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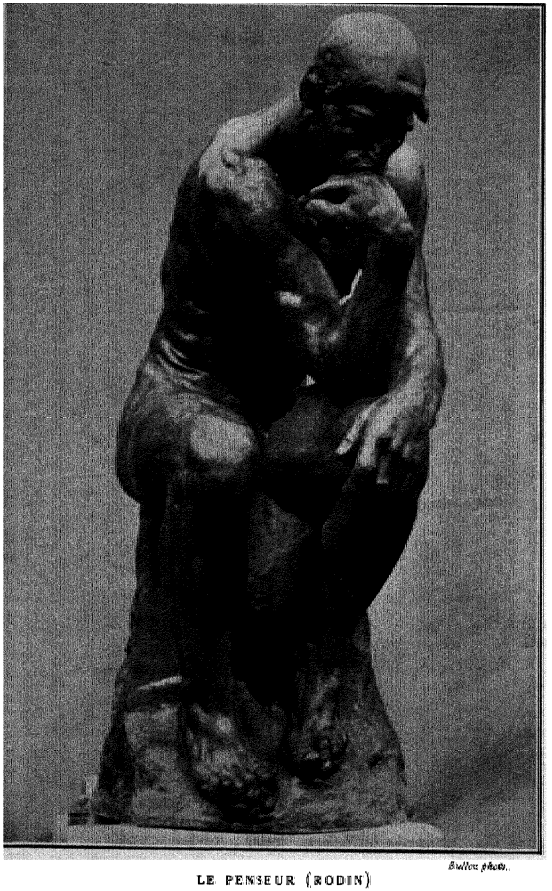
THE PROPER STUDY OF MANKIND



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LE PENSEUR (RODIN)

THE PROPER STUDY OF MANKIND

BY

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HEAD MASTER, ADDEY AND STANHOPE SCHOOL

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PREFACE

DESCRIBED in a sentence or two, this book is an attempt to do two things. First, to give adolescent boys and girls some conception of Man as an evolving being, and to indicate the way in which his body, his mind, his religion and his social organisation have all developed through the ages. Secondly, against the background thus provided, to suggest the attitude of mind which gives most hope of solving the many problems which press hardly upon man to-day. A full account of the reasons which have led me to combine these aims is given in a separate booklet, written for the use of teachers, and obtainable from the publishers. But a brief statement is desirable here.

The book has grown out of a course of lecture-discussions given, once weekly throughout the year, to the VIth Form of a London secondary school. I gave the lectures, the Form was responsible for the discussions; I then revised the lectures in the light of the discussions. This Form contains boys and girls whose ages vary from sixteen to eighteen years, who are approaching the end of their school course, and who are devoting the greater part of their time to specialised study in either the humanities or science. I am quite in agreement with the usual view that there should be some amount of specialisation at the top of a secondary school, but it has always seemed to me essential that, if boys and girls of this age are to attempt even the rudiments of specialisation, particular care should be taken to prevent their interests from becoming narrowed, and to keep their outlooks as wide as possible. An effort should be made, in other words, to encourage the growth of some kind of philosophy of life—not indeed by expounding to boys and girls the teacher's philosophy (which may be a good one for him but a bad one for them), but by helping them to get some acquaintance with those broad facts of human experience

out of which an educated person will eventually construct his own philosophy of life.

I have tried therefore to work out with my own classes a course which would present those facts, not dogmatically but in such a way as to encourage discussion of them; which, while covering a wide range of topics, would relate those topics to each other in such a manner as to create some sense of the unity of knowledge; and which would have a definite bearing upon the attitude these pupils would adopt to the problems of citizenship confronting them when they leave school. (For every pupil they send on to the university, schools send five or ten out into the world.) And above all, in working out the course I have tried to arouse some sense of that linkage of past and present, a realisation of which is essential to a proper understanding of the problems, whether social, political or scientific, of modern life. This book is the result.

The book, I am glad to say, fits no examination syllabus whatever. Examinations have their place; but twelve years' experience as an examiner has not imbued me with any desire to bring the whole of a school curriculum under their influence. If this book does anything at all to encourage a broader outlook upon life in some of the people who read it, I shall not be disturbed by the knowledge that it has not directly helped a single boy or girl to obtain a Higher School Certificate. I hope it will have done so indirectly. But there are things in life which are more important than examinations.

The book is so wide in its scope that it ought really to have been written by someone who is at once a philosopher, an astronomer, a biologist, an anthropologist, a psychologist, a theologian, a historian and a sociologist. And if anyone thinks that this implies a bigger cargo than any one man is likely to be able to bring to port, let him visualise the alternative, which is that the separate chapters should have been written by different specialists. And that would have been

fatal to the object of this book, which is nothing if it is not a unified whole. It is a book, not an encyclopaedia. But I am well aware of my own limitations; and I know that the most I can hope for is that any astronomer into whose hands this book may happen to fall will think that I must be a psychologist, and that a psychologist will suppose that I am a theologian. So perhaps it will be better to state at once that I am none of these things, that the book is largely derivative, and that in some of the subjects discussed I can only claim to be, as the anatomists say, "one bone ahead" of my pupils. My point of view is simply that of a teacher; and the book has been written in the hope that it may stimulate other teachers and their pupils to attempt similar work in a better way.

My medicine, however, has perhaps this to recommend it, that it has been tried on the dog. When the dog became sick (he often did) I altered the prescription a little and tried again. This book merely represents the latest version of the prescription, arrived at after some years of experimenting. No one knows better than the author that it is not the final one.

A word of caution should be added. My own pupils are so accustomed to seeing me make mistakes even in the subject in which they suppose me to be a specialist that they have no temptation to take my statements too seriously when I embark upon a wider subject matter. They are unblushingly sceptical of many of the opinions I offer. That is what I would have them be. But other readers ought to be warned that this book is suggestive rather than authoritative, and that though I have done my best to be fair to all points of view I have certainly made many controversial statements. This is so obviously the case in the chapter on religion that it was with considerable hesitation that I committed it to paper at all. I would not have done so but for the feeling that to omit religion entirely would be to stultify my whole scheme. The reader should regard that chapter

merely as one man's view of a controversial but vital subject, and should think of it as a challenge to himself to examine the reasons for his own faith.

I have to acknowledge much valuable help given me by many colleagues and friends. The book was never discussed with Mr Lowes Dickinson, but those who knew him will see how much it owes to his writings and will suspect a deeper debt. Sir Percy Nunn has read the entire manuscript twice and has allowed me to draw freely upon the fruits of his wide reading; every chapter of the book owes something to his encouragement and advice. Mr J. H. Simpson has criticised the manuscript from a different angle, and I have made some important modifications in consequence; Mrs M. M. Checksfield, Miss M. Clapham and Mr C. H. Dobinson, specialists in different subjects, have revised certain chapters from their own points of view. Miss C. C. Graveson, Miss A. M. Richardson and Mr J. W. Withrington discussed the plan of the book with me at an early stage and have detected various errors since; I am much indebted to all three. Miss Richardson has also verified all my quotations and has compiled the second Appendix. Finally there is Mr R. D. Morss, whose services to this book have far transcended those which an author has any right to expect of his publisher. The fact that my friends differ among themselves about some of the topics discussed in the book has made their criticisms all the more helpful and illuminating to me; but it also makes it desirable to remind the reader that an author's friends have no responsibility for the opinions he offers.

B. A. H.

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SYNOPSIS

I. MAN AND THE UNIVERSE

The different aspects of the study of man. Man is an organism which (i) grows; (ii) interacts with its environment. Evolution of man's physical environment: the stars; the sun; the earth; life on the earth; man. The relative insignificance of man: he is small; childish; lonely; mortal. The significance of man: his survival of an unfriendly environment; his intelligence; his self-consciousness. His attempt to understand the universe; scientific method; the abstract nature of science. Man the poet and the dreamer. Our final estimate of man's significance turns on a judgment of values.

II. THE GROWTH OF MAN'S BODY

The scientific atmosphere in the nineteenth century. Darwinism. The evidence for the theory of evolution. The method of evolution. The struggle for existence. Natural selection. Acquired characters. How mammals developed when they took to living in trees. Looking backward: the search for the 'missing link'—Javan Man, Piltdown Man, Peking Man. Looking forward: some speculations. Will man become extinct? How will he react to his new environment? Will he become more specialised? Will he become able to control his own future?

III. THE GROWTH OF MAN'S MIND

The concept of the body-mind. Brain; its functions. Animal behaviour. Instinct. The modification of behaviour. How intelligence differs from instinct. Man as

the outcome of 'generalised' instincts; his consequent need for shelter and training. The power of accumulating experience. Habit; custom; intelligence. The evolution of speech and of abstract thought. Man's tradition. Some present problems: the sublimation of instincts; creative impulses in modern society; the use and abuse of habit.

IV. THE GROWTH OF MAN'S RELIGION

Man has probably never been without a religion of some kind. Religion seems to express a fundamental need. The growth of religious ideas. Their gradual purification with the growth of man's intelligence. The subjective value of religion. Has it an objective value? This is a point which argument cannot decide, for belief in religion rests ultimately not upon an argument but upon an experience. The transcendent nature of the experience. Confusion of an intellectual doctrine and a spiritual experience. The difficulties of expressing the 'religion of the heart' in an institutional form. Some form of institutional religion may nevertheless be necessary. Men are often in the grip of religion even when they deny all its doctrines.

V. THE GROWTH OF MAN'S SOCIETY

The world-wide organisation of the Great Society. Modern man has lost his independence; the conditions of modern life make co-operation essential. The evolution of society from small groups and tribes: primitive barter and modern trade. Restriction of liberty an inevitable result of social organisation (though human beings would not be 'free' even as savages, for they acknowledge a moral law). The need for law; the dependence of liberty upon law; and the abuses of law. Looking forward: other kinds of organisation; the League

of Nations; international co-operation; the need for long-range planning.

VI. PROGRESS

The features of the human drama appear to be: change; change arising from the interaction between man and his environment; change in the direction of increased control over that environment; and mind influencing change. Progress in any age depends upon a small number of people, who themselves depend upon an inheritance from the past. The contributions of different civilisations to progress. Progress is neither automatic nor uniform, nor a movement in any fixed direction; but it is nevertheless a reality.

VII. AND VIII. THE USE OF MAN'S MIND

Man's mastery of his physical environment stands in sharp contrast to his failure to solve the problems of his political organisation. The difficulty of bringing intelligence to bear upon economics and sociology. Man is misled by

(i) his capacity for self-deception. He does not know how his mind works. His beliefs do not usually rest upon intellectual arguments; he constructs the arguments in an attempt to justify the beliefs;

(ii) his emotions. As emotion increases, the critical sense declines. Emotional thinking in politics and in time of war. The emotional tone of words;

(iii) his suggestibility. Press propaganda takes advantage of this weakness;

(iv) logical errors. Argument by analogy; its use and abuse;

(v) a confusion between observation and inference. The difficulty of telling the truth.

But intelligence is no more than a tool; man needs also ideals and courage. The deeper meaning intelligence can give both to ideals and to courage. It will convert a vague idealistic fancy into an informed idealism, will indicate the steps by which the ideal may be realised and will purify the ideal itself. It will also save courage from spending itself fruitlessly in policies of mere violence. The kind of courage which might transform the world.

I

MAN AND THE UNIVERSE

It is so soon that I am done for
I wonder what I was begun for.
Epitaph on a tombstone in Cheltenham Churchyard

"The stars", she whispers, "blindly run."
TENNYSON

Plato: What? . . . Do you suppose that nowhere else in the vast expanses of infinity, is anything at all that is alive?
Philalethes: We think it likely that our planet alone has the elements and the temperature and the gravity wherein and whereby life is possible.
Plato: Say rather wherein and whereby bodies like yours could come into being and endure. But do you conceive, you little men, that the subtle fire of life can inhabit no other integuments than those that so grossly close you in? Or that senses so few and crude as those you possess can prescribe how higher souls may live and have their being? No! the world is full of gods, ascending the golden stairs, although your feeble vision cannot see them. Rising out of the deep abyss, the long ascent of life reaches up into the heaven of heavens; and of that chain you, on your little step, are but one small link. For the whole universe groans and travails together to accomplish a purpose more august than you divine; and of that, your guesses at Good and Evil are but wavering symbols. Yet dark though your night be and stumbling your steps, your hand is upon the clue. Nourish then your imagination, strengthen your will and purify your love. For what imagination anticipates shall be achieved, what will pursues shall be done, and what love seeks shall be revealed.
LOWES DICKINSON

MAN AND THE UNIVERSE

I

A Dr T. E. Lawson has recently published an interesting prescription. If you take

> enough water to fill a ten-gallon barrel;
> enough fat for seven bars of soap;
> carbon for 9000 lead pencils;
> phosphorus for 2200 match-heads;
> iron for one medium-sized nail;
> lime enough to whitewash a chicken coop; and
> small quantities of magnesium and sulphur

you get, apparently, a Man. That is, indeed, what he is, or one of the things he is: a block of carbon, phosphorus, iron and a few more ingredients, bound together with a liberal dose of water. In individuals the proportions vary—a Mussolini, for instance, would perhaps have more iron; others may contain more soft soap. To make a man, you just mix these things together in the right proportions and in the right way. That's all.

An attractive theory . . .

A physicist would put the matter rather differently. He would say that man is, in part, an immense collection of minute electric charges, whirling round in complicated orbits; and that the rest of him, by far the larger part of his bulk, is mere emptiness. The chemist thinks of man as being chiefly water and the physicist thinks of him as chiefly a vacuum; and they are both right. It is true, for instance, that if man's

body were analysed in a chemistry laboratory, something like the above list of products would result. It would be far more difficult, but conceivably possible, to reverse the process, and by assembling these elements in the right way to construct a synthetic man. But there is one good reason why no one is likely to waste his time in attempting it. For the result would be a dead man. No one has yet constructed in a chemistry laboratory any form of life at all. It is only Nature's laboratory which has produced a living man.

Chemical analysis is a good servant but a bad master. Applied to the human body, it can find out some useful things; it can assist in the study and prevention of disease. But as a method of finding out anything about the essential nature of man it is almost valueless. It is researching in a field where its writ does not run.

We might as well ask the chemist to discover the real nature of a poem. His analysis will deal with the paper on which it is printed and the ink employed; he will find little difference between Blake's *Milton* and *The Vicar of Bray*. Another kind of analysis would be needed to bring out the difference; an analysis of metre, rhythm, style and content. But something would elude even that kind of enquiry. For the *value* of *Milton* depends on two things; what Blake was trying to express when he wrote it, and what it evokes in our minds when we read it; and that depends on the whole past history of our minds.

So it is with man. He is certainly a compound of carbon and iron; but he is more than that. He is also a bundle of inherited dispositions; a student; a citizen;

an artist; a shipwright; a statesman; and a dreamer. Some people regard him as an enterprising ape; others, as a fallen angel; still others think that both ape and angel are inextricably mixed in him, that he is at once a quarrelsome bit of protoplasm and the Image of God. Externally, he is a member of a complicated human society, eking out his living on the surface of a globe; internally, he is a mass of swarming fears and hopes. In short, he is a living thing. And as such he is in a state of flux; he is evolving; what he was once he is not now; what he is now he will not be a million years hence. This type of entity does not yield up its secrets under chemical analysis.

Man has been affected by his past environment, and changes under the influence of his present one; he is the result of age-long generations of travail. He has his roots in the past, and his past to some extent explains his present and foretells his future. We cannot begin to understand him unless we study his past. What are we to say about his civilisation unless we have some knowledge of how it has grown? And how can we see it in its true perspective unless we have some idea of the length of time it took to become established? What judgments can we make as to man's way of thinking unless we know how his ancestors thought? We know that we owe some of our roads to the Romans, but we forget that much of our thought derives from the Greeks; the texture of modern thought is shot through and through with Greek ideas. It is only the past which can give meaning to the present.

But man, as an organism, cannot be studied alone. All organisms have relations with the things outside

them; they interact with their environment. Man is always interacting with his, and is influenced thereby in a thousand subtle ways. Now man is a many-sided animal and as such has many environments; a material one, a mental one, a social one, a spiritual one. In practice they act on him simultaneously; we can only study them in isolation. And as the obvious environment is the physical one, our first step must be to look at that, and see in general terms what is known of the earth which man inhabits, and what its relation is to the rest of the external universe.

II

The earth on which man lives is in shape roughly a sphere, of diameter some 8000 miles, moving through space relatively to the sun at a speed of several miles a second. It rotates round the sun in an orbit which is nearly circular, and of mean radius about 93,000,000 miles; as it rotates it also revolves upon its axis, making one complete turn in twenty-four hours and thus causing the alternation of day and night. It has been in existence an almost unthinkable period, roughly estimated at 2000 million years. But, long as this period is, it is short compared with the age of the solar system of which our sun is a part, and to which astronomers, though they cannot speak with any certainty, are inclined to set an age of some 10,000,000 million years, or five thousand times as long. The earth is thus a comparative new-comer to the universe. Relatively to the solar system, it may be said to have come into existence yesterday.

We do not know for certain what it was that brought the earth into existence as a separate entity. But on the whole the most likely explanation is that its birth was due to an accident; that is to say, to a thing which does not normally occur. To see what may have happened we have to go back to a period in the far distant past when darkness was upon the face of the universe —when there was no universe, in the sense in which we understand the word to-day, when there was nothing but an immense number of small electric particles journeying through space. Apart from them, the world was "without form and void". In time these particles seem to have gravitated together round various centres; each collection of particles, which we call an 'island universe', containing the material for millions of stars. How many of these island universes there were, or are, we do not know; our system developed from one of them; others can be seen through telescopes to-day. None of the other island universes is nearer to us than

5,000,000,000,000,000,000,000 miles.

Even if we write this number as 5×10^{18} miles we are no nearer to grasping its significance. Astronomers, who traffic daily in numbers of this kind, have their own technique for expressing them. Light travels at the rate of 186,000 miles a second (that is, it could go more than seven times round the circumference of the earth in a second, and reaches us from the sun in less than nine minutes); the almost unimaginable distance it travels in a year is called a light-year. The distance given above is about 900,000 light-years. This means that, if we look through the telescope at this island universe to-day, what we are really seeing

is what it looked like 900,000 years ago, a period before man himself came into being on our earth.

Our solar system, then, has come from one of these universes. There seems to have been a further gathering together of the electric particles into, first, clusters, and then separate stars. In our own system there are some 10,000 millions of them. Our sun is just one of these. It appears much bigger than any of the others only because it is so much nearer to us than they are. Actually, it is very similar in size; there is an upper limit to the size of any star above which it has a tendency to split. The force of gravitation operates to collect the original nebulous material round a centre, but radiation-pressure prevents the collection from becoming too big. The mass of the sun is 2×10^{27} tons, and most stars have masses of about this size. Like the other stars, our sun is immensely hot; its surface temperature is about 6000° centigrade; the temperature at the centre is calculated to be about 40,000,000°. The temperature of boiling water, it will be remembered, is 100°.

There is nothing special, or there was nothing special, to distinguish our sun from any of the other stars. Except one thing: one day it met with an accident. Some other star seems to have approached too close to it. Stars are scattered about so sparsely in space that the odds against one star approaching another closely, which can be calculated mathematically, are enormous; but at present astronomers have no other explanation which seems to fit the facts. Huge tidal waves were set up in the sun, similar to, but vastly greater than, the waves set up in our oceans by

the attraction of the moon; and parts of the sun were torn out of it. Having some angular momentum when they left the sun, they did not fall back into it again when the disturbing body had receded, but rotated round it, which they have continued to do till this day. We call them planets. Our earth is one of them.

