," wrote Hodgson, "the communicating G. P. has picked out the friends of G. P. living, precisely as the G. P. living might have been expected to do, and has exhibited memories in connection with these and other friends which certainly do not suggest in themselves that they originate otherwise, and which are accompanied by the emotional relations which were connected with such friends in the mind of G. P. living."

On one occasion while Phinuit was still functioning, he was asked by Hodgson to send G. P. away to watch a friend, Mrs Howard, and to report what she was doing. Hodgson had written to Mrs Howard asking her to be sure to make a note of any odd thing she was doing at the time. Phinuit announced that G. P. had done what was asked and gave a minute description of Mrs Howard's doings, which Hodgson sent her. He got the following reply: "I did *none* of those things today, but all of them yesterday afternoon and the evening before!" This seems to suggest that G. P. could get information about everyday happenings, but that he had lost his time sense.

Hodgson points to this and other partial mistakes as evidence

that G. P. was really a separate being and not a secondary personality of Mrs Piper; for he could only get facts accurately when there was an emotional feeling between himself and the living persons involved, and he often failed when test questions were set which had no emotional factor in them. Why should a secondary personality of Mrs Piper make mistakes about the time-element, or when there was no emotional element? Yet this is what one might expect of a disembodied spirit.

The reader must understand that these are but a few shreds taken from a three hundred page report. In that report he can find all the minute precautions taken to prevent any kind of fraud on the part of medium or sitters. He will see that much that came from G. P. can be explained, fraud being eliminated, as a transfer of information from the sitter's mind to the entranced Mrs Piper, but he will also find much that proved true although the sitter did not know it. In this case we can still explain things by telepathy, but only if we extend the possibilities of telepathy to an almost incredible extent. Mrs Piper in trance must be able to ransack the minds of all sorts of people who have never been near her or the sitters or Hodgson. In that case it is doubtful, I repeat once more, whether telepathy between the living can really be regarded as a less complicated hypothesis than communication with the dead.

Even so there remains a certain residuum which no extension of telepathic powers seems able to explain. Particularly odd is the fact that personal friends felt that they were actually talking to G. P. not merely because of any information he gave, but because of his mannerisms, his mode of expressing himself, the minor idiosyncrasies which go to build up an individuality. None of these could Mrs Piper have invented, waking or in trance, since you cannot imitate a person's idiosyncrasies if you have never known the person.

For all these reasons there are people who find the episode of G. P. and the whole accumulated evidence of Mrs Piper's long mediumship sufficient to give them a belief in survival, even though a strict proof of survival cannot be claimed for them. Among these are many conspicuous for their lack of any excessive will-to-believe, including Hodgson himself, in whose case scepticism about survival was certainly stronger than credulity.

Those therefore who wish to take a scientific view of the

question of survival are bound to examine the thousands of pages in the *Proceedings of the Society for Psychical Research* and elsewhere which are devoted to careful study of Mrs Piper's life-work. In the end, belief depends in part on temperament, and one man's meat is another man's poison, intellectually as well as physically; but a dogmatic denial of the possibility of survival is not worth anything unless the speaker has taken Mrs Piper into serious consideration and found a simpler theory to account for her.

It is certainly not possible here to give even the barest epitome of the vast mass of evidence published by the Society for Psychical Research and other reputable groups of investigators, evidence which has to be traversed by anyone who denies the possibility of survival on rational grounds. Anyone seriously interested in assessing this material has only to apply to the Society for a list of its publications.

However, a word must be said about the particular material which is generally believed to have influenced Mrs Sidgwick to admit to a belief in survival and communication with the dead. There has recently died a remarkable woman, Mrs Croombe Tennant, distinguished over a number of years for her public services, notably as the first woman delegate to the League of Nations Assembly. After her death a well-kept secret was revealed. Mrs Tennant was the remarkable medium whose identity had been carefully hidden under the name of "Mrs Willett."

Mrs Willett, for all her intellectual achievements, had no training either in classics, philosophy or psychology and yet she developed the ability to produce, chiefly by automatic writing, profound studies involving all three branches of knowledge. These automatic scripts purported to come from the disembodied personality of F. W. H. Myers and others of his group. They describe the way in which a number of dead psychical researchers are trying through Mrs Willett, not merely to find means of communicating but of explaining the methods involved.

We are here at the opposite pole to the childish *naiveté* and rather revolting nonsense which seems to satisfy too many spiritualists. What Mrs Willett's scripts give us is an approach,

to appreciate which considerable philosophic training is needed. Lord G. I. Balfour's profound study published by the S.P.R. in their Proceedings, 1935, Part 140, is a bewildering document. Even those who will not accept any such origin as Myers beyond the grave must be hard put to it to explain how the material ever emanated *from* or *through* Mrs Willett's mind. If I were to recommend one publication only to all those interested not necessarily in survival but in the mere composition of the human mind as such, it would be this.

In the present state of the scientific investigation into survival we can do no more than state the kind of evidence which has satisfied careful and skilled investigators that survival is a proven fact, and indicate the lines upon which those who still remain unconvinced but open-minded hope to advance. Throughout history there have been phenomena reported which would tend to strengthen the case for survival but in almost all cases these reports do not contain the necessary strict attention to evidential needs without which they are worthless to the scientifically minded. For instance there are numberless cases where people have been seen, if we are to believe the witnesses, in two places at once. If this can be proved to have happened, we have evidence that a part of a person can exist, visibly and actively, away from their physical body. This would strengthen though not directly prove the possibility of survival. In most cases the reports come from pious people, predisposed to believe anything "miraculous" and innocent of all philosophic or scientific doubt. They can hardly be blamed therefore for presenting their evidence in a way which to us seems notoriously defective.