But the development of the planets, and in particular our planet, has been very different from that of the stars. For the earth was small enough to cool quickly. Originally a mass of flaming gas, it must have had the temperature of the sun. It was incapable of supporting life of any kind. But gradually its surface temperature fell and its crust solidified; rocks and mountains were formed. Its interior has not cooled yet, as anyone who will look down the crater of Vesuvius will discover.

Of the gases outside the crust, the vapours became liquids and the permanent gases gave us our atmosphere. And a new phenomenon thus came into being: a planet whose internal warmth no longer affected its surface, but which happened to be sufficiently near to another star, its 'sun', to get heat from it. The stage was set for the curtain to go up upon the next act of the drama. A new actor appeared: Life.

There is some doubt as yet as to when life first appeared on the earth. Estimates vary from 1000 million years ago, or even a little more, to 300 million years ago. Even the larger of these estimates implies that life is an affair of the last half only of the earth's existence. There is still more doubt as to how it came. No one knows. Some scientists think that it was an

inevitable consequence of the earth's development; that, given the exceptional conditions described, it arose just as naturally as any other phenomenon—just as naturally, for instance, as water appears if we explode a mixture of hydrogen and oxygen under precisely the right conditions. Those who hold this view think that it may be possible, when we know more about the determining conditions, for men to make a form of life in the laboratory. Others think that a second accident was needed, though as to the nature of the accident we have no clue at all.

But there is very little dispute among scientists as to the form life took when it first arose. It arose in the water; aquatic life. The way in which it developed, the different forms through which it passed, will be discussed later; here, anticipating a little, we shall content ourselves with a bald statement. From aquatic life developed amphibian; after the amphibian, reptile; later, mammal. Life expressed itself in a myriad forms. We may think of Nature, in a figure, provided that we realise that it is no more than a figure of speech, as trying experiment after experiment. She tried a dinosaur; he failed. She tried a whale; she built him on generous lines—he weighs one hundred tons and more; she endowed him with long life—he often lives for hundreds of years. And he was not exactly a failure; he has endured till this day. But also, he was not exactly a success; his consciousness appears to be of a low order. She tried a land-animal of enormous proportions, a mammoth—a single one of his teeth was as big as the whole of a man's skull. But his strength was as a very little thing to save him; in fact,

it is thought that his bulk was an actual disadvantage; he could not manœuvre quickly enough to defeat his enemies. He perished. She tried an ape; he seemed teachable, and he has survived; yet somehow he has proved incapable of passing a certain point. "At last she tried a being of no great size, almost defenceless, defective in at least one of the more important sense-organs; one gift she bestowed to save him from threatened extinction—a certain stirring, a restlessness, in the organ called the brain.

"And so we come to Man."

III

If we try to give man a date at all, the most probable seems to be of the order of 300,000 years, though some recent estimates make him considerably older. Long enough ago; but less than one thousandth of the time since life first appeared. It had taken the other nine hundred and ninety-nine thousandths of the time to fashion him. If we speak of the earth as born yesterday, we shall have to speak of man as born within the last minute. A late arrival on a late formed planet. . . .

What are we to make of it all? How is man related to this vast framework of space and time in which he is set? Is he the pinnacle of the building—or is he an afterthought? Is it his significance, or is it rather his insignificance, which emerges from the picture?

Let us try to give full weight to the facts we have been relating. They seem to take man from the centre of the stage (which is where he likes to think of him-

self), strip him of his imposing garments, and exhibit him in time and space as a very little thing. He is perched on a pin-point of space, on a satellite of a star which seems no more important than any other, a star which is only one of 10,000 millions. That is in the one system of stars alone—there are other systems! To call man a pebble on the beach of the universe is grossly to overrate him; he is more like a speck on one pebble on the beach—and there are other beaches! Looked at in space, man is negligible.

He hardly cuts a more presentable figure in time. His history reaches back a few hundred thousand years, a tiny fraction of the time during which life has inhabited the earth. And the earth had run half its course before life appeared on it at all; and the solar system is perhaps five thousand times as old as the earth. To say that man is not yet firm on his childish feet is to credit him with much more dignity than he possesses. We are practically present at his birth.

He would like to think that the universe has been called into existence to produce him. If it has, then he regains the importance of which the measuring rod and the clock seem to deprive him. But the evidence hardly supports such a theory. For the cosmic process does not seem to culminate in man; he is a kind of by-product, a freak. The millions of stars which he can see contain no life at all; at least, no life comparable to human life; their immense temperatures rule out such a possibility. Life as we know it seems only possible on a planet small enough to cool and produce liquids; and then only if the planet happens to remain in an orbit close enough to its parent star to get suffi-

cient heat, and if its atmospheric envelope can protect it from the bombardment of meteors. It is conceivable that there is life on Mars; there are symmetrical markings on its surface which might represent an artificial system of irrigation; but there is no conclusive evidence in favour of the theory. Venus also might be capable of supporting life. The other planets are probably lifeless.

It is true that in other island universes similar conditions may have produced, or may yet produce, a stray planet or two capable of supporting life. But it would still remain true that life would be the exception, not the rule; so that whatever the purpose of the universe, supposing it to have a 'purpose' at all, it is hard to believe that it is directed toward the production of life. If it is, the prodigality of effort seems immense. *Parturiunt montes, nascetur ridiculus mus.*

At the best, then, man is an infrequent phenomenon in the universe. But the worst has yet to come; even when he does occur, he is not a permanent phenomenon. He comes to an end. If he does not destroy himself by his own quarrelsomeness, cosmic evolution seems likely to bring about the same result in time. Man has flashed into a transient existence in a temporary condition of the universe, which started without him and apparently will end without him. He exists, at the moment, through a combination of favourable circumstances, one of which is that the sun warms him, as it will presumably continue to do for an enormous period. But the sun is nevertheless a dying star; owing to its radiation, it is losing mass at present at the rate of 4,000,000 tons every second. It

has a good deal of mass to lose; but it cannot go on losing it for ever.

There is the further possibility that before it has lost most of its mass by radiation the sun may collapse into what is known as a white dwarf, a small star of incredibly high density. We do not yet know the conditions under which this happens, but it does happen sometimes, and life could not exist on a satellite of a white dwarf. Astronomers have rival theories as to what the end of the world may be. One school holds that the universe is running down; others think that perhaps it will be wound up again. But there is little support for the view that man's life on earth can be everlasting.

Small; childish; lonely; mortal: it does not indeed make an impressive picture. One would infer that man would at least be humble; but he is not even that. 'Drest in a little brief authority', he struts about the stage as if he were playing the leading part. His kingdom, to him, seems extensive; that is because he has no direct experience of the vastness of space. His life on earth seems age-long; that is because he has no real conception of the passing of time. When one thinks of him as he is, a trivial manifestation in either space or time, one understands the feeling of the Psalmist: "When I consider Thy heavens, the work of Thy fingers, the moon and the stars, which Thou hast ordained; what is man, that Thou art mindful of him?" and one sees a bitter point in the reply of the modern cynic: "Mankind is a *disease* which overtakes matter at a certain stage of its existence".

IV

Is that, then, the conclusion of the whole matter—that man is an afterthought, a by-product, something off the main track of cosmic evolution? His mind rebels against the conclusion; he has moments when he does not feel either small, or childish, or lonely; he is by no means sure that he is mortal. If he is really out of focus in the material universe, so much the worse, he feels, for the universe, not him. This is only what he might be expected to feel; no man is a good judge of his own case. And yet there is some substance in his feeling that the analysis has somehow missed his real significance, and that there is more dignity about him than it would suggest. What kind of reply can he make?

He can reply, to begin with, that the very fact of his youth, his comparative inexperience, only throws into greater significance the things he has managed to do since first he set foot on the earth. He seems like the plaything of Nature; but he has been by no means entirely at her mercy. Born into an unfriendly environment, he has faced her challenge and met it. He can cross her oceans, and make tracks through her jungles. When she has blocked one line of advance for him, he has found and opened another. He has some positive achievements to his credit: the Pyramids of Egypt; his bridges, his cathedrals, his aeroplanes. True, Nature may produce an earthquake, a pestilence, a famine, and trump his ace in the end: meanwhile, he makes a spirited enough show of it.

But his engineering triumphs are not the most

important of his victories; they are significant chiefly because of the method by which they have been reached. They are the fruits of the victory of brain over muscle. They are the symbols of one stage in that process by which intelligence is gaining some kind of mastery over brute force.

Man, alone, has gained some consciousness of the processes which have produced him; in a small measure he is beginning to *understand*. He has discovered, in some degree, the machinery of the universe; he has got behind the look of things and is beginning to read purpose into it. At least, that is what he thinks he is doing; though some philosophers argue that he only finds a purpose in the universe because he himself is the sort of animal which thinks in terms of 'purposes'. But in any case it is an achievement indeed.

The history of man's attempt to understand the material universe is an astonishing story. It is still more astonishing to reflect that he made comparatively little progress with the problem until recent times—that is, until the last two or three thousand years of his life. This may be because his intelligence has suddenly grown; but it is far more likely that it is because, at last, he discovered a *tool*.

At first man lived on earth an existence not greatly removed from that of the animals; hunting, fishing, fighting, wandering upon the face of the earth. How many civilisations he ran through, how near he came to extinction, we do not with any certainty know. But there is little evidence that he studied astronomical problems with any seriousness. He had no knowledge of the forces that had produced him, no ordered con-

ception of the distant heavenly bodies which lit up his sky. He could make nothing of them; so he turned them into gods and worshipped them. He accepted uncritically what his priests told him about them; which was a pity, for his priests were little wiser than he. Such empirical knowledge as he did from time to time acquire they stored up for him; and it became inextricably mixed with superstition. After long years he came in time to collect a few facts of observation and became able to predict, for example, the probable times of eclipses. But the machinery by which knowledge was preserved was still a priestly machinery, and it was used for ecclesiastical purposes. Two Chinese mathematicians, Ho and Hi, who flourished some 4500 years ago, were put to death because of their unfortunate failure to predict an eclipse, which was supposed to have a theological significance; which illustrates the dangers of mixing up mathematics and theology.

We have to come right down to the great days of Greece—we call the Greeks ancients, but an astronomer is obliged to call them modern—before we get glimpses of any real understanding of what the earth really is. The debt modern civilisation and modern thought owe to Greece is incalculable; the Greeks were a speculative race, interested in the things of the mind and the spirit; but they still had not fashioned the tool. They had abounding intelligence, and in some ways they came nearer the spirit of modern science than many who succeeded them; but they lacked the method. Pythagoras is known chiefly to schoolboys as the discoverer of a theorem which,

unlike them, he was never asked to 'prove'; his value for our present purpose is that he enunciated the truth that the earth revolved; but again, he was not asked to 'prove' it. To 'prove' a truth means to bring it into harmony with an accepted series of truths, to exhibit it as part of a systematised body of knowledge; and the Greeks were only then beginning to systematise astronomical knowledge.

The doctrine that the earth revolved, as opposed to the simple and satisfying theory that it is completely still ("so fast that it cannot be moved"), was a revolutionary idea; but it did not, at the moment, revolutionise thought at all. The truth disappeared for many centuries. For this there are many reasons. Many theories were formed in the old world which disappeared again, only to be resurrected later; there was no recognised method of spreading them, or even of preserving them. Pythagoras himself seems to have imparted the truth to the inner circle only of his disciples. And the doctrine conflicted with the interests of the Church, or what were supposed to be the interests of the Church; and men of science had no authority to set up against the well established authority of the Church. If Pythagoras' doctrine had formed part of an ordered treatment of astronomy; if he had lived in a world in which scientists weighed and sifted evidence; and if he could have formulated his evidence, his doctrine might have won acceptance. But science, and scientific method, still lay in the womb of the future; and succeeding generations took up the old position that the earth was fixed. Ptolemy, for example, who had perhaps the greatest reputation as an astronomer

among the ancients (though much of his work derives from Hipparchus), expounded a whole system of astronomy based upon a fixed earth. It must not be inferred that he did not obtain many results of value from his system. "The earth moves round the sun" and "the sun moves round the earth" are not statements which are mutually contradictory; they are merely different ways, one of them far more convenient and suggestive than the other, of expressing the *same* fact about the relative motion involved.

It was left to Copernicus (A.D. 1500) to revive once more the ancient theory of Pythagoras; and it was left to Galileo Galilei, a hundred years later, to make the greatest single step towards its confirmation. For he heard that a Dutch optician had been able to arrange lenses in such a way as to make distant objects appear nearer, and with this hint to guide him he constructed a telescope and turned it skywards. Crude though his instrument was, it gave him much real evidence in support of the Copernican theory. He was able, for instance, to point to the satellites of Jupiter, now visible, as illustrations of a system in which several planets revolved round a parent star. Galileo met with bitter opposition on the part of the Church, some of which, it must be confessed, he went out of his way to provoke. He was eventually examined by the Inquisition, and under threat of torture he was obliged to recant his heresies. There is a legend, now disproved, that upon rising to his feet after making recantation, he exclaimed "*eppur si muove*"—"and yet

it moves". This is the kind of story of which we may say that, if it isn't true, it ought to be.

The complete triumph of the theory was not long delayed. For whereas Pythagoras' knowledge was empirical, Galileo's was, or was soon to become, scientific; it formed part of a series of ideas, logically connected and verified by experiment. The tool was at length being forged: *scientific method*. First, the actual observations; then the deductions from the observations; hence, the theory, the abstract 'law', is formulated. From the law, further deductions can be made theoretically, and these can be tested by specially designed experiments. In making the 'law', and in making deductions from the law, science has made use of, and indeed to some extent has forged, a further tool: mathematics. Mathematics is the most abstract of the sciences, and just for that reason the most fundamentally useful of them all.

Galileo was perhaps the father of modern astronomy; it was left to others, and above all Newton, with his amazing mathematical genius, to work out the details of the scheme. But the progress which has been made in the last three hundred years has been remarkable; the names of Copernicus, Galileo, Kepler Huygens, Newton, Flamsteed, Halley, Lagrange, Laplace, Einstein, are milestones on one of the greates adventures of the human spirit.

It is a short period in which to have brought some sort of order out of chaos. It is a subjective order, jus as it was a subjective chaos; man has put his mind in order rather than the universe; but it is far from being an illusion; for man's deductions from his theorie

seem to fit the objective universe. And such is the power of human thought, that sometimes, when man's theories have been at variance with his observations, it is the observations themselves which have later been found to be wrong. Two striking instances may be given. The astronomers of the last century had some trouble in understanding the orbit of the planet Uranus; according to Newton's laws the planet should have done one thing, whereas in fact it did another. Adams and Leverrier, by a process of mathematical analysis, thereupon deduced the existence of an unknown planet, the attraction of which would account for the observed variation in the orbit. After their prediction, the planet, Neptune, was discovered in approximately the position foretold. But certain small discrepancies in the orbit of Uranus still remained. This problem has been solved only in our own day. To account for the discrepancies Lowell deduced the existence of another planet, Pluto, which since his death has been discovered.

Man's attempt, then, to understand the material universe has met with brilliant success in the last few hundred years. He has numbered the stars; he has worked out the orbits of the planets. He is able to predict with almost unfailing accuracy the time of eclipses; so confident is he of his methods that if the moon, or the earth, is apparently a few seconds late in keeping the appointment he is more inclined to suspect an error of observation than an error in his calculations. He has deduced the presence of stars too faint to be seen; and afterwards refined methods of observation have detected the stars and justified him.

He has reached out to the uttermost parts of space and has investigated the composition of the stars; he knows what elements are to be found in them. He has investigated their densities, and has confidence in his results even when they seem most at variance with commonsense; he has found, for example, that a star called the Companion of Sirius has a density of nearly one ton to the cubic inch, and that the star Betelgeuse, on the other hand, has a density which is only about one thousandth of the density of air. His theory tells him that the diameter of Betelgeuse is about three times the total distance of the earth from the sun. He can go in a stride from the infinitely great to the infinitely little, and has found a curious correspondence between them; at present he is looking inside the atom, which seems to contain a kind of solar system in miniature. He has reached back in thought for millions of years and is constructing an increasingly complete picture of the past; he looks forward also, and can make reasonable speculations about the nature of the world millions of years hence. If he has done so much in so little a time, has he not grounds both for hope and for pride, and can he not claim a significance of his own?

Man sets up his intelligence, then, as one of the things which give him significance; as something which prevents his life from being 'nasty, poor, and brutish', and which might one day prevent it from even being short. And he can ask that special attention be given to the inherent nature of his intelligence; his greatest triumphs have been the result of intelli-

gence exercised in a theoretical medium, not a practical one. He has set out to master the secrets of the external universe; but in order to study its working effectively he has had, so to speak, to withdraw himself more and more from it into an abstract world of his own construction.

This statement needs some amplification. In order to understand the actual world which we see around us, scientists have had to construct a world of their own which corresponds to the actual world but is of a different nature. An example will show how this happens.

When Galileo wanted to study the motion of a body falling from a height towards the surface of the earth he had difficulties; the body moved too fast for him to be easily able to observe its motion. So he slowed up the motion by taking a sphere and allowing it to roll down a groove on an inclined plane, arguing quite correctly that the motion he wanted to analyse was only a special case of motion on an inclined plane. In this way he verified what he had suspected before, that the distances moved by the body in 1, 2, 3 . . . seconds were approximately proportional to 1, 4, 9 . . . feet; and so he deduced the law that the distance was proportional to the square of the time.

Now in fact whenever this experiment is actually performed the distances never turn out to be accurately proportional to the squares of the times. But we find that the more perfect the sphere, the more uniform the groove, and the more accurate the measurement of time (Galileo used a form of water-clock) the more nearly do the distances work out in these pro-

portions; and so we infer that under 'ideal' conditions the law would be accurately true. But in fact 'ideal' conditions are no more than a fiction; neither Galileo nor anyone else has ever been able to experiment with a 'perfect' sphere or a 'perfectly uniform' groove, for these things do not exist; so that the law is never exemplified accurately in practice. It is a theoretical description of how we think perfect (non-existing) bodies would behave under perfect (non-existing) conditions; the law deals with abstractions, not with real things at all.

But it is not for that reason any the less valuable; for the scientist is able, by the help of those abstract methods of reasoning which we call mathematics, to deduce from this law a whole series of further laws which will be true for the abstractions with which he is now dealing; and when he applies these laws to the external world he finds that they give him results which correspond more or less closely with observed facts in that world. In this way he often discovers facts about the external world far more easily than he could find them out by making actual experiments. If he wants, for example, to foretell how an airship is likely to act under certain conditions of wind and weather, he may be able to get the information by solving some differential equations.

The scientific world, then, deals with abstractions; the 'particles' and 'smooth planes' and 'rigid rods' of mechanics do not exist in the actual world any more than the 'points' or 'lines' of geometry exist. And so far afield does the process of abstraction take the scientist that he often finds himself dealing with ab-

stract entities which he has little chance of comparing directly with what corresponds to those entities in the physical world, if indeed anything does correspond to them. In physics, for example, his research into the constitution of matter has led him to an 'electron'; and he cannot guarantee that the electron is anything more than a symbol, though a very useful one.

Hence it is by thought exercised in an abstract medium that man has been able to grasp as much as he has of the plan on which the universe is built. Much of that plan is still obscure; but the essential fact is that man has been able to interpret the external universe by constructing a universe of symbols which alone enables him to read meaning into the world around him. And if the construction of that abstract universe is not a significant thing, it is hard to say what is.

The purpose of natural science is to describe the external world; to show the connection of one phenomenon with another; to construct the formulae which exhibit the connection; to find the invariable sequence, if there is an invariable sequence, in which natural events take place. Science aims at answering the question 'How?' rather than 'Why?'; at providing descriptions rather than ultimate explanations. The scientist avoids the 'why?'; that is the province of the philosopher, the poet, or the theologian, anyone's province but his.

V

But someone must attempt to answer the 'why?'; and that brings us to a final class of achievement to which man can make claim. He is so made that he

will not confine himself to the things which he can feel and see, the world of sense around him; he has ideals; he is forever following a "light that never was, on sea or land". He writes poems; paints pictures; composes sonatas; and dreams dreams. These things, so far as we know, are peculiar to him. They differentiate him sharply from the external universe. They are achievements of quite a different order; and on the value which is to be attached to them depends our final judgment as to man's significance. It is possible to argue that these things are man's infirmities; the creations of a sick mind. But he is so fast in their grip that if they are of no value, if they are illusions, then man himself must lose in stature; he must become like a shadow, pursuing a shadow. Poets, however, do not consider that they are following a will-o'-the-wisp at all; they think that they are in closer touch with Reality than most men:

> We are the music-makers,
> And we are the dreamers of dreams,
> Wandering by lone sea-breakers,
> And sitting by desolate streams;
> World-losers and world-forsakers,
> On whom the pale moon gleams:
> Yet we are the movers and shakers
> Of the world for ever, it seems.

And in certain moods man thinks that his day-dreams are the best lights he has; that they

> Are yet the fountain-light of all our day,
> Are yet a master-light of all our seeing;
> Uphold us, cherish, and have power to make
> Our noisy years seem moments in the being
> Of the eternal Silence;

that they give him a hint, in fact, that his true kingdom is not of this world.

What seems to emerge, then, is this. If we think of man as entirely commensurable with his physical environment he must inevitably appear as a thing of little account; if we appeal to space-time he will be submerged. On the other hand we can take the appeal to another court; we can refuse to let our imagination be dwarfed by huge measures of times and distances, on the ground that man, though related to space-time, is not fully expressible in terms of it and demands a standard of measurement of his own. His significance then appears upon quite another plane. So that our final estimate turns upon our judgment of values.

But the problem of man's relationship to the universe still remains unsolved. Some idealists, carried away by their vision of Man the Dreamer, have been apt to snap their fingers at the external world. Man is a spirit, they say, and has nothing to do with time and space. But even philosophers get the toothache, which is all too likely to put them out of their philosophical stride; man is related to his visible surroundings closely enough. He may be more than his body, but he is not independent of it; it is the channel, or at least one channel, through which he expresses himself; we might call it his nearest universe; and we have no certain evidence that mind can exist apart from body. The next stage is therefore to examine the evolutionary process by which that body has come into being.

II

THE GROWTH OF MAN'S BODY

Life, like a dome of many-coloured glass,
Stains the white radiance of eternity.

SHELLEY

A firemist and a planet,
  A crystal and a cell;
A jelly-fish and a saurian
  And caves where the cave men dwell;
Then a sense of law and beauty,
  And a face turned from the clod—
Some call it Evolution,
  And others call it God.

W. H. CARRUTH

THE GROWTH OF MAN'S BODY

I

We have now to look more closely at that process which, starting with primitive forms of life some 1000 million years ago, culminated yesterday in Man. What forces produced him? How did he come into being?

We have spoken of Nature as trying a series of experiments: a jellyfish; a dinosaur; an ant; a saurian; a whale; a mammoth; finally producing man. But that is a rhetorical statement rather than a scientific one. It is an analogy, and like most analogies it takes a good deal for granted. It implies that there was a conscious effort throughout the process, which may be a reasonable thing to believe, but is a pure assumption. It implies that 'Nature' was aiming at man throughout; and the only sense in which this statement has any real justification is that, up to the present, man appears to our not wholly impartial eyes as the highest manifestation of life that has yet appeared. It implies that there was a series of connected experiments, taking place successively in time; and it implies that man is connected with the earlier experiments, and is in a sense the result of them. It implies, in fact, that instead of standing apart from and in contrast to animal life, man has developed from it.

It is only in modern times, however, that this has become a serious scientific theory, though there were occasional speculations of the same kind among the ancients. It would have been hotly denied, by all but

a few people, in the earlier part of the nineteenth century. It was believed then, generally though not quite universally, that all the various species had been separately created and were independent—the doctrine of the 'immutability of species'.

There was nothing surprising in this doctrine; it was the natural one to hold. Things which look different are assumed to *be* different, until such time as science is able to show that under their apparent diversity lies some kind of similarity. For example, matter was thought to be something essentially different from electricity until science was able to establish their connection.

And there was another reason why belief in the immutability of species was inevitable. If species develop at all, they do so very slowly; the change apparent in the lifetime of any one observer is imperceptible; a few hundred years, except in special conditions, produces very little effect. But whereas we think now of a few hundreds of years as trivial in the history of the earth, it was once thought to be a considerable period. The world was believed to have had a far shorter existence than we should now assign to it; in some circles, an exact date was given to its creation, 4004 B.C. While men believed this, it is obvious that they could not believe that different species had evolved out of a common stock.

Belief in a creation no more than a few thousand years old was encouraged by a literal reading of the Bible; which, of course, also supports the idea that the different forms of life were created independently. People who read the Old Testament literally are bound

to take a view, both of the creation of the earth itself and of the development of life upon it, which is fundamentally at variance with what is now the scientific outlook. To this day some sincere Christians read their Bibles as though they contained scientific statements about the facts of Nature. But many other Christians, equally sincere, read them differently. They think of the Bible as a progressive record of man's spiritual development. They remember that its various books, though now assembled for convenience under one cover, were written at widely different periods in the world's history, by men who were at various stages of mental and spiritual development, for the benefit of other men and women whose powers of understanding were similarly diverse. They remember that some of the later books of the Bible expressly warn the reader against accepting some of the views put forward in the earlier books; telling him, in fact, that the earlier point of view was only allowed "for the hardness of men's hearts". They feel that the Bible, like any other book, cannot be understood without a knowledge of the circumstances in which it was written; that scientific accuracy about the material universe was not its aim, and that its writers could only make use of such 'scientific' knowledge (often wrong) as was current in the world in their time. They make allowance also for the fact that the Bible has come to us from the East, and makes more frequent use of allegory and metaphor than a European book would make. Taking all this into account, they do not expect to find the Bible a scientific textbook; when reading it they are looking for truths of a different

kind from those of natural science; and so they do not find their faith shaken by the inconsistencies of Genesis with scientific thought. But all this is largely a modern point of view; in the early nineteenth century it would have found but little acceptance.

A certain view of religion, then, on the one hand, and a lack of knowledge among scientific people on the other, combined to keep obscure the real connection of human life with other forms of existence. But knowledge gradually spread as to the real age of the earth; it was found to be far older than had been thought. The estimate of its age given in the first chapter is a modern estimate, arrived at by modern methods, but the Victorian scientists would have agreed in estimating it at a huge figure. The geologists began to assign rough dates to the various layers of rock in the earth's crust, and they found embedded in the rocks an increasing number of fossil remains of what had once been living creatures. They found also flint implements, of human construction, and yet of great antiquity. Men of science began to reclassify the various forms of life; to note their connections; to realise the implications of the fact that life was far older than had once been thought. And they were helped by the steady growth of a scientific atmosphere. Workers in all branches of science were establishing connections which had hitherto been unsuspected; they were extending more and more their knowledge of the reign of scientific law; they were finding many illustrations of the principle that *natura non facit saltum*. Nature does not make jumps; at least, not very large jumps: why should she have jumped from one

animal to another? Why should she have jumped from an animal to man?

Such was the state of affairs when, in 1859, Charles Darwin published *The Origin of Species*, and enunciated the theory of Evolution for which his name is famous. If he had been living to-day he might appropriately have called it the Inevitability of Gradualness. But, although Darwin's name will always be associated with the theory, of which he was the principal exponent, Wallace was working at the theory at the same time and is entitled to a large share of the credit. That certain forms of life were connected was by now no new idea. The scientific public in Germany had discussed the possibility a good deal. Darwin gave the idea a wider application, extending it to all forms of life. It was the linking up of human with animal life which impressed the man in the street as being the core of the theory. But even that was not entirely new; in the previous century the French naturalist Buffon had foreshadowed a connection between men and the apes, and Lamarck had indeed stated that man was derived from an ape. Darwin asserted, not that one species of plant or animal life turns into another, but that if the past history of two given species could be traced back, the species would be found ultimately to have come from a common stock. Just as the literal Christians pictured a single man, Adam, from whom all of us, widely different as we are, are descended, so Darwin pictured the whole of life itself, plant, animal and human forms, as connected, and descended from certain primitive forms of life. And the gospel which

he preached to his astonished audience was that of a man not suddenly created, but evolved; grown slowly and with infinite pains out of more rudimentary forms of existence.

Darwin was first led to think of his theory when, as a young man, he acted as naturalist on board the *Beagle* on her scientific expeditions. He noticed that it frequently happened that the animals found in the islands they visited were like the animals on the adjoining continent, but not exactly the same; and he inferred that isolation upon the island had resulted in the development of a stock somewhat divergent from the parent stock. He noticed also that the animals in any one country were related to, but not identical with, the fossil remains of animals in the same country; which suggested that time had produced modifications in the stock.

The evidence for the theory of evolution is cumulative; and the cumulative effect is convincing. It has been strengthened since Darwin's time. It can be grouped most conveniently under four heads, according as it is drawn from (*a*) anatomy; (*b*) the existence of vestigial organs; (*c*) embryology; (*d*) geology.

(*a*) Similarity of structure in various organisms can be frequently observed. In fishes, amphibians, reptiles, birds and mammals the biologist observes the same broad relations of the same essential parts. For example, in the wing of a bird, the flipper of a whale, and the foreleg of a horse the same bony elements can be traced.

The relations in structure between men and apes are exceptionally close (*e.g.* the apparatus of reproduc-

tion). The bone structure of the hand is almost identical, apart from the thumb; the human thumb is a far more developed structure, and has had much to do with man's special dexterity. Some apes have air sinuses in their frontal bones like those of men, and gorillas and chimpanzees sometimes have a peroneus tertius muscle which, apart from them, is found in man alone.

The similarity, moreover, is not merely a structural one; chemists as well as anatomists have noticed it; it extends to the chemical composition of the blood. A study of blood transfusion shows that human blood falls into four different groups; and the same groups are found in apes.

These and other similarities are not, strictly speaking, 'proofs' that all life has a common origin. An opponent might argue that certain features of one species were 'copied' when another species was created, just as an architect, satisfied with the bay window he has constructed for the occupants of *Chez Nous*, builds a similar one into the *Cosy Cot*. Almost any similarities, of course, could be argued away in such a fashion; but they cannot fail to impress the mind of a biologist as significant.

(*b*) An important class of evidence is drawn from the existence of what are known as 'vestigial' or 'rudimentary' organs. Sometimes a structure which functions satisfactorily in one organism appears in a rudimentary form in another, in which its use is either much less obvious or else completely non-existent. For example, the New Zealand kiwi has a wing which is invisible externally, which is attached to the body,

covered with feathers, and without function—a wing that is not a wing. It has the same bony framework, and the same muscles, as the wing of a pigeon. Why is it there? The inference is that it is a survival from an ancestor in whom the wing functioned normally; that the kiwi, in fact, is related to the pigeon.

Again, a rabbit grows teeth and uses them in the normal way. But a whalebone whale grows an excellent set of teeth and then throws them off either just before or just after birth, unused. If the whalebone whale has been created separately from the rabbit, to fulfil a destiny peculiar to him and unrelated to that of any other creature, why should he be given the trouble of growing a useless set of teeth?

Man's appendix provides a third example of what is apparently a survival of an organ from a period in which it performed a definite function. Anatomists are not clear that the appendix is of any value at all to man in his present stage of development; nowadays it seems useful only to surgeons.

(*c*) The embryo of a mammal, in the course of its development inside the mother's body, passes through stages which are curiously reminiscent of the stages through which Darwin suggested that the human race as a whole had passed. At first certain arches appear which are comparable to those which support gills in fish; its blood circulation is also similar to that of a fish. Later the embryo is comparable in certain respects to an amphibian, later to a reptile; and it is only much later that it takes on its special mammalian characters. (All that is meant by this, of course, is that a biologist would notice various technical similarities,

not that there is anything in the nature of a photographic resemblance which could be seen by the layman.)

The inference from these facts is that the embryo passes through, or 'recapitulates', the different stages of evolution. The facts, becoming known to any intelligent person for the first time, can hardly fail to be strikingly suggestive; but again they constitute no proof, in the scientific sense of the word. If the evolutionary theory were otherwise established, these facts might prove the recapitulatory theory; they cannot prove the theory of evolution itself.

(*d*) Perhaps the most impressive body of evidence in favour of man's descent from the animals has been furnished by the geological record, which has now yielded much more evidence than was available in Darwin's day. An increasing number of fossils have been found in the rocks, enabling us to form some idea of what forms of life existed, and at what stage of development, at periods of the earth's history to which the geologists can assign at any rate an approximate age. If this geological evidence were in any sense complete it would solve the problem once and for all, since the record in the rocks would enable us to trace the whole course of man's history, and thus make it possible to prove, or disprove, Darwin's theory. Unfortunately it is far from complete; it is as yet only fragmentary. But enough fossils have come to light to enable us to make an intelligent reconstruction of the main lines of man's ancestry; and here and there the evidence has been sufficient for us to trace certain lines of development in fairly complete detail. For

example, over 260 fossil species have been discovered which lie on, or near, the line of descent of the horse. So far as the evidence goes, it leaves scientists in no serious doubt of the truth of the theory of evolution.

There are many reasons why the geological record must inevitably be full of gaps. In the first place, only an insignificant fraction of the fossil-bearing rocks has been examined, or is ever likely to be examined. Then many groups of animals have no hard supporting parts and could not therefore be expected to leave any trace. Again, great masses of strata which might have contained valuable evidence have been washed away by floods and water action generally; and other rocks have been completely changed by the intense heat and pressure to which they have been subjected. Add to these reasons the fact that mammals generally decay or are eaten at death, so that only in exceptional circumstances will they become immersed in some morass or buried in such a way as to preserve them, and the surprising thing will be, not that man's lineage does not stand revealed to us in every detail, but that scientists have succeeded in piecing together any significant body of evidence at all upon the subject.

II

So much for the fact of evolution; what is known about the method? What has caused this astonishing development to take place? This is a much more difficult question, and biologists of our own day, though they agree with Darwin as to the fact of evolution,

would by no means agree that his theories offer an adequate explanation of the method.

Darwin's conception of the process was somewhat as follows. He started from the observation that variations do in fact occur. No one of a man's children, though it may exhibit a general resemblance to him, is an exact copy of him or of any other member of his family. In lesser degree variations occur all down the scale of life. Some of these variations confer on their owners an advantage over those who do not possess them. Now, to survive, organisms need certain advantages; for there are many factors in Nature which cause a struggle for existence. Life multiplies at a fast rate, and there is not sufficient food available for all. One animal competes with another member of its species for food; the one which wins is the one which is swifter, or has better powers of observation. One plant competes with another for nourishment from the soil; it survives if it is better adapted to obtain the nourishment. Or an animal has a foe, which it can best elude if it has a 'protective' colouring which makes it difficult to see; or if it possesses a certain kind of shell. Or the environment alters; perhaps the climate becomes more severe, favouring those variations which are the better protected against cold—for example by having more fur. Or some natural upheaval, such as the raising of a range of mountains, may result in a sudden alteration of the entire habitat; food, shelter, climate may all change quite suddenly; and some variations will be able to adapt themselves to the change better than others. There is, then, a constant struggle in progress, and in that struggle certain

variations will have a better chance of survival than others. There is thus a constant weeding out of the unfit, so that the species as a whole becomes more closely adapted to its environment.

There is a further factor. The environment may at times tend to isolate certain variations, so that in-breeding occurs, and the new stock gets more firmly rooted. New varieties may, for example, be isolated by volcanic upheaval.

The survival of the advantageous variations is generally referred to as the "survival of the fittest"; and the whole process was called by Darwin "natural selection", Nature selecting, as it were, those variations which gave their possessors an advantage in the struggle for existence. The process is generally described in personal terms, as though some external being, 'Nature', or 'God', consciously planned an evolution and then selected the most virile specimens for survival. It is a picturesque way of expressing the facts; but, like many picturesque ways of describing things, it is a dangerous one. The process can be described in purely impersonal language, and that is how a scientist ought to describe it. All that we really know is that those variations which are the most suitable do, in fact, tend to survive. It is convenient to have such a phrase as "survival of the fittest" to express the result of the process, though it is not perhaps happily chosen, for it does not mean as much as it is sometimes thought to mean. What is the test of 'fitness'? Simply that the variations survive; so that the expression seems equivalent to "the survival of those that do survive". When the ivy chokes our fruit trees we are

inclined to think that it is the unfittest which survives. "Survival of the most adaptable" might be a better phrase.

Natural selection as described by Darwin may not be the only or indeed the chief agent in evolution; but it is far from being a myth. Man, in fact, for his own purposes, in dealing with lower orders, deliberately carries out an analogous policy of artificial selection. He has taken advantage of the fact of variation to produce those things which are specially useful to him. Out of the wild crab-apple he has produced by proper breeding about one thousand different varieties of apple. From the plants belonging to the group Cruciferae he has developed cabbages, cauliflowers, broccoli and brussels sprouts. All our different breeds of poultry have come from the wild jungle-fowl. And, for other reasons, man breeds horses too. Darwin's theory was that Nature—that is, the environment, the external conditions—selected certain variations very much as the gardener selects his plants.

Selection, however, does not reach the core of the problem. It can only select what is there. It acts upon the variations, but does not produce them itself. It does not produce the fit; it only eliminates the unfit. It is one-sided in its action; its only weapon is extinction. And hence it leaves a good deal unexplained.

Suppose, for example, that a species of animal is in existence having fur of varying colours, say white and brown, and suppose that a sudden change in environment favours fur of one particular colour—perhaps snow appears, giving an advantage to the white-

furred animals, which can now more easily escape detection by their enemies. At any given moment we shall expect the white-furred to predominate, since 'natural selection' will kill off a number of the brown-furred. So far everything is simple. But what happens in the next generation? If white parents produce in general white offspring, then the preponderance of whites will lead to still more whites in the succeeding generations, and in time, if conditions persist, the browns will be exterminated completely; they are a race fighting a battle which they must inevitably lose. But until we know what produced the variation in the first place—what, in other words, initially determined the colour of the fur—we do not know whether in fact the whites will predominate in the second generation. And if they do not, natural selection will have to begin its work all over again from the beginning.

The problem here is a problem of inheritance. Problems of this kind, about which very little was known in Darwin's time, have been extensively studied since. If, for example, we cross dwarf peas with tall peas we know how to predict the ratio in which the characters of dwarfness and tallness will appear in the various progeny of the cross. The investigations of Mendel, an Austrian monk who was contemporary with Darwin, but of whose work Darwin was ignorant, were the foundation of a whole branch of biology called genetics; but its conclusions are too technical to be summarised here.