Typical is the account of Sor Maria of Agreda, the remarkable woman who virtually dominated the mind and will of Philip IV of Spain. She never left her convent in the wilderness of Aragon but she is reported to have been seen preaching to Central American Indians. The account is worth reading for its romantic if not for its scientific value. Hundreds of Indians came in to the Spanish missions from parts of the country which had never been penetrated by a European, so well instructed in the Christian faith that they were ready for immediate baptism and confirmation. Asked how they had learned the Christian religion they described minutely the physical appearance of a nun, exactly like Ser Maria, who came and went, teaching and persuading,

at times when the abbess was known to be praying in her Agreda convent for the conversion of the Indians.

Such a story of bilocation is lightly dismissed when scientific discussion is attempted, so long as no evidence worthy of credence can be given; but if in certain cases there would seem to be sound evidence for bilocation we have less right to dismiss summarily all the hearsay cases. They were badly reported from our point of view no doubt, but bereft of the bugbear of "antecedent improbability" they would be less repellent; and one well-authenticated case is all that is needed to remove "antecedent improbability."

Is there a well-authenticated case of bilocation? There are several, of which one may be quoted in an abbreviated form (from the *Proceedings of the S.P.R.*, vol. VII, p. 41):

> I sailed from Limerick to New York on the steamer *City of Limerick*. On the second day out a severe storm began. Upon the eighth day the tempest moderated and for the first time I enjoyed refreshing sleep. I dreamed that I saw my wife, whom I had left in the United States, come to the door of my state room, clad in her night-dress. At the door she seemed to discover that I was not the only occupant, hesitated a little, then advanced to my side, stooped down and kissed me.
>
> Upon waking I was surprised to see my fellow traveller, whose berth was above mine, but not directly over it—owing to the fact that our room was at the stern of the ship—looking fixedly at me. "You're a pretty fellow," he said, "to have a lady come and visit you in this way. I pressed him for an explanation; he related what he had seen while wide awake lying in his berth. It exactly corresponded with my dream. He was a sedate and religious man whose testimony upon any subject could be taken unhestiatingly.
>
> The day after landing I went to Watertown, Conn., where my children and wife had been for some time. Almost her first question was, "Did you receive a visit from me a week ago Tuesday?" "A visit from you?" I said, "We were more than a thousand miles out at sea." "I know, but it seemed to me I visited you." "It would be impossible. Tell me what makes you think so."
>
> My wife then told me that on account of the weather she had been extremely anxious about me. She had lain awake thinking of me and at about 4 a.m. it seemed to her that she went to see me. "Tell me," said she "do they ever have staterooms

like the one I saw, where the upper berth extends further back than the under one? A man was in the upper berth, looking right at me, and for a moment I was afraid to go in, but soon I went up to the side of your berth, bent down and kissed you."

The description given by my wife of the steamship was correct in all particulars, though she had never seen it.

This account is accompanied by adequate *pieces justificatifs* and is considered up to the rigorous standards required by the S.P.R. If it is to be accepted, then we must either decide that telepathy in people under stress can conjure up hallucinations of a structure which enables a third person to see them, or that bilocation is a fact though exactly how it works we do not know. Whichever we decide, we must look more charitably on the innumerable cases of bilocation less well reported by people whose object in reporting them was not scientific proof. Furthermore, if bilocation is possible, then we have evidence that there may be a part of the personality which can exist apart from the living body and perhaps apart from the dead body also. More than this we cannot accept, though the convinced believer in survival will do so. Thus "It is no exaggeration," wrote Mr Andy Collins, "to say that if the externalization of consciousness and conscious projection are accepted as facts, the whole edifice of materialism falls to the ground and survival after death actually becomes probable." This perhaps goes too far but at least we can say that we have another category of facts to add to the mounting pile which seem to put materialism gravely in doubt and in particular to demand an open mind on the possibility that mind can survive the body.

Even so we are only at the beginning of our problems. Even if something, a psychic factor, a portion of mind-stuff released from temporary contact with an individual brain, an etheric body, a bodiless soul—call it what you will—survives, this is a long way from having evidence of true personal survival. Indeed at present it would probably be correct to say that such evidence as we have suggests that most of what we call personality is so attached to patently evanescent things that its survival when these have vanished is hard or indeed impossible to conceive. It has been well-observed that if nothing but a wife's sterling qualities or immortal part untouched by transient things were

to survive, few husbands would be able, or indeed would wish to recognize it or her.

We may be on firmer ground for the next stage of our inquiry if we humbly accept the fact that oriental psychology may well be in advance of our own in these matters. It may be that the one thing that cannot survive is personality and that our salvation lies in this very fact. But one thing at least is certain, the facts, little as we may understand them, give no grounds for supposing that nothing survives death. Just as a man's hair and finger-nails continue to grow quite a long while after his heart and brain have entirely ceased to function, so something associated with consciousness and capable of thought seems also to continue an obscure functioning.

It may be that the assertion which is usually so hypocritically made, that death makes no difference, is true; that at least we exaggerate its effect as far as certain mental things are concerned, largely because the things obviously affected by death seem so overwhelmingly important to all of us.

These questions may one day be answered. We have not yet reached that stage in our growing knowledge. We have, however, reached a stage where it is no longer possible to ignore well-observed facts. Indeed it is doubtful if the mere accumulation of more facts will contribute much of value, except as revelatory experience to the individual. What we want, and entirely lack, is a theory which fits the facts into the sum total of our knowledge of life and the universe.