There is a further point to be considered. We have assumed in the above case that it was not the actual environment at the time which produced the variation

in the colour of the fur. But the environment does frequently produce changes in individual members of a species. Life in a specially difficult area, for example, might develop in an animal some special characteristic distinguishing it from its fellows, such as special dexterity in obtaining food, or speed, or great strength. This we should call an 'acquired character', something produced by the action of the environment in the course of the individual's existence. Now if these acquired characters are inherited, the whole process of evolution becomes much easier to understand. The individual develops some characteristic which enables him to meet the needs of his situation better; he passes on the characteristic to his heirs; hence they start life better equipped for facing their environment; and the species evolves at compound interest. But are acquired characters inherited? Lamarck said they were; and Darwin, though not an admirer of Lamarck, always recognised that this view lent useful support to his own theory. Darwin thought that natural selection acted not only upon what we may call 'random' variations, but upon the inherited effects of use or disuse of some organ. But these effects are acquired characters; and we are now much less certain than we were that such characters can be transmitted to succeeding generations. Weismann's work on the continuity of the germ plasm, for example, seemed to show that all inheritable variation must arise in the germ cells, and thus be uninfluenced by the direct action of the external environment. And modern biologists, though they are not unanimous on the point, tend on the whole to think that Lamarckian inheritance must be ruled out.

Other possibilities are being explored, and the final explanation is likely to be more complicated than was at first thought.

It is difficult for anyone who encounters the idea of natural selection for the first time to realise the profound changes which the environment can bring about in organisms. Compare an amoeba and a savage; can the environment have played anything more than a casual and subsidiary part in the process by which the one was evolved from the other? The difficulty does not wholly disappear even when the huge stretch of time involved is fully realised. But although we may not fully understand just how the action of the environment does bring about a change in organisms, it is clear that, as the environment changes, so the organism evolves also, and in such a manner as to become more and more adapted to its environment. As an illustration, we will take one small (and recent) step in the evolutionary process, and see how an organism seems to have responded to the stimulus of its environment.

At a certain stage some four-legged mammals (not all of them) took to a tree life. Perhaps there was a change in vegetation, producing trees which were originally not there; or the tree life may have helped the mammals to evade their enemies; or it may have been a way of getting certain kinds of food. To animals which climb trees, sight and touch would become of increased importance; the sense of smell, on the other hand, would be less useful. Hence those mammals which developed sight and touch most rapidly would tend to survive. In time this seems to have resulted

in a reduction of the snout (now of less importance); and this would allow the eyes to be focussed on nearer objects, giving a more precise view.

But tree-dwellers jump from branch to branch, and thus there is a great need for eye and limb to act in harmony, and for a general co-ordination of movements. Hence there would gradually come about a great development of those areas of the brain which are concerned with the co-ordination of movements. And so we arrive at the lemurs and apes, with two features distinguishing them from their ancestors: bigger brains, and limbs adapted to grasping.

In course of time some of them came to earth once more. Atmospheric conditions may have altered the type of vegetation, or the forests may have become thinned through some calamity. But now our mammals can do things which they could not do when previously upon the earth; they can balance and move on two limbs only, so that two can be used for handling sticks and stones; in fact, they can now use tools. This at once extends the range of experience, and, as more and more delicately adjusted movements are carried out, there is a further development of the frontal area of the brain. And the growth of the brain is helped by the erect position, which supports its weight better; to some extent the heavier brain probably caused the erect position. So that our tree-dweller has now become a biped, with a (relatively) large brain, able to use implements of various kinds; in fact, a primitive man.

III

For reasons already stated, Darwin's theory was slow in winning acceptance. Men said that they were opposed to evolution. They might as well have said that they were opposed to death, for evolution, like death, happens to all of us. Evolution simply means 'growth'. What they really meant was that they were opposed to a particular view of evolution. The real question at issue is as to what theory of growth is to be adopted. There are at least three competing theories.

(i) There is the 'separate creation' theory, which can be symbolised by a series of parallel lines, each line representing a separate species. This was the theory Darwin set out to disprove.

(ii) There is the 'ladder' theory, represented by a series of straight lines, placed end to end. According to this, each species grew out of its predecessor and gave rise in turn to its successor; man, being at the top of the ladder, must have climbed every rung of it. There is no support for this theory and no scientist believes it; but it is the theory which the man in the street still likes to attribute to Darwin. It implies, for example, that men are descended from monkeys, which was the popular view of the evolutionist's belief. What Darwin maintained was that men and monkeys are both descendants of some common ancestor; that they spring, in fact, from the same (less specialised) stock.

(iii) Finally there is the 'tree' theory, in which the different species are represented as branches of one

tree, with primitive forms of life at the roots. This symbolises the evolutionary theory described in this chapter. It shows the interconnection of all forms of life. It would show *Homo sapiens* as one branch, the anthropoid apes as another and a neighbouring branch, and various species of 'sub-men' as withered branches forking from the same junction in the tree. It would be rather a curious tree to look at, since the intersections of its branches with any horizontal line would represent all the different forms of life in the world at any given instant; and the analogy must not be pressed too far. So long as it is realised that this concept of a tree is only an analogy it offers a useful way of picturing diagrammatically what we know about evolution.

As we go out from the main trunk along the branches of the tree, we get life assuming more and more specialised forms. These forms are well fitted to certain definite but limited purposes, but contain less general adaptability. Biological development shows a tendency towards specialisation, with the corollary that the chances of life evolving into a different form become slighter. A dog, for example, may be subjected to generations of careful breeding without running any risk of being evolved into a cat; or a cat into a dog; they are too highly specialised. But they have each evolved in the course of time from some less specialised ancestor; and if their lines of development were traced backwards down the tree of evolution they would be found to join at some point. The possibility which still remains with the dog is that he may give rise in the future to still more specialised breeds

of dogs. And the possibility which remains with the man . . . what are the possibilities ahead of him?

Let us first try to trace him backwards down the tree. This kind of search for his ancestors has proved, and is proving, of great difficulty. To set the seal upon the evolutionary theory we want to find the 'missing link', if indeed there is a single such link, which joins man on to the tree. Before summarising the attempts which have in fact been made in the last fifty years to discover it, we may ask ourselves what, on *a priori* grounds, we should expect to be true about the missing link.

In the first place, the link between man and the animals belongs to the past rather than the present. It is no use to look for a living link in the forests of Borneo. The link we want must be sought in the past, at the junction of man's branch of the tree with the main stem—or with one section of the main stem. And in view of the obvious affinities between man and the apes (some of them have been mentioned, but the camera alone illustrates others) we must search in that part of the tree containing both men and the apes. Hence we must search in a country known to have been inhabited at one time by both men and apes. Unfortunately, this does not afford us much clue, since the great apes are known to have wandered over the whole of Europe and Asia and also into Africa. Finally, the link we are seeking must be largely unspecialised; capable, that is, of developing into either man or ape, according to the pressure of the environment and of any other factors, whatever they may be, which

produce evolutionary change. We arrive, then, at a missing link which

(i) belongs to the far distant past. Within very wide limits, the geologists can tell us the strata we ought to explore;
(ii) has resemblances both to the anthropoid apes and to men;
(iii) is less specialised than either; and
(iv) inhabited a region common in the past to both men and apes.

That is what we should expect to be true about the missing link. Whether this was really true about it no one can tell for certain, for it has not yet been found. But the search for it has been extraordinarily interesting, and a good deal of progress has been made with it this century. When Darwin published *The Origin of Species* the only fossil remains then known which could even conceivably have filled the gap were those of Neanderthal Man, which had been discovered two years earlier, in 1857. But not very much importance was attached to them at the time; it was not until 1886, when further fossils of the same kind were found in Belgium, that it was possible to pronounce them to be definitely human remains, and to assign them to an approximate age. The significance of Neanderthal Man is that there are ape-like features about his skull; he is, however, comparatively recent. His age is probably to be measured in tens of thousands of years, whereas the missing link must have an age running into hundreds of thousands.

The Javan Man was the next to be discovered, in

1891. Strictly speaking, he is not a man at all; he is one skull, two teeth and a thigh bone (anthropologists, grateful for small mercies, call that a fertile crop). The skull has certain features which indicate that he was in a transitional stage. No one knows his age for certain. The best opinion seems to be that he was probably off the main human line of the tree; one of its withered limbs, now extinct. But the controversies that have arisen as to whether he was really man or really ape are themselves sufficient to show that he was somewhere near the junction.

The Heidelberg Man, who consists of a jaw, was unearthed in 1907. Just where he fits into the scheme is not yet settled, but he is too recent to be the missing link.

The Piltdown Man, discovered in Sussex in 1911, was thought at first, on the evidence of the skull, which was all that was originally found, to be related to Heidelberg Man. But the next year a jaw was found in the same excavation which suggested a much more primitive ape-like creature; so much so as to raise the obvious doubt as to whether the two fossils were remains of the same person. It stretches the probabilities somewhat to suppose that, of two different beings, one left behind him his skull but not his jaw, while the other in the same place deposited his jaw but not his skull; still, it might have happened. But a little later, in the same neighbourhood, another skull and another tooth were found, again in close association and with the peculiarities of the previous fossils. That was practically conclusive; and Piltdown Man is now thought to be the most ancient relic of man yet found in Europe.

The record is brought up to date with a discovery made in China in 1929, that of the skull of Peking Man. Peking Man when reconstructed has some general resemblance to Javan Man, but anthropologists were inclined at first to credit him with a combination of characters which had previously been regarded as incompatible. Had this been established, his importance would have been considerable, for this lack of specialisation is one of the characteristics for which we are looking. But in 1931 much more material was unearthed. It now seems probable that Peking Man made stone implements, that he could fashion them also out of bones, that he could make drinking-cups out of the skulls of deer, and that he had already discovered fire. He resembled modern man in his hands but not in his feet; he seems to have walked, as apes walk, with his toes turned inwards. In spite of his antiquity he must have been definitely a member of the human species. So our ultimate human ancestor still remains in hiding—to be discovered, perhaps, by someone who reads this book. But it is now becoming clear that this ancestor represents only one of a large number of species in the world of his time, though in the end his became the dominant one: a fact which complicates our search considerably.

The 'missing link' is not, however, the only critical point of the tree. We can push our speculations back further: what is known about the root of the tree? How did life begin? The answer is that we do not know. All the life of which we have any experience springs from previous life; what happened in the far-off ages we can only guess; and the material for our

guessing is slight. That primitive, undifferentiated life began in the water is all that we can really say. A formless blob of protoplasm: that seems our ultimate ancestor. Whether science will one day bridge the gap that separates organic from inorganic matter we do not know.

IV

What of the future? What lies ahead of Man? That takes us into the range of speculation, and the reader may profitably do his speculation for himself. One or two points are suggested to stimulate his thought.

1. Man may become extinct. This has happened to some branches of the human race; and *Homo sapiens* himself may have been in peril in the Ice Ages.

It is pleasant to think of evolution as though it were a kind of automatic ascent. But many lines of evolution have been degenerate lines. They do not become sufficiently adapted to their environment and they perish. And sometimes characters produced by the evolutionary process go on developing past the point at which they reach their maximum utility; and when this is the case the result is extinction. The gryphaea shells furnish an example; according to Haldane, their coiling was continued to a point at which it must have been almost impossible for them to open at all. Again, the size and the horn-development of certain classes of hoofed mammals increased to a point where they ceased to be advantageous and became an actual handicap. Now it is true that man (numerically a very small line, with few ancestors) appears to us, at the moment, as one of the successful lines. But his

advance has been due, as we shall see more fully in later chapters, to the development of one of his organs —his brain. And perhaps his brain will develop past its point of maximum utility too: just as the gryphaea overdid their coiling, and the mammoths overdid their weight, perhaps man will overdo his thinking. This, though only a speculation, is not as impossible a contingency as it may sound. Up to the present, man has used his brain to obtain for himself what is, relatively, an astonishing degree of mastery over his physical environment; but there are signs which suggest that, unless a corresponding increase of moral control accompanies this development, man may only succeed in exterminating himself all the more quickly. He may use his intelligence to devise more and more effective methods of blowing himself to bits. Brains lead somewhere, but not necessarily to heaven; and there is such a thing as being "too clever by half".

2. The environment is certainly changing: how will man change with it? It may be that catastrophic changes are ahead of us, caused by earthquake, pestilence, or man's own failure to control the impulses that drive him into war; but certain more slowly moving changes are actually taking place. Man is now a member of an industrial community: he is becoming divorced from the earth and is crowding into towns; and a town-dweller has quite a different environment and is faced by quite distinct problems.

3. Man's adaptation to his changed circumstances is by no means perfect. He has inherited a food-canal which is some thirty-six feet long and which does not seem at all well adapted to the diet of civilisation.

And his upright position, throwing strain upon his stomach muscles, leads to various forms of trouble, such as hernia. He is also becoming a prey to diseases which are unknown among savage tribes. All these things raise interesting possibilities. It is clear that the forces which have produced man's evolution have not yet spent themselves.

4. Will man become a more specialised being than he is at present; if so, what are the probable directions: and if not, why not?

The reader will be in a better position to consider this point when he has read some of the later chapters; meanwhile he should note that specialisation beyond a certain stage may be a dead end. In many ways man is not a very highly specialised being, and is therefore capable of considerable adaptation. The human hand, for example, does nothing perfectly, and yet can be trained to do almost anything. It cannot tear and rend as the claw of a tiger; it cannot grip as the paw of a monkey; but it can help man to dig gardens, write letters, play musical instruments, paint pictures; in fact, it can be adapted to almost any ends that the never-resting mind of man desires.

In our present civilisation there are marked advantages accruing from specialisation, as the industrial revolution made clear, and the conditions of modern life seem increasingly to force specialisation upon mankind. But "born a man and died a grocer" is an epitaph with a sad ring about it. We have an intuitive feeling that a man who devotes his working hours to making, say, a hundred chair-legs instead of one chair becomes less of a man and more of a machine. Which

is a pity; for it was not as a machine that man climbed the long ascent of life.

5. Quite a new possibility is now slowly dawning. Man has now evolved to such a point that it is within his power to take conscious thought concerning his line of advance. Perhaps he may to some extent make of it what he will. There is a nascent science of eugenics, of which we are likely to hear more in the future; already suggestions are made that mentally unfit people shall be made incapable of producing offspring. This proposal involves difficulties, for we do not know very precisely what constitutes a mentally unfit person; but what is significant is not the merits or demerits of this particular suggestion, but the fact that such a suggestion should be made at all. It opens up tremendous vistas of speculation. Suppose man were to take his own future in hand scientifically, breeding only from the best stocks, determining the kind of superman he wanted to produce, and taking the necessary steps to that end? To some readers this may sound Utopia and to others a nightmare; there is certainly an element of fantasy in imagining it possible at the present day; it involves not only more knowledge but also far more long-range planning than seems within the grasp of modern civilisation. But a hundred thousand years are as nothing in the sight of evolution; and what has been suggested is an obvious enough possibility of the future.

6. This brings us to a more fundamental consideration still. So far, we have been considering the growth of man's body as a whole. But the whole of the later part of man's evolution has been due to the develop-

ment of one organ of the body—the brain. Man is now a thinking animal. And that development has changed fundamentally the whole character of man's environment. Man is now influenced by the books he reads, his intercourse with his friends, the customs of the countries in which he travels, the paintings which inspire him, and by the whole of that subtle intellectual atmosphere, the spirit of his age. In other words, he has now a mental environment; and perhaps his future development will be on quite another plane. But the development of his mind deserves a chapter to itself.

III

THE GROWTH OF MAN'S MIND

Cogito, ergo sum.

DESCARTES

Qu'est-ce qu'une chose qui pense? C'est une chose qui doute, qui entend, qui conçoit, qui affirme, qui nie, qui veut, qui ne veut pas, qui imagine aussi, et qui sent.

DESCARTES

. . . One gift she bestowed to save him from threatened extinction—a certain stirring, a restlessness, in the organ called the brain. A. S. EDDINGTON

Creative intelligence in its various forms and activities is what makes man. Were it not for its slow, painful, and constantly discouraged operations through the ages man would be no more than a species of primate living on seeds, fruits, roots, and uncooked flesh, and wandering naked through the woods and over the plains like a chimpanzee. J. H. ROBINSON

THE GROWTH OF MAN'S MIND

I

THERE have been definite changes in man's body since the time of our earliest human ancestors. Man has altered, for example, in stature, weight, posture, colour. But such changes have contributed only slightly to the astonishing differences which separate modern man from his primitive ancestors. The evolution of mind, from the days when man was hardly a man at all, to the days in which the first true human beings roamed about the earth, and again to the days in which an Einstein can express a law of Nature in a differential equation: it is this which is the really significant growth. It has given man a far larger measure of control over his physical environment, it has turned him into a member of a social organisation, and it has brought him face to face with problems which are different in their very nature from those which confronted his ancestors. It has transformed his mental environment. In comparison with the growth of man's mind, the growth of his body has been trivial. In this chapter we can only hint at one or two of the features which have characterised this mental development.

It is misleading to think of 'mind' and 'body' as though they were essentially distinct things. For the sake of effective study we concentrate attention first on body and then on mind, but the two pictures we thus construct do not contain the whole truth. Man is best thought of not as a body which has a mind

attached to it, nor as a mind expressing itself through a body, but as something which we may call a body-mind. 'Body' and 'mind' are thus two aspects of a whole which is greater than either.

The evolution of the mind has been conditioned by the body, and in particular by one organ of the body, the brain. But mind and brain are not interchangeable terms. Brain is the concrete, physical entity which can be seen if you split a man's head open; you see it in every head, not only in the heads of the intelligent. The body is the organ of mind, that through which mind manifests itself, and the brain is an important part of the body. But brain is not to be identified with mind, any more than a piano, or the keyboard of a piano, is to be identified with the music it plays, or with the pianist who operates it. We shall attempt no definition of the word 'mind' here, but merely stress the facts that it is an abstract conception, that it manifests itself through the body, and that we do not know for certain whether it can manifest itself in any other way. As to its real essence: whether this complex of thoughts, tendencies, emotions, feelings, is the ultimate 'reality' or not; that is a question which has no meaning until we have defined our terms more precisely, and we must be content to defer it.

Our immediate point of departure is the brain. Brain is generally regarded as the organ which does our thinking for us. But it is concerned with many other functions besides that of conscious thought. It is the centre of our nervous system. All our sense-impressions go either through the brain or through such extensions of our central nervous system as the

spinal cord; and it is only through our sense-impressions that we gain any direct knowledge at all of the external world. We gain our knowledge by seeing, hearing, touching, tasting and smelling things, and then by 'thinking' about these sensations. If I touch a hot plate, my fingers do not draw back of their own volition. An impulse travels up a nerve from the finger; a second impulse is sent back along another nerve to the muscle; the muscle withdraws the finger. Fortunately for me, all this happens in a fraction of the time it takes to describe; but it does not happen in no time at all. Scientists can measure the actual time that elapses, and compare the reaction-times of one person with those of another; there are considerable differences.

I am driving a car along a road obstructed by an obstacle. My optic nerve is stimulated by the rays of light proceeding from the obstacle; an impression goes to the brain, and I 'see' the obstacle. I may make a conscious decision to slow up; if I do, my brain transmits to my muscles the impulses which cause them to apply the brakes. I may not, however, be conscious of coming to any decision at all; I may find myself 'automatically' slowing up. I am so used, in fact, to making this kind of decision that now I have been able to hand the work over to be done by the brain without a conscious effort of will.

In a human being, then, the brain controls many other processes besides those of conscious thinking. Sense-impressions, whether received by the eye, the ear, the nose, the tongue or the hand, are poured into it, and corresponding impulses are transmitted by it

to the muscles. It not only receives and transmits, but it also stores up, and is thus the seat of association-processes, such as memory, which allow past experience, as well as present experience, to influence our behaviour. Reflex actions, such as those governing breathing, the movements of the eyes, the motion of the food-canal, pass mainly through the spinal cord, although in man they can be brought under direct control of the brain itself.

Brain is not the only organ controlling thought. It is certainly an essential part of the mechanism of thought; if for example a minute splinter of bone were to drop from the roof of the skull on to the brain, thinking might be rendered impossible, and a cultured man might be transformed into an imbecile. But thinking is a function of the whole body, not of the brain alone. There is a sense in which we 'think with our hands'.

Obviously brain, or an organ performing similar functions, is not the exclusive possession of man. It is found in rudimentary forms of life. But it is a much more developed organ in man. As life evolves to what we call higher levels, brain becomes more highly organised, and in general larger; it is much larger and much heavier in man than in animals. But it should be said at once that intellectual capacity does not depend directly upon the size of the brain, any more than strength depends directly on the size of the body. What seems to matter is intricacy of organisation. It is quality rather than quantity that counts. At least one race of sub-men appear to have had quite large brains, but not to have been well developed in-

tellectually. And Anatole France is an example of a man of high intellectual capacity who proved to have a brain which was below the normal in size.

II

What kind of behaviour can be observed in creatures lower in the scale of evolution than man? Let us take as an example the case of the digger-wasp, a creature which preys upon caterpillars. Its method is to sting the caterpillar, quickly, in the three nerve-centres of the thorax; it repeats the process, more leisurely, in the abdomen. This is the very reverse of random activity; it is activity directed towards a very definite end, for by this means the caterpillar is paralysed without being killed and can be added, alive, but helpless, to the wasp's storehouse of food. At first sight we might call it highly intelligent behaviour. But the wasp does not 'think' about what it is doing, in the sense in which a human being would have to think, and think hard, before he could carry out an equivalent process; the wasp can perform the action the first time it sees a caterpillar. The capacity to do it is inborn; that is what its mental structure causes it to do to caterpillars; and if anything should occur to disturb the routine of the action it might be quite incapable of adjusting its behaviour accordingly. This kind of action is called *instinctive*.

An instinct is an inborn response to a specific stimulus; a response which need contain no element of conscious reflection, called forth by a certain stimulus applied to the organism from outside. Its mechan-

ism may be no more than that of a chain of reflex actions, each called forth by the one before it. A bird has an instinct to build a nest; a mammal has an instinct to feed its young; its child has an instinct to suck at the mother's breast; and so on. Certain responses to certain situations—suitable responses—appear in time to have become hereditary; and when an action is based on these hereditary modes of response we call it instinctive.

The wasp's instinct is quite a specific one; it reacts to a certain stimulus in a perfectly definite way. Another species of wasp will respond to a different stimulus; it will ignore caterpillars and react instead to spiders; but the stimulus is again a specific one. Some instincts, particularly in human beings, are more generalised; men have instincts of fear, love, acquisitiveness, curiosity, sex and so on, which can be stimulated in a variety of ways. My instinct of fear, for example, might be stimulated by a ghost, a tiger or a schoolmaster; though in other circumstances I might be curious about the ghost, interested in the tiger, or actually pleased to meet the schoolmaster. In passing, it is important to note that when we classify an action as 'instinctive' we are not fully describing the mental activity associated with it: instincts are accompanied by strong feeling, and some by specifically named emotions. But we are not concerned at the moment with the emotions of the wasp.

An instinctive response is not the only kind of response which an organism may offer to a stimulus. When a new situation is encountered, the instinct may be at fault, and the organism may not respond at all,

or may respond in an irrelevant way. Or it may devise some means of meeting the situation out of the basis of its own experience; and we may then say that it is beginning to exercise intelligence. This is not a technical definition of intelligence, but it corresponds roughly to the common-sense idea of intelligence as the power to deal with the unfamiliar element in any situation; or perhaps we should say the power to recognise an element of the familiar in the apparently unfamiliar. If I have had sufficient training in algebra to enable me to solve such equations as $x^2 = 36$ or $a^2 = 19$ it will not require much intelligence on my part to deal with $y^2 = 35$. But if I am now for the first time confronted with the equation $x^2 + 2x = 8$, intelligence will be required to link this up with my previous knowledge that $x^2 + 2x + 1$ is really $(x + 1)^2$, to write the equation as $(x + 1)^2 = 9$, and hence to solve it. I have recognised an element of the familiar in what at first sight was unfamiliar.

If we now try to draw some kind of distinction between the behaviour of animals and of human beings, we shall probably be tempted to make some such distinction as the following: "animals act upon instinct, men act upon intelligence". The advantage of this theory is that it is easy to remember; but unfortunately there are two things wrong with it. It is doubtful if animals do act exclusively upon instinct; and it is certain that men do not act exclusively upon intelligence, not even when they are most firmly convinced that they do. Human beings have a habit of calling upon their intelligence to furnish them with reasons for some action which is really based upon an in-

stinctive tendency. They become so successful in doing this that they often deceive themselves as to their real motives.[1]

Instinct does, however, function before intelligence: the biologists tell us that "the mechanisms of intelligence come later in the history of the development of the brain than the mechanisms of instinct"; but the line between the two types of action is not very easy to draw, and the advent of intelligence did not, apparently, coincide with the emergence of man. Assigning instinct to animals and intelligence to man is altogether too rough a classification.

Just as man's body appeared at first to be poles asunder from those of animals, but was later found to have grown out of theirs, so man's mental activity was once believed to be altogether different from the animals', and we are only now coming to think of it as having evolved from theirs. We now think of mental life, like physical life, as a continuous whole, what we call intelligence developing by almost imperceptible degrees out of what we call instinct. Or perhaps (as we ought not to assume that instinct and intelligence are on the same line of evolution) we ought rather to say that, as organisms rise in the scale of evolution, we can recognise more and more activity as intelligent and less and less as purely instinctive.

Instinct in animals is not the fixed and unerring thing it may at first appear to be. The nest-building instinct, for example, is possessed by different members of the same species in different degrees; and to some

[1] This very important point will receive attention in Chapter VII.

extent it is a modifiable instinct. Beetles have an instinct to deposit their eggs in certain places; they do not always deposit them where they should. Sometimes a lamb, instead of sucking its mother's teat, will by mistake suck other things instead, such as tufts of wool on its mother's neck. So that instincts are not necessarily perfect at the moment of birth; they are not always unerring; they change; in fact, they evolve. Instinctive response, then, is not a fixed thing.

Nor is instinct particularly successful in preserving the race. It does not enable an animal to adapt itself to its environment so completely that all members of the species come to maturity. As a rule, only a small fraction of them do, the species surviving because of its great fertility. The survival rate of animals low in the scale of life is comparatively small. It is the more intelligent animals, and particularly man, who have high survival rates.

Instinctive action, however, is often so wonderfully adjusted to the requirements of an individual that it is difficult for an observer to believe that no intelligence is being exercised. But intelligence requires experience, and although instinct may modify as the result of experience it is, by definition, inborn, and therefore cannot be a form of intelligence. And in many cases the intelligence required to perform an instinctive act would be so amazing that, if the animal really possessed it, it is inconceivable that it should not be manifested in some other way.

Take, for example, the construction of the honeycomb by the bee. The bee builds the precise form of six-sided cell which gives it the maximum storage

capacity for a given amount of comb; a remarkable example of natural economy. The right shape for this cell can be determined mathematically; a rather complicated problem in differential calculus is involved, which is sometimes set as an exercise to young university students. The student, when he works it out correctly, agrees with the bee. He reaches his result by a process in which intelligence is essential; it seems clear enough that the bee does not.

It is beside the point to enquire how the bee discovers the most economical shape. To the biologist, the bee's performance seems neither more nor less wonderful than a thousand other examples of animal behaviour. It used to be said that the bee's instinct was a good example of intelligence, but of the Creator's intelligence, not the bee's. But this is the kind of explanation that explains nothing in particular, just because, if we accept it, it explains everything, the failures of the evolutionary process as well as the successes.

As another example, consider that instinct of the wasp which leads it to lay its egg in a specially constructed nest, place a caterpillar in the nest, and seal it up. We can hardly imagine that the wasp soliloquises as follows: "When I am called hence, my egg will hatch out into a grub, which will require the protection of a nest until such time as it is able to fend for itself, together with some food on which it can live during that time; therefore I will seal up a caterpillar with my egg, taking care to cover the egg effectively, so that it shall not be seen, but not to bury it so completely that the grub will be unable to

emerge". That would require rather more intelligent forethought than many human beings would show. If the wasp could really argue like this, it would use a modicum of intelligence in other directions; it would not, as it sometimes does if interrupted, seal up a carefully made nest empty; and in building the nest it would not, as it does, reject entirely suitable material for the process.

But, though instinct in animals is not a form of intelligence, it by no means follows that animals do not possess intelligence. There are many instances in which animals do modify their responses and thus show the beginnings of intelligence. The connection of such action with instinct is that it always arises out of instinct and operates within its sphere; the energy of the action, so to speak, is provided by the instinct.

A tiger has an instinct to prey on certain animals; it does not, as a rule, prey on man. But if for special reasons (such as scarcity of other food) it has once attacked a man it discovers that he is good to eat, and it will profit by this experience the next time it encounters a human being. Experience has caused it to respond in the old way to a new stimulus; so that it is not entirely without intelligence.

A wasp has an instinct to get a spider into its nest. If one method proves unsuccessful it may devise another. It will start by dragging the dead body of the spider to the hole. The spider may be too large to go in; that may be the end of the matter for some wasps. But others will reduce the size of the spider by biting off its limbs, and try again; or they may fold the limbs

over the spider's body in order to make a more compact parcel of it. Occasionally the spider will be turned over on its back, or manipulated sideways; and if all else fails, the wasp may at last enlarge the hole. All that may be done to satisfy the wasp's instinct; it is clearly a case of actions modified as the result of experience, and this is what we have agreed to call intelligence.

Contrast with this the behaviour of fishes. A fish, placed in a tank and separated by a glass partition in the tank from another fish which is its natural prey, will continually dash itself against the partition, and seems unable, even after repeated experience, to inhibit its instinctive response. It may be many months learning, or it may never learn at all. On the other hand, flies have been dipped in turpentine and then placed in the way of spiders, which start by attacking them; but a very few attempts in such a case are sufficient to teach the spider to desist.

In some species of moths the females, which are wingless, have a habit of climbing fruit trees and laying their eggs on the leaves. This, for a time, can be effectively prevented by placing bands of grease-proof paper, smeared with some treacly substance, round the boles of the trees; the females cannot cross the band. But it has been found that after some years the males will meet the females below the band and transport them to the top.

Many cats, dogs and monkeys have a quite definite power of learning by experience. The animal may simply learn that a certain action does not pay, which is generally a straightforward illustration of one in-

stinct, say hunger, being inhibited by another instinct, say fear. The cook goes out of the kitchen, the fear instinct becomes less stimulated; the hunger instinct wins, the cream is stolen . . . and the cook is the next person to have her instincts stimulated. Some animals can be trained to imitate, and imitation is a low-grade form of intelligence rather than instinct. Performing animals in circuses have been trained, by methods which in some cases are far from admirable, to do various things, such as spelling out names with a set of letters. The intelligence may not be of the complicated kind it looks; imitation alone may be responsible; but the fact remains that the animal has been taught to perform a series of actions which are not directly dictated by instinct. They are still, however, performed in the sphere of instinct, the lump of sugar, or the trainer's whip, appealing to instincts of different kinds. But the same is true of many actions of human beings.

Of animal stories which suggest a higher type of intelligence there is no end. There is a story of a dog forbidden in its owner's absence to sleep upon a bed. If the owner returned and found the bed warm the dog would get into trouble. Returning unexpectedly one day the owner found the dog at the side of the bed, blowing upon it to cool it. This story may be quite untrue, but the reader may safely be left to substitute for it some anecdote of his favourite dog. There is no doubt in fact that the higher animals do possess in varying degrees that quality which we have agreed to take as marking off intelligence from instinct. But, even in the higher animals, the intelligence shown

deals with immediate ends; it is concerned only with concrete and practical things. In the higher animals there is probably some memory of the past—the individual's past—and some anticipation of the future. Their intelligence can comprehend events in a connected order so far as they arise out of immediate practical interests.

III

We can now form some kind of idea of the mental state of primitive man. He had, first, an extensive equipment of those inherited tendencies we call instinctive. Now we have already mentioned that human instincts tend to differ from animal instincts in one important respect. They are more generalised. In the development of instinct Nature seems to have tried two alternative plans. The first plan was to endow the organism with an increasing number of complex and highly specialised instincts. The individual is thus well equipped to meet, in certain definite ways, a variety of situations; its reactions are soon tried out in practice and confirmed by use. Highly complicated behaviour may result; but there is one drawback: the behaviour tends to be of a routine kind. The organism settles down into its groove at once. This plan is best illustrated by the higher insects, such as ants and bees. It does not rule out the growth of intelligence, but it does not give intelligent behaviour its best chance.

In some of the higher animals, and in man, a second plan was followed. The organism was endowed with rather more generalised instincts, which could be

more readily modified and specialised, according to need, during the life of the organism. This plan exposes the organism to a definite risk; the risk that, before the instincts can be sufficiently specialised to meet the challenge of the environment, a situation will be encountered to which the organism cannot react, and which will therefore end fatally for it. This method has greater potentialities in the long run; but that will be of no avail if, in the short run, it results in extermination. Hence there must be combined with it a playing for time; the organism must be protected until it can specialise its instincts sufficiently to protect itself. And so we get, in the higher mammals, a period of shelter after birth, and a period of training. The fine flower of the second method is man. An ant, which also requires some training, matures in perhaps a fortnight; a baby of the human species is helpless for a long period after birth, and does not come to full maturity for many years.

Primitive man, then, had instincts which may already have been less specialised than those of his ancestors. They would be accompanied by states of high emotional feeling, not essentially different from the emotions of the other mammals. And we must suppose him to have had a considerable power of learning by experience, for he would not have been less developed in this respect than his competitors. In other words, he had intelligence. It must, in fact, have been his developing intelligence which caused him to survive. Without it, he could not have stood up to the beasts of the field. For man was an animal with no armour, no great strength, no special fleetness of foot

to enable him to outdistance others; with rather good vision but a decidedly poor sense of smell. His rivals were stronger than he was: he was more cunning than they were.

Man had, then, from the beginning, some power of profiting by experience; and this would in its turn give him more experience by which to profit. When anthropologists compare the skulls of early members of the human race with the skulls of gorillas and chimpanzees, and deduce information about the brains which those skulls contained, they find significant differences. They find that in the human brain there is a great expansion of the region of the cerebral cortex interposed between the areas receiving impulses from the organs of sight, hearing and touch; and they infer from this that primitive man differed from the apes in having a much greater power of recording the impressions of these senses. In other words, he could store up impressions better and could accumulate experience, and this would give him much greater powers of discrimination.

Because he was able to accumulate experience he was increasingly able to bring his past to bear upon his present; and in this we can see the germ of his power of freeing his thought from the tyranny of the immediate moment. But this power was of much later development; primitive man lived mostly, though of course not exclusively, in the present; for long ages it did not occur to him, for example, to store up food systematically in preparation for a future shortage. To a large extent his to-morrows were unborn and his yesterdays dead.

After a time man began to use rough tools; at first making use of such sticks or stones as happened to be cast in his way, but later, though much later, contriving implements for himself. The use of tools is an education in itself, for it demands co-ordination of muscular activities and co-operation between sight and touch; and the deliberate construction of tools implies a degree of foresight, and an ability to devise an indirect means to an envisaged end, such as no animal save man has ever possessed. Indeed, any considerable facility in even the use of tools is a sign of a mental development much beyond that of an average ape, as recent experiments with apes have shown. But man was not an average ape; he was an exceptionally intelligent one; he used tools at a comparatively early stage; and the use of tools widened his experience still more. Hence he encountered an increasing number of new situations. Now the essence of instinct is that it works well in familiar situations, but is a poor guide in unfamiliar ones; and it must have been in such situations that his intelligence found its opportunities. For new situations his instincts might either fail to give him any guidance at all or they might urge him in contradictory directions; curiosity and fear, for example, must often have struggled for the mastery. They struggle still. And intelligence would once more get its chance.

The history of man's subsequent progress has been the history of the slow advance of intelligence; not ousting instinct, but supplementing it. Man did not, however, rule his actions exclusively by these two; instinct would have failed him again and again, and the

constant exercise of intelligence would have been exhausting. He came under the sway of habit, as we say if we are thinking of his mental processes; or of custom, as we should say if we are thinking of him as a member of a tribe.

Habit is so important that we sometimes call it 'second nature'. Its value is that it effects great economy of mental effort. If an action arises as the result of intelligence in the first place, and is then committed to the care of habit, much energy can be saved. The danger of habit is that it stereotypes bad behaviour as well as good.

As a member of a community, primitive man relied on custom. He must 'marry out'; he must not kill his own kith and kin; if someone else kills them, he must avenge their deaths; he must observe the tribal rites, and so on. Captain Palmer tells us of the Fiji Islanders that

> A chief was one day going over a mountain path followed by a long string of his people, when he happened to stumble and fall: all the rest of the people immediately did the same except one man, who was set upon by the rest to know whether he considered himself better than the chief.

To depart from custom, in a primitive society, was to incur the displeasure of the whole community. To perform an action in a new way; to question the need of performing some other action hallowed by the practice of the past ages; to put forward an original speculation; these were things attended with real danger. The innovator might be canonised (after his death); he was much more likely to be burnt alive at the stake, which is discouraging to innovators. Man could not

have advanced without being to some extent a creature of habit; but the 'dead hand' of custom has weighed heavily on the human race.

IV

One other thing affected the development of man's mind very greatly; the evolution of his power of speech. Two things are necessary for speech; certain muscles, and a cerebral apparatus for controlling them. Now these were already developed in man's simian ancestors. The further things needed were an appreciation of the usefulness of communication and the ability to devise the necessary symbolism. Man's articulation must at first have been rudimentary, and his vocabulary limited to a few sounds expressing terror, or warning, or delight. But it grew by degrees into a language. So great is the importance of language that some philosophers have argued that it is essential to thought (as opposed to emotion), and they would call the use of language the real dividing line between intelligent and non-intelligent behaviour. Whether this is true depends on the definition given to 'intelligence'; it would not be true in the sense in which the word has been used in this chapter. Nevertheless speech is probably the best indication there is of the standard of mental development of a race.

Young scientists are apt to be contemptuous of the study of language, which deals with 'words' rather than 'things'. They could not make a greater mistake. Language has enabled man to generalise, and to indulge in abstract thought. Without language, abstract

thought would have almost insuperable difficulties to overcome. Symbolism of various kinds—for example, the symbolism of mathematics or of logic—is simply an advanced kind of language, which gives still more opportunities for abstraction.

Here is a round object in front of me—I call it a table. To my dog, it is something on which he can jump if he wishes to get out of the window; or else it is something from which, if he waits patiently, he will get his dinner. That is the beginning and the end of the table for him; as far as we can judge, he sees it only in its immediate relation to him. But to me it is a 'table'; and to me the word means not only 'this' table, but 'any' table; I can form a generalised idea of a table without specifically thinking of the one at which I am sitting, or of any particular table. Until man was ready to make the generalisation he would not have invented the word. That generalisation is inherent in the word. And the word 'table' takes my thoughts to my uncle's table, or to the kitchen table; or I may think of it as an article of furniture which will fill a space in my study; or as a good illustration of Jacobean work; or as a thing which, if my fortunes decline, I may be able to sell for five pounds; or as an excellent source of examination questions on stable equilibrium. There is no end to the number of different connections I can form with the word 'table', simply because it represents a generalised thing. I cannot make it mean a specialised thing without adding something to it—'my' table, or 'your' table. And it so happens that this particular word has a whole class of associations of a different kind, and will set me thinking

about time-tables, nautical tables, mortality tables, and tables of logarithms. The time-table reminds me of a pleasant holiday I spent last week, the nautical table of the moon's tidal influence, the mortality table sets me thinking about my insurance policies, and the logarithm table recalls to my mind a calculation I have to make this evening. For all of which trains of thought the one word 'table' is responsible.

Language has enabled man, then, to develop the power of abstract thought; and abstract thought has opened for him the gateway into another world, the world of ideas; a world, so far as we can tell, explored by man alone. Some people (and not only professional philosophers) live more happily in this world of ideas than they do in the external world; they often, indeed, fly to it as a refuge from the external one. But the world of ideas does not represent, in the life of man, merely a kind of mental enjoyment. There is nothing which has given man such power over the external world. As we saw in the first chapter, the more abstract his thought has become, the more powerful it has ultimately been. Man's immensely increased control over his physical environment is due mainly to the fact that his thinking has not been confined to the immediate problems of that environment. Pythagoras, Archimedes, Galileo, Bacon, Newton, Maxwell, were all abstract thinkers and have all influenced the conditions of twentieth-century life in a hundred indirect ways. Bacon was prominent in practical affairs, but is remembered as a scientific thinker rather than as a judge; few people would have heard of Newton had he been only Master of the Mint; and Archimedes'

efforts at the siege of Syracuse are only recalled as anecdotes connected with a man whose claim to fame was in another direction.

The development of man's power of speech has had another far-reaching result: it has turned him into the only animal with a tradition. The laws of heredity—that is, the laws which describe what is passed on from parent to child—are not as yet very clearly understood. But the important fact is this, that man's inheritance from his ancestors has not been a purely physiological one. Each generation of human beings, to a far greater extent than is the case with other species, has instructed the new generation. The instruction was at first carried out by parents; later it became so lengthy and specialised a task that it was handed over to a class of beings called teachers; nurture has increasingly been called upon to help Nature. In this way some of the experience of one age has been acquired much more expeditiously by the next one; and the development of language has facilitated this process to an enormous extent. Thus man has gradually acquired a tradition, perhaps the greatest single advantage over the animals that his brain has secured for him. And in the last few hundreds of years (that is, yesterday, on the cosmic scale of time) a new factor has revolutionised the speed of this process. Knowledge, which was at first handed down orally, and then preserved in manuscripts, has since the invention of printing been stored up in printed books, which have become both cheap and widely circulated. Intelligence grows at a slow rate; the fruit of intelligence, knowledge, grows fast. The native in-

telligence of twentieth-century man may be no more than that of the ancient Greeks (some people think it is considerably less); but he can focus it far more quickly and effectively upon many problems, because he *knows* more.

We can summarise the position in some such terms as the following. Mental life shows continuous development from the lowest forms up to man. At first an organism acts upon inborn responses to stimuli, called instincts. Some animals can learn to respond to a different stimulus; an advance. Others can imitate; an advance. Others are able to modify their responses considerably; an advance. Man, as the result of more experience, modifies his reactions still more. He comes under the sway of custom; an advance; and later becomes capable of conceptual thought, which is intimately linked with language. This is the greatest advance of all, since it frees his thought from the limitation of the immediate surroundings. So long as we recognise the evolutionary nature of this process it is a matter of minor importance, in fact a matter of definition only, to decide at just which point in the process we ought to describe the behaviour of an organism as 'intelligent'.

V

When we think of the stumbling efforts of primitive man, of the length of time that elapsed before he could make even so simple a thing as a flint implement, we are apt to think of twentieth-century man as a highly

intelligent being. But, on any astronomical scale of time, man is in his infancy as yet; and perhaps at present we are only at the beginning of the Age of Intelligence; emerging from darker ages, and only just getting a glimpse of the sun. As yet intelligence does not play nearly as large a part in the ordering of our lives as we like to think it does. If the reader will examine with care his own actions for the last half hour he may be surprised to find how few of them were dictated by pure intelligence; how many were merely habitual, how many automatic, and how many the outcome of some strong feeling he happens to have, some instinctive like or dislike.

But though we may hope that man will continue to evolve until he is more guided by intelligence than he is now, it does not follow that he will develop, or that we ought to want him to develop, into a purely intellectual being. Many people feel that a point might well be reached beyond which they would not care to see intelligence intrude, and that what should be aimed at is a more balanced life, in which sensations, thoughts, feelings, aspirations would all have their due share. Such a life, they feel, would be more significant to human beings than a life lived in the pure white light of intelligence alone. Others will reply that many thousands of years must pass before the human race is likely to show signs of being overrun with intelligence.

When the power of organised thought became realised, however, it was quite often believed that instinct was a bad thing, which ought to be suppressed; that it typified man's lower nature, at war with his higher

one; and that the right course was to trample it under foot, in the sacred name of science (or progress, or morals, or religion). But we are now beginning to find that there are certain dangers in such a course. Instincts which are repressed have a dangerous habit of burrowing underground and finding expression in unexpected ways which no one thinks desirable. The repressed instinct is not killed, but only forced out of sight; and when the energy attached to it is not allowed to express itself in the natural channel it will find an unnatural one. And so the modern attitude towards an instinct is not to think of it as a kind of enemy of our better selves, to be repressed at all costs, but to accept it for what it is, an integral part of our mental life. It is neither 'good' nor 'bad', though it may give rise to either good or bad conduct in any given set of circumstances. But in any case it is there; so we may as well make the best of it. As the energy attached to the instinct will be utilised somehow, we try to direct it into a useful channel rather than a harmful one.

Some instincts need only the slightest amount of redirection. When a small boy makes mud pies in his mother's drawing-room, he is only satisfying his instinct of constructiveness. Give him a Meccano set and he will be equally happy; and his mother will be much happier.

Other instincts may need more; they may need raising from a lower end to a higher one; the psychologist would say that they need to be 'sublimated'. For example, there is an instinct of pugnacity in all of us. Man was born with the capacity for fighting.

If he had not fought upon occasion he would have died. This does not mean that he was inevitably and always a fighter. Many savages are peaceful people. Man fought when his instinct was stimulated; when someone threatened his life, or removed his dinner, or when he was hungry and wanted someone else's dinner. But now his environment has so completely changed that it would be truer to say that if he goes on fighting wars he will die. War has thus become an undesirable outlet for the instinct of pugnacity. But it is impossible to suppress the instinct entirely; if we make a conscious effort to do so, it will probably only mean that the instinct will express itself in unexpected forms, and that we shall become awkward, quarrelsome people, always magnifying our grievances and always "agin the government". What the instinct needs is sublimation—redirection into a higher channel. And it could be redirected easily enough if we took the trouble. It might be enlisted in the battle against ignorance; it might turn us into doctors, and be the motive power of an attack upon disease; it might inspire us to attack poverty; it might turn us into happy warriors against all those features of our social system of which we may disapprove. The energy of the original instinct would remain; the direction given to the energy would be different.

Instinct, then, is not to be regarded as bad in itself; it needs control and direction rather than suppression. But there is more to be said about it than that. We have already noticed the close connection of our impulses, good and bad, with our instincts. And it may be argued that impulses derived from our instincts

provide the driving power of our activities to an extent of which mere reason is incapable. Hence some people feel that the real problem of our time is to organise society, not so that it shall encourage exclusively rational conduct, but so that certain impulsive forces shall get much fuller opportunities of expression than they do at present.

The argument is as follows. What is wrong with our society is not that it is based upon instinct, but that it is based upon the wrong instinct; the instinct of acquisitiveness, the desire to have and to hold. From this spring all our complicated laws of property, all our careful distinctions between mine and thine; they are but expressions of man's feeling that he cannot properly enjoy a thing unless he 'owns' it. This is thoroughly bad; for 'a man's life consisteth not in the abundance of the things which he possesseth'. He can enjoy a sonnet, or scenery, or the society of his friends, without owning any of these things. But there is a group of other impulses, the creative impulses, which can be utilised very readily for good ends, but which are denied full expression; if society were organised so as to encourage these, they might transform its whole spirit. If the impulse to make things, to create something new, could be given a chance, a society might arise in which to love rather than to have would be the ruling principle, which would be based on co-operation rather than competition, and in which the craftsman, the poet and the artist would come into their own.

I too will something make
And joy in the making.

The reader must form his own opinion as to whether or not this over-simplifies a difficult problem. Is what is wanted a life based still more upon impulse, but upon the right impulses, not the wrong ones; and if so, can we agree upon what are the right impulses; or is there already too much impulsive action in the world, so that what is wanted is a steady taking over of its territory by intelligence?

VI

Something remains to be said about habit, which hardly merits the scorn we are sometimes apt to pour upon it. Its function is really to economise intelligence. We used to be told that we should always "think what we are doing". If we carried this out literally we should make no effective progress at all. I sit down, for instance, to work out a mathematical problem. I have first to make a simple multiplication. As a matter of habit I say, "Seven 8's are 56". If I really thought about what I was doing, if I asked myself *why* seven 8's are 56, I should never get the sum done. My next operation is to take a square root. I do it quite mechanically; that is, I let habit do it for me; I do not ask myself the reason why (which may be fortunate, for many of the people who extract square roots do not know the reason why). And so on; I must clearly save my real thinking for that step or steps in the problem presenting new features, about which I have not thought before.

Or again; suppose I really thought what I was doing when I drive my car? I should reflect that the

car was now wandering so far to one side of the road that it would be advisable to correct its motion; hence, the front wheels must be made to rotate round a vertical axis; and this could be effected by imparting a torque of the appropriate moment to the steering-wheel, since such a torque would be transmitted, through a simple mechanism, to the wheels. By which time the car would probably be in the ditch.

I need, then, to rely largely on habit when driving a car, just as I do when carrying out any series of mental operations. But there is an important qualification to be made. It is a good thing that I should understand intelligently, in the first instance, just how my car does work, for I may be stranded with a broken-down car in circumstances in which mere habit will not be of the slightest use. But having once understood, I ought then to form the right habits as quickly as possible. Anyone who consciously drives a motor-car on scientific principles is a danger to the public.

This condition, that intelligence shall precede habit in the first place, is vital. Otherwise I may repeat for long periods quite unnecessary processes for no better reason than that I have habituated myself to doing them. Factory workers, for example, sometimes make many unnecessary movements in carrying out some given piece of manual work; they have become used to doing so, and do not notice that by a reorganisation of the process they could economise time. If they do notice it, they then have all the trouble of breaking a bad habit before they can form a good one.

In that externalised form of habit we call custom there lie special dangers. We may accept as justified

a custom which is really not justified at all. For custom is conservative, and tends to continue long after the justification for it has passed; that is why reformers tend to think of custom as a drag on the wheels. The standard of morality in a state tends, we may hope, to advance, and customs which accord with the moral sense of the community in one century or even one generation may not accord with it in the next; but they will continue unless energetically opposed.

It is tempting to give examples of this; but it will be far more profitable to the reader if he finds examples for himself. As a modest excursion into an indefinitely large territory, he might ask himself whether such customs as slavery, bull-fighting and fox-hunting come within this category. And coming to matters which may affect his own conduct more closely, he might enquire whether there is, or is not, any justification for such customs as the following: taking off your hat to a lady; not walking under a ladder;[1] not eating peas with a knife; putting buttons on the sleeves of a man's coat; 'women and children first' in lifeboats; throwing salt over one's shoulder; 'touching wood'; and saying morning prayers at school.

[1] This apparently originated in the idea that the ladder, the wall and the ground symbolised the three Members of the Trinity.

IV

THE GROWTH OF MAN'S RELIGION

The divine is the head and root of man. PLATO

The Pilgrim they laid in a large upper Chamber, whose window opened toward the Sunrising; the name of the chamber was Peace. BUNYAN

Like tides on a crescent seabeach
  When the moon is new and thin,
Into our hearts high yearnings
  Come welling and surging in—
Come from the mystic Ocean
  Whose rim no foot has trod—
Some of us call it Longing,
  And others call it God.

W. H. CARRUTH

There are some to whom the sense of a divine presence irradiating the soul is one of the most obvious things of experience. In their view a man without this sense is to be regarded as we regard a man without a sense of humour. The absence is a kind of mental deficiency. We may try to analyse the experience as we analyse humour, and construct a theology, or it may be an atheistic philosophy, which shall put into scientific form what is to be inferred about it. But let us not forget that the theology is symbolic knowledge whereas the experience is intimate knowledge. And as laughter cannot be compelled by the scientific exposition of the structure of a joke, so a philosophic discussion of the attributes of God (or an impersonal substitute) is likely to miss the intimate response of the spirit which is the central point of the religious experience.

A. S. EDDINGTON

THE GROWTH OF MAN'S RELIGION

I

A CLERGYMAN was once endeavouring to explain to a small boy the doctrine of the Immanence of God. "My boy," he said, "God is everywhere." "Is He in this room?" asked the boy. "Yes, my boy, He is in this room." A short pause. "Is He on this table?" "Yes, He is even on this table." A longer pause for the consideration of possibilities. "Is He in this ink-pot?" "Yes, He is even in that ink-pot." The boy swept down his hand triumphantly upon the ink-pot and said, "Got Him!"

The boy was merely making a mistake which runs through all disputations about religion; he was confusing the material and the spiritual, and mixing up things which are of different *kinds*.

There are honest people who think that religion is only another name for superstition, and that much of the misery and unhappiness of the human race should be laid at its door. They are not without a case, if they select their facts carefully. They must emphasise the long record of bloodthirsty religious sacrifices; the Inquisition; the astonishing way in which the religion of the Cross has wielded the sword; witch hunts; the corruption of monasteries; the anti-scientific influence of the Church; the fact that, when a real seer or prophet arose, the priests often crucified him; and a hundred other disfigurements. There are equally honest people who believe that many of the greatest

improvements in life can be traced to the influence of religion; that education would have been impossible without it; that it has helped countless thousands of people in all countries and at all times to live upright and helpful lives; and, above all, that it furnishes man's only contact with ultimate Reality: they also can make a case. But to talk of religion being 'bad' or 'good', as though it were a static thing which could be measured and weighed in the balance, is to over-simplify the whole problem. For man's religion, like everything else connected with him, has grown. His body has evolved, his mind has evolved and his religion has evolved. And in the course of its evolution religion has passed through many stages, some which now seem to us to be bad, others which many of us would consider good.

We are hardly justified in saying definitely that man has never been without a religion of some kind; our knowledge is insufficient for so wide a generalisation. But it is certainly true that he had a religion at a very early date.

The more we consider this the more astonishing it becomes. We have seen something of primitive man already; a being not greatly removed from the animals, "of the earth, earthly". He had hardly the rudiments of conceptual thought; what we should call culture was entirely alien to him. And yet he had a religion. But lately emerged from the jungle; preoccupied in avoiding his enemies and in finding his food; set in the midst of a hostile environment which must have absorbed all his energies, he was yet able, it would seem, to lift up his eyes to the hills. And he

asked 'Why?' Which was a question no one had asked before him.

How his religion started we do not know. Was it the product of fear, or awe, or a sense of the Unknown? Fear is a frequent element in primitive religion, and particularly in cases in which the environment was more than usually hostile; its predominance in Africa, for instance, led to a degenerate form of religion known as devil-worship. But fear was not the only element; and a man can be frightened without being frightened into religion.

Man seems always to have had what we may call a religious impulse, which arose out of the very nature of his being. He was always the never-satisfied; always a visionary; always with some touch of the infinite implicit in him. He was always dreaming dreams—in a world which did not, one would have thought, offer much encouragement to dreamers. Many of his dreams were stupid enough. But the significant fact is that he did dream.

That, then, is the first thing which appears to emerge; that man, the warrior, the hunter and the hunted, felt a need. That seems to have been the way he was made. He could not be satisfied with the things he saw and felt; he reached out. What he was seeking he did not know; but he was seeking something.

But while we may thus think of religion as the expression of man's craving for a Beyond, we should not think of it as wholly the expression of an idealistic impulse; other elements were entwined with it. In his religion man found protection for himself against an alien world; it comforted him. Man could better face

the forces of Nature, to him inexplicable and overwhelming, if he thought of them as having the same kind of life as was in himself. This led him to invent gods who seem to us to have been more terrible than the storm and pestilence which were their manifestations; but primitive man could understand them better; a humanly conceived savagery is humanly tolerable.

Nor should we think that primitive men always expressed in their worship either a religious impulse or a feeling of dread; they must often have performed their religious ceremonies simply because it was the tribal custom to do so.

Man did not begin by worshipping a God. He worshipped, first, very simple and obvious things. He worshipped stones, which he believed to be the framework of the earth; did he not himself emerge from a cave? If he lived on an island he worshipped the ocean; if he lived in a valley he worshipped the river. He worshipped the sky which was above him, and the sun which shone in the sky; he worshipped the dawn, the mountains and the trees. At a very early stage he seems to have been a corpse-worshipper. He fed his religious impulse, then, on the things which were around him; the only things which so ignorant a being could worship. What is important is not the particular external object which he worshipped, but the inner urge which impelled him to worship something.

It is probable, however, that he did not worship quite what he thought he did. He was not a psychologist and he could not analyse his feelings. Perhaps it

was really the infinite in the ocean which attracted him. Perhaps, when he worshipped the river, what really drew him was its unapproachable source. Perhaps he worshipped the sky because it contained a beauty he could not understand. Perhaps when he addressed his prayers to the Dawn he was stirred by the unknown element in it. And perhaps in his corpse-worship he was drawn onwards by that mystery of death which we have none of us yet been able to penetrate.

Perhaps, in other words, he was unconsciously seeking after what we may call the Infinite, but which he could only conceive in the simple terms of his every-day experience.

Whatever the reason, he began with very real and concrete things. They were the only things he could begin with. But he grew; we already know something of the changes which came over his mind. And as his mind developed his religious conceptions enlarged. He came gradually to invest these simple objects with special attributes. He had a feeling that, after all, it was not exactly the Dawn which he worshipped. It must be Something or Somebody at the back of the Dawn; something great and wonderful. There is no wonder that he thought of it as a man; how else could he envisage it? What higher compliment could he pay it? But it must be an extraordinary and all-powerful Man. And so the object of his worship took form; it was no longer the Dawn, but the God which was the Dawn.

We must remember, however, that a *clear* distinction between a 'thing' and a spirit animating the thing is

probably a later rationalisation, for at a very early stage primitive man may have had difficulty in distinguishing between animate and inanimate objects; he may have thought of all things as alive.

What kind of a God did man invent? A powerful being, able to compass distant ends; and therefore likely to be useful to him. For there is no doubt, unfortunately, that man wanted at times to get something out of his religion! Even at a far later stage, it will be remembered, Jacob saw nothing wrong in striking a bargain with Jahweh:

> And Jacob vowed a vow, saying, If God will be with me, and will keep me in this way that I go, and will give me bread to eat, and raiment to put on, so that I come again to my father's house in peace; then shall the Lord be my God. And this stone, which I have set for a pillar, shall be God's house; and of all that thou shalt give me I will surely give the tenth unto thee.

Jacob seemed to want a good deal for his ten per cent. Most human motives are curiously mixed; and before we condemn Jacob, or feel ourselves superior to the savage, we might remember that we ourselves in the twentieth century pray for rain.

The gods of primitive man were not only powerful, they were jealous and revengeful beings, who required propitiation; in fact, beings with many qualities like those of man himself. For if "God created man in His own image", it is also true, as Voltaire said, that man was obliged to create God in man's own image. And as his god required propitiation, the savage sacrificed

to him. In greater or less degree, most primitive religions contain a sacrificial element. The 'life' which is in the god is supposed to go into the worshipper as he eats. The sacrificial element is one which it is reasonable to suppose would, because of man's own ancestry, excite a strong emotional feeling; and it would have a special rite or ceremony attached to it, in the performance of which the priest would be prominent, and which he would therefore have a vested interest in preserving; human motives, again, are mixed. Man may have started with a pure impulse for the unknown, but it led him into many a blind byway before he stumbled out again with his face toward the Light.

Primitive man, then, we suppose to have had implicit in him a religious sense; an impulse to reach out into the unknown; a feeling of incompleteness. But he was also ignorant and uncultured, and his sense could only find expression through his own mind. His mind being unformed and uncritical, his conception of God was obliged to be correspondingly low. It may be that he could experience God; but when he *thought* about God, he was at once subject to the limitations of the vehicle which did his thinking—a but slowly awakening mind. His doctrines were therefore full of error, which is to say that they were thoroughly human; but the impulse which made him worship was implanted in him from the beginning. He was an incurably religious animal.

The fact that we can trace back most of the ideas in primitive religion to the everyday experiences of

man, that man made up his own doctrines, has seemed to some people one more proof that religion is a deception of the mind. It bears, they say, the stamp of its human origin unmistakably upon it. But that only accounts for the doctrine of the religion, not for the religion itself.

The reader may look at the problem from another standpoint and yet come to substantially the same conclusion. He may feel that religion is divine in origin, not human. But the difference may be one of language rather than of substance. For God, it could be argued, made man; and it was only as man grew in stature that God was able to unfold more and more to him. Man's understanding was limited by his powers at any given time; if the full Truth had been revealed to a savage it would have been meaningless to him. If the full Truth were revealed to us now it might be meaningless to us too. To say "God revealed Himself progressively to man", and to say "man purified his religion as he grew", is to say the same thing in different ways; at least it is the same thing if we agree with Plato that the divine is the head and root of man. In the last analysis, many religious controversies resolve themselves into disputes about statements rather than disputes about realities.

The essential fact is that as man's horizons widened he felt the need for a better creed; and the better creed came. The history of religious ideas is the history of a gradual purification. Error is seen to be error and is pruned out, and the new doctrine is (usually but not always) an advance on the one before it. How great the total advance has been is best realised by com-

paring a few ideas found in primitive religions with the ideas current among educated Christians of our own time.

In early times we get widespread totem-worship, a totem being an animal, or object, connected with a people by ties of blood and from which they believe themselves to be descended. Later, the totem becomes the symbol of the tribe.

We get fetish-worship, a fetish being an object containing a spirit which by its magic will assist the savage.

We get deities who are little better than mere totems, and also deities who are a long step in advance.

We get, not merely tribal gods, but gods for each district, village and family; and then we get later an advance from a tribal god to a national one, and in the end to a universal one.

We get the cult of the dead, even in a community as advanced as that of ancient Egypt (though judging it, as we must, from its tombs, perhaps we judge it unfairly and fail to give it credit for more advanced ideas it may have had).

And in practically all forms of early religion we find the rites of sacrifice, and the traces of irrational prohibitions or taboos. An object placed under taboo becomes in some way sacred. If it is food, it must not be eaten; other objects under taboo must not be touched, or in some cases even looked upon; and the penalty for infringing the taboo is usually death. Taboos gather frequently round blood, or round the phenomena of birth and death, or round the person of the king, even extending to the king's weapons and his food. The taboo plays a great part in the religion of

primitive peoples; it encourages a sense of mystery, and it feeds on the sense thus created. In progressive tribes the taboos become to some extent rationalised later.

At a later stage we meet Animism,[1] with its doctrine of the soul which can exist apart from the body, and which goes on adventures. Sometimes it gets lost, and the medicine man is summoned to bring it back, which he does with many incantations and noisy rites. Animism is a product of dreaming; the soul is thought of as a little manikin imprisoned within the body, which can escape during sleep. It is partly from politeness and partly from convention that modern man places his hand in front of his mouth when yawning; his ancestors did it as a precaution against the escape of the manikin.

At a later stage again we get traces of Pantheism, for example among the Hindoos, an exceptionally religious race. God is in everything; everything is equally divine, including man himself. But as this applies to things which are evil as well as things which are good, pantheism, otherwise an advanced conception, makes the spread of morality difficult.

Broadly, we may say that we first find man worshipping inanimate things, then worshipping a spirit which animates the same things, then worshipping many gods, and finally rising to the conception of one supreme God.

It is only in the later religions, such as Confucianism, Buddhism, Judaism and Christianity, that we find a marked development of moral ideas. (Morality and

[1] 'Animism' is sometimes used in a wider sense than is implied here.

religion, though they have often joined forces, are essentially different things.) Buddhism, for example, not only sets forth a path of spiritual development; it also preaches, in its purest form at least, a lofty ideal of conduct. If the Buddha really said, "Never does hatred cease by hate; hatred ceases by love, that is its nature", he was foreshadowing, six hundred years before the birth of Christ, one of the central doctrines of Christianity itself. Buddhism is a fatalistic religion without much appeal to the Western mind, but there is no doubt of the sublimity of much of its teaching; and the reader who is interested will find in Sir Edwin Arnold's poem, *The Light of Asia*, a sympathetic account of a religion which has, at the present day, more adherents than Christianity itself.

As Christianity developed out of Judaism, and was to some extent a protest against its abuses, it is natural for Christians to feel that it represents a great advance upon the religion of the Jews. What is not always realised is the great advance which Judaism itself represented upon its forerunners.

Judaism was a monotheistic religion, or more accurately, it was at first a monolatrous one; Jahweh did not say "There is no other God than me" but "Thou shalt have no other Gods before me". It was thus an advance upon polytheism; and further, it believed in a God who formed laws, had a moral code, and acted rationally. Respect for Law runs through the Old Testament like a *leit-motif*. Judaism has its taboos, but is comparatively free from the more pernicious ones; and it is full of great ideas—sometimes curiously linked with commands to follow out some

formal ritual. Leviticus, for example, enjoins us to love our neighbour as ourself, following it up by a command not to wear a dress made of two kinds of stuff. But the best spirit of Judaism is to be found in Isaiah rather than Leviticus.

From Judaism there developed finally what Christians believe to be the purest religion the world has yet seen; a religion preaching a God of love; a religion which followed the old Hebrew prophet in demanding mercy and not sacrifice—or rather, which still demands sacrifice, but a sacrifice of oneself and not of other people; a religion which condemns those who tithe mint and anise and cummin and leave undone the weightier matters of the Law—justice and mercy and truth; a religion preaching so selfless a morality that there is a grim humour in the reflection that it has become the official religion of the predatory nations of European civilisation. Clever young men sometimes enquire whether or not Christianity is 'behind the times'. The trouble is that the Christian ethic is as yet far in advance of the times; no state has ever yet been even approximately Christian in its dealings with other states. The state cannot be Christian because too small a proportion of its citizens, though they may profess Christianity, act upon Christian principles themselves. The Galilean is still "too large for our small hearts".

II

That is the kind of way in which religious ideas have spread; from the practice of killing our enemies (in the belief that we do God service) to the command

to love and cherish them. And whether we believe in religion as the ultimate reality of existence, or dismiss it as mere sentimentality, there is one thing which is beyond reasonable doubt: religion has written itself into the history of the world as a great compelling force. The influence of the priesthood upon politics, and the wars which have been fought in the name of religion, are not necessarily the most convincing illustrations of its power. Religion may have had most influence when it was least sensational; and its slow growth within the individual heart may have had more effect upon civilisation than its occasional sudden flowering in dramatic 'conversions'. We can see its power most easily, however, in the exceptional cases of individuals. What happened, for instance, to Saul of Tarsus? He said that as he journeyed to Damascus a blinding light shone upon him and he heard a Voice. . . . Perhaps he was quite wrong about it; perhaps it was an illusion merely, a trick played upon him by an overwrought mind. But it was real enough to him; it transformed his whole life; and it has transformed the lives of thousands of other people in consequence. What happened to Joan of Arc? *Something* happened; and history has been written differently because that something happened. It would have been small consolation for the goddams on the Loire to have been told that Joan's heavenly voices were her own, a mere product of self-deception; in fact they did believe that she was a witch; but they could not stop her from raising the siege of Orleans all the same. Joan's theology—that is, her theoretical explanation of her voices—may have been nonsense,

as the theology of ignorant country girls is apt to be; and yet her religious experiences created a new world for her. And in consequence, she set about creating a new world for other people.

There can be no question, then, of the value of religious experience to the individual; and through its subjective value to one individual it profoundly affects human activities in the widest of spheres. But to say that is not to say that religious experience is necessarily 'true'; for false ideas have a subjective value if they are believed, and they are woven into the history of the world as closely as true ones. So that we cannot avoid asking ourselves the question: Was Joan's experience, after all, an illusion? Was Paul really deceived?

There are those who believe frankly that all religion is superstition, and all religious experience an illusion of the mind. No doubt something happens in the mind; but not what the subject thinks is happening. It is, they argue, merely the persistence of an old bad habit in the brain. Through man's ignorance an illusion is fostered; he relies upon a God who is not there. The illusion, continuing through centuries, grows up into a tradition; it is surrounded by taboos, ceremonies, rites, which prevent calm thought about it. It is encouraged by the priesthood, since by this time there has grown up a 'vested interest' in religion, and the whole machinery of organised religion is employed to impress the illusion more firmly. Hence it becomes in time the centre of an astonishing complex of emotions, with their roots buried beyond recall in the far-distant past . . . all illusion, though an illusion

that has for many a compelling power. A weakness of the mind, grown up through centuries of muddled thinking and perpetuated by priestly statecraft and cunning; but a weakness out of which, as mankind advances to fuller knowledge, it will surely grow.

This kind of position is both easier and harder to maintain nowadays than it was in the nineteenth century. Easier, because we have more knowledge now of the working of our minds, and have amassed an ever-increasing body of evidence showing how in fact we are constantly deceiving ourselves. We are slowly coming to see that customs and traditions which have so many centuries of growth behind them that we have for long regarded them as sacrosanct are, in fact, often rooted and grounded in error. And we are beginning to fathom the astonishing power of mental complexes, and are finding how obscure human motives really are.

On the other hand, there are certain facts which make the position harder to maintain. Science was once thought by some to have 'explained' the universe entirely in terms of matter and motion, and to have left little room for a God. The scientist thought of the universe as just one vast machine. But nowadays he does not tell us so much about matter and motion; he is not now sure what either of them really is; his basic concept is that of an 'organism' rather than a 'machine'. A purely determinist philosophy is going out of fashion; we are by no means now convinced that the universe is simply an elaborate piece of clockwork; and if it is we should still like to know who wound it up originally. Physicists and biologists

and psychologists may give effective accounts of the mechanisms of consciousness, and yet consciousness itself may be more than is represented by the sum-total of their accounts. Science is now restricting herself to her proper field of describing natural phenomena rather than explaining them; she has little to say about a Cause. So that it is now quite possible to argue that we cannot 'make sense' of the material universe unless we go outside and beyond it, into a region in which Joan's voices are not necessarily to be dismissed as pure illusion.

Theologians have always been trying to construct philosophical arguments to 'prove' the existence of God. They say, for instance, that if man really has a religious impulse that in itself implies that there must be some reality outside him; can one even think of an instinct of hunger unless there is, somewhere, food? Can one think of an eye unless there is such a thing as light? This kind of argument generally convinces those who were convinced already, but makes no impression upon the others. And it is probably true that there is no proof, of the only kind which can appeal to an opponent of religion, that religion is other than a snare and a delusion. For the heart of the matter is this. Belief in religion rests ultimately not upon an argument but upon an Experience, and it is arguing in a circle to attempt to prove the validity of an experience by referring to the experience itself.

But if religion cannot be proved to be 'right', it also cannot be proved to be 'wrong'. The opponent of religion is quite unable, in his turn, to prove a negative.

He cannot disprove the belief that, in what is known as a spiritual experience, amid all the confusion, misunderstanding and error, in spite of all the self-deception that honest people would admit, there is a residual experience of a kind which can neither be completely analysed nor fully communicated, an experience that gives unity and meaning to life. Those who have had this kind of experience call it contact with the Living Presence of God; and for them no argument is needed.

> Whoso has felt the Spirit of the Highest
> Cannot confound nor doubt Him nor deny.

But although he cannot disprove this, the opponent may quite reasonably reply: If that is so, if there really does exist an experience of the nature you describe, how is it that the world is not much better than it is? How is it that religion has made so many mistakes in the past? How is it that religious people to-day are split up into warring sects? And whence comes all the corruption which even religiously minded people, if they are candid, admit has too often disfigured the name of religion?

That kind of challenge can only be met by drawing a careful distinction between the spirit of religion and the steps by which that spirit is expressed in an organised system. The attempt to draw that distinction will take us upon controversial ground, and the reader is warned that what follows may not be assented to by many who may have been in general agreement with the argument up to this point.

III

We start now from the assumption that there is such a thing as a genuine spiritual experience; that it is a Fact; the Supreme Fact. No one can define in words what it is, except negatively, by saying that it is not a material experience. But that implies the existence of another order; and though it need not, philosophically, imply a God, yet the mystics who have borne witness to the experience have usually described it in terms of a God. It is the 'incommunicable'; the 'vision splendid'; it is an 'awareness' of higher values than material ones. No philosopher can assess the experience by any standard of values, because, for those who have had it, it creates a Value by which they assess everything else. And when man rises into this kind of experience it transcends all else for him; he is aware of Reality; and he glimpses the fire that burns at the heart of the world. He *knows*, then, that he is a citizen of a Kingdom which is not of this world. This kind of experience, some would tell us, is obtained only by those who worship according to the formularies of a certain Church (their own Church); others would tell us that no rite and no formula holds the key, but that some sacraments are particularly helpful in realising this communion; while still others say that the whole of life is a sacrament, and that the experience is available to all pure and humble souls without the intermediary of any special priest or creed. But, whichever view the reader may take, he should understand that we are not referring to something which only manifests itself in a few striking cases of so-called 'conver-

sion', but to an experience which is equally available to those whose religion is one of slow growth within the heart. Man may live in persistent and conscious contact with the Unseen; or his vision may fade and leave him only with the knowledge that he *has* seen. But there may remain, afterwards, a light upon his life; and he knows that "the best is yet to be". He reinterprets everything: the world takes on a new value in his eyes:

> The station brook, to my new eyes,
> Was babbling out of Paradise;
> The waters rushing from the rain
> Were singing Christ has risen again.
> I thought all earthly creatures knelt
> From rapture of the joy I felt.
> The narrow station-wall's brick ledge,
> The wild hop withering in the hedge,
> The lights in huntsman's upper storey
> Were parts of an eternal glory,
> Were God's eternal garden flowers.

Not only the world, but the people in it, are transfigured:

> The men! O what venerable and reverend creatures did the aged seem! Immortal Cherubims! And young men glittering and sparkling Angels, and maids strange seraphic pieces of life and beauty! Boys and girls tumbling in the street, and playing, were moving jewels. I knew not that they were born or should die; But all things abided eternally as they were in their proper places. Eternity was manifest in the Light of the Day, and something infinite behind everything appeared: which talked with my expectation and moved my desire. The city seemed to stand in Eden, or to be built in Heaven. The streets were mine, the temple was mine, the people were

mine, their clothes and gold and silver were mine, as much as their sparkling eyes, fair skins, and ruddy faces. The skies were mine, and so were the sun and moon and stars, and all the World was mine; and I the only spectator and enjoyer of it.

That, then, is the Experience itself; what of its expression? Men have tried to express it in literature; but of its very nature it is inexpressible. They are trying to reduce four dimensions to three. They can do no more than give a hint:

> Bring me my bow of burning gold!
> Bring me my arrows of desire!
> Bring me my spear! O clouds unfold!
> Bring me my chariot of fire!

The experience is not there. If we have not had it, we shall never find it in Blake; only if it has once been ours can mystic literature re-create it for us. And that is the first difficulty; not even literature can express the heights and the depths.

But men do not only attempt to express the Vision in literature. From the earliest times they have tried to preserve it in a vehicle, the vehicle of an Ecclesia; and that is where almost insurmountable difficulties are met. There is, for several reasons, an inevitable drop from the heights.

In the first place the Ecclesia, though it may help if good or hinder if bad, is a vehicle only; it is finite and limited, and it is trying to express the infinite. Man made the Ecclesia; but he did not make the Experience.

In the second place, religion seems to go ill with organisation. Man is fond of organising all his activi-

ties; his business, his laws, his politics; it is organisation, he thinks, which alone has made progress possible; and in a sense he is right. Organisation preserves things, strengthens them, makes them independent of the life of any particular person, and gives them cohesion and driving power. All of which may be true; but unfortunately religion does not fit well with a machine. It is a spirit blowing where it listeth, and no man knoweth the path thereof. It is difficult to organise anything as care-free as that; and a cleavage appears between the spirit of religion and its organisation. It is organised all right, but something is apt to disappear in the process. The experience is brought to earth, so that it may become flesh and dwell among us; but its way of life is not ours . . .

And in the third place, organisation implies organisers; and organisers are but human beings. If the Church is well served by nine of her organisers and poorly by the tenth, the tenth may be a stumbling-block which all the efforts of the other nine will not remove; for much is expected of those who have the Ark of the Covenant in their hands. In the third place, then: the Experience has now been committed to human hands; and human hands are not always clean.

Those are three reasons why we should expect to find a gap between promise and performance; why, in other words, organised religion will fall far short of its ideal. And the gap appears in practice immediately the Church tries to express the Experience in a dogma, as all Churches do try. For dogma is fallible; it is as liable to error as any other intellectual effort of man.

It is true that the dogma is generally represented

as divinely revealed. But revelation is a communication of the divine to the human; and the human is always liable to misinterpret. It may *know*; but it does not know how to express in human terms just what it is it does know. "To this man or to that, there shoot down, from the place where there is light, flashes and gleams which dazzle and blind him. What he can tell of his vision in stammering words is false, since he did not see clearly, yet true, for something he saw." There is no way of eliminating the human element, with its liability to error. Some of the dogmas of the ancient Churches were patently untrue; others were self-contradictory; others were productive of real sin and suffering; but all, in their time, have been represented as divinely revealed, and were sincerely believed.

So man argues and fights about his doctrines, and his history is one long record of religious wars. He has seen no incongruity in fighting bloody battles in the name of the Prince of Peace. He would see it, if he could live permanently upon the heights of his being. But man does not live the whole of his life in the conscious Presence, and when the Vision fades he all too readily confuses the substance with the shadow. Only he knows that there *is* a substance; and so he goes to the stake with high heart for the doctrine of transubstantiation, or Calvinism, or reincarnation, or the Thirty-nine Articles, or the infallibility of the Pope; because, forgetting, he has identified the Experience with the creed. At his best, he goes himself to the stake; at his worst, he sends others there . . . in the name of Him who died upon the Cross to bring peace to mankind.

A finite creed, then, is confused with an infinite Experience; but that is not all. Another of our *a priori* difficulties has made itself felt only too clearly in practice. Although morality and religion are not identical, in the world's leading religions there is a clear enough connection between them; and organised religion will have to bear witness to a standard of morality higher than that of the world in which it is set. Hence it will be subjected to an almost irresistible pressure to compromise—from the best motives, not the worst ones. It will be told to be 'reasonable'; to accept a standard of morality only slightly in advance of that of the world, a standard which will have some chance of winning, through the efforts of the Church, a measure of acceptance. Unless it does so, it will win no adherents; and so it will fail to serve its day and its generation as it might otherwise have done. This kind of argument is valid enough when applied to political organisation; whether a Church should accept what may be called a 'second-best' standard is more open to question. But in fact it generally, though by no means invariably, does; and it has its reward in seeing its boundaries extend. But once more something is lost in the process; the world may perhaps have moved a little nearer to the Church, but the Church has certainly moved a little nearer to the world.

There is thus a lowering of the moral standard; but there is also a lowering of the religious standard too. For the Church is now carrying its banners to a widening circle of those who have not had the Experience; and just because they have not had it, they

cannot understand the inner meaning of the doctrine. So the doctrine tends to become still further debased. That which was meant to be spiritual is interpreted in material terms. The rite comes to be an end in itself, instead of a means to an end. The symbol, never meant originally to be anything more than a symbol, is mistaken for the underlying Reality for which it stands.

Some scholars assert that it is in this way that the miraculous element enters into all religions. The miracle appeals to the less spiritually developed; it is sensational; it creates awe. An evil and an adulterous generation seeks after a Sign. They cannot understand that the whole of life itself is a miracle; they want the conjurer's kind of miracle, the material kind which they can see with their eyes. There are those who say that the miraculous element in Christianity was a late importation into Christian doctrine; that it was not there originally, but was introduced later, as a conscious or unconscious effort to help Christianity to 'hold its own' in a material and hostile world when the direct inspiration of its Founder was withdrawn. Max Müller expressed this point of view finely when he said, "what is natural is divine; what is supernatural is human".

There are, then, inevitable dangers in the path of any religion when once it becomes organised. The subtle doctrine which, at the best, could only give a hint of the fundamental Experience, becomes debased; the symbol becomes identified with the substance; and the standards are lowered to meet the needs of those

who like their theology 'hot and strong'. That is why a few men in every age, and perhaps an increasing number in our own time, have been repelled by what we may call institutional religion; though religion, in a deeper sense, is that by which they live and move and have their being. While others have felt that, in spite of all its errors, organised religion gives people their best mode of communion with the Divine. But if they share the same Experience both classes of men, though they may go through life wearing different labels, or indeed may refuse to wear any label at all, may, in the real sense, be at one. "It is dogma which divides; but the Spirit of Christ unites."

IV

In the last section we have been discussing reasons why the religious Experience, claimed to be the supreme experience that life has to offer to mankind, has not, in fact, been successful in reforming the world; and we have argued that religion inevitably loses something when organised, and that institutional religion cannot fully express the religion of the heart. It follows that no one must conclude that religion has failed just because he may think that the Churches have failed.

But before we speak too glibly of the 'failure' of the Churches we should remember that, although the cleavage between its inspiration and its institutions is specially marked in the case of religion, there is a similar cleavage in secular institutions as well. They too fail to give full expression to the best aspirations

of their members. A man inspired by a flaming passion for social justice will probably feel that the most effective way of furthering his ideals is to join some political party. As a member of that party he may, if he is fortunate, find himself sustained and encouraged by the comradeship of others who have similar ideals; but he will be fortunate indeed if he finds that the party as a whole expresses his best thoughts. He is all too likely to find in it elements of meanness, jobbery, intolerance, selfishness. It was a well-known statesman who complained that the leading club of his own party at a time when vacancies in a new government were being filled "resembled nothing so much as the Zoological Gardens at feeding-time". And what is true of political institutions is true of other kinds. No educational institution ever yet expressed in full measure the hopes and ideals of those who founded it; no legal institution ever yet brought even-handed justice to the doors of all.

Whether it is fair to draw a parallel between religious institutions and secular ones is a point which the reader must decide for himself; but at least he should not think, as some of their more extreme critics have appeared to think, that there is a peculiar depravity in religious institutions which is absent from other kinds. What makes the gulf between the inspiration and the institution so marked in the case of religion is the fact that the original inspiration is so high.

But because a political party does not fully express their ideals men do not for that reason, as a rule, refuse to join any party at all; and because religious institutions do not realise their ideals it by no means

follows that we should be better without them. There are some people who think that; but the more usual view is that it is impossible to dispense with religious organisation; and as in the last section we stated the difficulties in the way of religious institutions it is fair to remind the reader of the claims that would nevertheless be made for them by those who think them essential.

They would argue, first, that there is no other method of storing up the religious experience of one age for the benefit of another. The Roman hierarchy, for example, in the second century A.D. had a stabilising effect upon Christianity and prevented it from disappearing in a chaos of conflicting religions (though this does not prove, of course, that it stabilised the right things). Secondly, they would argue that a Church provides a bridge from the finite to the infinite which the ordinary man, as distinct from the man of high spiritual development, is capable of crossing when once it is constructed, but which he could not build for himself were it not there. Thirdly, that many men are so made that they can reach a higher level of conduct as members of a well-organised religious society than they could reach as isolated individuals. And fourthly, they would argue that the religious experience is heightened by being shared in common.

The only person who can decide the reader's attitude towards institutional religion is the reader himself. But whatever view he takes he should strive to be charitable towards those who think differently from him, and should resist all temptation to think

that wisdom will die with him. It is one of the hardest of temptations to resist.

V

When we are most ourselves, we are all of us in the grip of religion of some kind. We cannot help it. We are made that way. Mankind is chased by a relentless Hound of Heaven, and in the end finds no escape "from those strong Feet that followed, followed after". When a man denies religion, what he is really doing is to deny its doctrines. Oswald, in *Joan and Peter*, was quite sure that he had no religion at all; to him the name of God was "a name battered out of all value and meaning". And yet:

> And yet, whatever it might be, assuredly there was *something* greater than himself sustaining his life . . .
>
> There was a light upon his life, and the truth was that he could not discover the source of the light nor define its nature; there was a presence in the world about him that made all life worth while, and yet it was nameless and incomprehensible. It was the essence beyond reality; it was the heart of all things . . . Metaphors! Words! Perhaps some men have meant this when they have talked of love, but he himself had loved because of this, and so he held it must be something greater than love. Perhaps some men have intended it in their use of the word beauty, but it seemed to him that rather it made and determined beauty for him. And others again have known it as the living presence of God, but the name of God was to Oswald a name battered out of all value and meaning. And yet it was by this, by this nameless, this incomprehensible, that he lived and was upheld. It did so uphold him that he could go on, he knew, though happiness were denied him; though defeat and death stared him in the face. . . .

It looks as though a religion must have grown up in his mind without his noticing it.

There are more ways of apprehending Reality than one; and even those who think of Reality in personal terms must remember that the Shepherd who brings men to the same fold is not "careful of the fashion of his crook". When some people look at the sun they see a "round ball of fire, something like a guinea"; when Blake looked at it he saw a company of the heavenly host, singing "holy, holy, holy is the Lord God Almighty"; and if we cannot see the sun that way ourselves we might at least be grateful that Blake could.

V

THE GROWTH OF MAN'S SOCIETY

We are all members one of another. ST PAUL

L'homme est né libre, et partout il est dans les fers.
ROUSSEAU

I have come to the conclusion that I, a girl, not a member of the aristocratic classes, not a member of the wealthy classes, have more liberty in the twentieth century than I should have had in any prehistoric age: but I hope for more in the Utopian World State which I am certain is very gradually being evolved. *From a schoolgirl's essay*

THE GROWTH OF MAN'S SOCIETY

I

We have seen something of the way in which man's intelligence has grown, solving more problems for him and creating ever more problems to solve, but giving him an increasing control over his environment. But with the alteration in man has gone an alteration in his environment too. Man's habitat has not very greatly changed; he still lives on a round ball rushing through space at approximately the same speed in approximately the same orbit, and subject to very similar variations in temperature; the land masses on the sphere have changed in distribution, but not in essential character. But there has been one change in the environment which is of far-reaching significance. Man is now a member of a complicated human society stretching over almost the entire globe. This has profoundly altered all his problems, and differentiates him entirely from his savage ancestor. He may not be a 'social animal' in the sense that he has a desire for sociability, but he is certainly one in the sense that, whether he wishes it or no, his life is linked with those of his fellows by a thousand subtle ties. He is now, as we say, a 'civilised' being, a member of a state. And in this chapter we shall think of him not as an individual but as a member of an organised community.

What has caused man to develop as a social animal? Many possible explanations suggest themselves. Was that destiny inherent in man's original psychological make-up—had he an instinct for gregariousness? Did

he band himself into groups for the purposes of self-protection? Was his organisation designed to make easier the processes of exchange and barter? Was it forced upon him by his geographical environment? Was his religion a unifying factor? Or did the whole process 'just happen', in the sense in which Topsy 'just growed'?

These are some of the possibilities we must bear in mind; but, whatever the cause, the Great Society is an accomplished fact. And before discussing one or two of the points connected with its evolution, it is as well to grasp the magnitude of the fact with which we are confronted. Modern society has thrown out its tentacles all over the globe; its organisation is intricate; and on that organisation not only man's well-being, but probably his very existence, depend. For the organisation, imperfect in many respects though it is, not only gives man his only chance of culture; it provides him with his daily bread.

Let us take a simple example. Mr Haddock is a Cornish fisherman. He is not a very sophisticated individual; he, if anyone, should be able to lead a simple existence. He needs, if he is to be kept alive, food, shelter and clothing; if he is to live, in anything more than the sense in which animals live, he needs intercourse with his friends, education and books. Practically all Mr Haddock can do for himself is to provide himself with fish; everything else the Great Society provides for him. He could not, indeed, even catch his fish by his own unaided efforts unless he could make for himself a rough boat with wood from the neighbouring forest and could manage to dispense

with nets and lines. But an exclusive diet of fish has its drawbacks; most people, for example, like some bread as well. Mr Haddock's bread is delivered to him every morning. Thousands of people have been at work to provide it for him. The corn is grown, it may be, on a Canadian prairie, by a farmer who employs some dozens of farm-hands. It is reaped by a machine made specially for the purpose by other men in a factory thousands of miles away, and sent from the factory to the farm. The grain is placed on a railway which is organised and staffed by another set of human beings. There is hardly any kind of human skill which has not contributed, directly or indirectly, to the making of that railway—all to serve the purpose of Mr Haddock. The grain is transported to the coast and placed, by still more men, on a boat which has been made in Belfast, by Irishmen, out of material drawn from all parts of the world, and which is driven by coal from Durham or by oil from Persia. Unloaded at Southampton, the grain is taken by motor-car (made, perhaps, in America) to an English miller, who later sells it, as flour, to a baker in Mr Haddock's village. The baker combines it with water (sent to him through a complicated system of pipes placed underground by the Urban District Council) and other ingredients obtained from still other sources, bakes it in an oven made in Birmingham out of iron found originally in Spain, and sends his son to leave the resulting loaf on Mr Haddock's doorstep. So that Mr Haddock obtains his bread as the result of the co-operation of hundreds of thousands of people in all parts of the world; and if we follow up similarly his

other needs we shall find that he is kept alive by the united efforts of the rest of the world—a vast army of people whom he never sees, of the very existence of many of whom it is quite possible that he is not even aware. All his favourite newspaper is likely to tell him about them is that the 'foreigners' are taking his living away from him.

One simple example of this kind is sufficient to show the intricacy of the organisation from which we all benefit. It is world-wide; and if it were to be withdrawn Mr Haddock would run a real risk of being deprived of the necessities of his existence, to say nothing of the amenities.

It is an open question, of course, whether there might not be advantages in restricting the organisation to some extent. Some people think that it would be a healthier world if each country were more self-contained than at present. But as there are many important products (such as rubber and coffee) which for reasons of climate cannot be grown in England, and as the same is true in greater or less degree for other countries, no one believes that a country can live entirely to itself; so that the difference between the points of view is one of degree only. Mr Haddock cannot live in the modern world, either as it is at present or as it might conceivably become, without depending to a large extent upon other people.

And even supposing that, by some reversal of the trend of civilisation, it could be made possible for Mr Haddock to live a life in which his dependence upon his fellow-men was reduced to a minimum—supposing, indeed, that he could be made a com-

pletely independent being—his life would be a much poorer and narrower thing than it is at present. Mr Haddock would lose something; Mr Woolsack, a London solicitor, whose life is more highly organised, would lose a good deal more. It may be that he could well dispense with his cinema; but he would also lose his concerts, his plays, and all that comes to him over the wireless. He might possibly be improved by the absence of his daily newspaper; but he would certainly be worsened by the loss of all his books. His inability to travel, or to communicate through the post, would rob him of any kind of pleasant or ennobling relations with friends who lived more than a few miles from him. And he would have to work so hard for the bare necessities of life that he would have no time to develop such cultural possibilities as might be within him. In a few generations, deprived of the support of the Great Society, Mr Woolsack's descendants would sink towards the level of the savages from which they have risen.

Many people, baffled by the irrationality of many aspects of civilisation—a civilisation in which, for example, men seem doomed to engage in wars which they do not really want—have moments in which they wish they could withdraw themselves from all the mistakes of society and live the 'simple life' on some South Sea island. (They generally postulate an island

> Where falls not hail, or rain, or any snow,
> Nor ever wind blows loudly; but it lies
> Deep meadow'd, happy, fair with orchard-lawns
> And bowery hollows crown'd with summer sea;

in which the climate is neither too hot nor too cold,

too dry nor too wet, in which there are no poisonous insects, and in which suitable and attractive food drops off the trees just when and where it is wanted—an island where every prospect pleases, and not even man is vile. This sort of island is not very common.) They have that within their own minds, they think, which would save them from ever becoming mere savages. But they do not reflect upon the state to which their children's children would be reduced on an island which had no materials for writing, no books, no pianos, no pictures, no cathedrals and no culture—an island which could not be fertilised, as our modern life is fertilised, by contact with the living past.

Our present methods of organisation are, of course, open to criticism in many respects. The myriads of people who supply Mr Haddock with his loaf do not do it for love of Mr Haddock. They do it, largely at any rate, for love of themselves; because that is their way of earning their living. It is arguable that an organisation of this kind, based as it is upon self-interest, is a morally unhealthy one. It is certainly not an ideal one. Others criticise the organisation upon the related ground that it dehumanises so many people. They see neither the beginning nor the ending of the process of which their work is a small part; they become mere cogs in a machine; hence their work ceases to have any ideal value for them. Others assert that this is true but inevitable, and that the best course is to organise industry still more highly, so that the necessary (but increasingly uninteresting) tasks can be performed as quickly as possible, and man can devote his increased leisure to those activities which

really do attract him. Still more people criticise the Great Society on the ground that it is not, in fact, completely efficient; in England alone some millions of people have the greatest possible difficulty in earning a living at all. And still others, as has already been said, assent to the general principle of the 'division of labour', but think that some limits should be set to its applicability, and that different political areas should be as self-contained as possible. All these are legitimate points for discussion: none of them, however, affects our main conclusion. The fortunes of twentieth-century man are inextricably mixed with those of his brethren. He has ceased to be an independent being. He cannot cut himself adrift from the society in which he lives. The community is not something outside him, a kind of cow to be milked, but an organisation of which he is an integral part. And those who think that every tale should be adorned with a moral will have no difficulty in finding a moral here. It should be a matter of self-respect with us to put into the common stock as much as we take out.

II

No attempt can be made here to trace the way in which man's society has developed; all that can be done is to direct attention to one or two points. Man seems to come from a stock, the anthropoid apes, which is gregarious in small groups. We picture him first as a member of a family—a small group based generally on the father, but in some cases centred round the mother. Even at this primitive stage a blood-

relationship would not remain the only one; there must have been some kind of trade-relationship as well. How long this would take to establish itself we cannot tell. But there must eventually have been exchange of one thing for another thing, a skin, say, for a flint axe. But the method of exchange would hardly be organised at all. The well-known 'silent barter' practised among primitive peoples is an example of the first stage of organisation. The first savage deposits his offering on a stone in the clearing; he hides in the shelter of a tree and waits. The second savage sees the skin upon the stone, removes it, and replaces it by the axe or whatever else he is willing to barter. And when Number Two has gone on his way Number One emerges from hiding and takes possession of his axe. Primitive as this is, it shows an advance upon animal behaviour.

After the family there comes the tribe, which is a coalescence of a number of family groups. The emergence of the tribe seems to have been due to practical reasons rather than psychological ones; man had inherited from his simian ancestors a tendency to gather in small groups, but there is no reason to think that he had an innate tendency to develop larger forms of grouping. The tribe can get its living better than the family; it can combine to hunt its prey. And the family, if attacked, can defend itself better as a member of a tribe. Many early tribes had an essentially military basis, and were ruled over by a warrior chief.

The hunting tribe appeared on the scene at a comparatively early stage. People would join it to get food. Such tribes would be nomadic, and the possibilities

of development ahead of them would not be very great. The amount of organisation in such a case would be very small, and the tribe might have little cohesion; it might be hardly more than a collection of families. But in time there was evolved the pastoral tribe, still largely nomadic, but tied at intervals to a certain strip of land, and living a life of temporary settlements. And that in time would lead to the agricultural tribe, the members of which were settled cultivators.

This evolution implies a great advance, and it took mankind a vast period of time to reach it. The establishment of the agricultural tribe may have been the greatest single step towards civilisation. Some scholars think that man's previous history was not that of a slow and gradual preparation for civilised life, but that civilisation, in the sense of a community with some amount of order and stability in its common life, came suddenly, with the invention of agriculture. It certainly came suddenly enough in Upper Egypt some six thousand years ago, though whether Egypt was its only cradle, or merely one of several cradles, is a point upon which there is some difference of opinion. In Egypt the environment was particularly favourable. A crop of wild barley made settlement a possibility; meat, game and birds were all to be found in the neighbourhood; the river provided an abundance of fish. The valley being surrounded by desert, its inhabitants were comparatively free from disturbance by other tribes. In these favouring circumstances two new ideas came to birth: the idea of storing up provisions, which would not occur naturally to a nomadic

tribe, and the idea of artificial irrigation, suggested, it has been conjectured, by the periodical overflowing of the Nile. And these two ideas, both of them making for permanence, had a profound effect upon subsequent history.

Whenever and wherever it occurs, settlement offers a greater chance of progress. Useful objects can be made and accumulated; harvests can be stored; the tribe may in time learn to grow something at least of what it wants instead of accepting what Nature provides; there will be more opportunities of learning by experience, more opportunities of co-operation, more chance that each generation can start where the previous one finished.

Parallel with man's development as a member of a tribe is a development in trade. Barter becomes more than the indiscriminate exchange of one article for another. As man develops, certain inconveniences begin to make themselves obscurely felt. To trade an axe for a skin may be an unprofitable affair; perhaps I have only one axe, but I may be able to secure a skin with relative ease. Perhaps I could obtain several skins for the one axe? But that may be inconvenient too; I may be glad enough of the skins later, but I do not need them at the present time. Or perhaps I really want a gourd; but the only man who has a gourd has no use for my axe. It is easy to be wise after the event and to see what will be the eventual solution of these difficulties. Some standard article or articles will be selected—call it x—which will be the medium of the exchange; the axe and the skin will each be exchanged for x, or for several x's. The ideal x will be something

which is of such utility, and so permanent in character, that the man who takes it in exchange for his goods will be reasonably sure of being able to exchange it for something else in his turn. At different periods in man's history different objects have served the purpose; for example, cattle, fur, corn, salt, knives, shells, spades, various weapons. What any particular tribe would select as its *x* would depend of course upon the special circumstances of its environment. Shells have often been used; they are useful as ornaments, and they were sometimes believed to have certain magical properties. Man has not always lived, perhaps indeed he has never lived, by bread alone.

It is only quite recently that political organisation advanced beyond the stage of the tribe. In many cases tribes were gradually succeeded by a feudal society, ruled over by the great lords. This, in Europe, did not come about till the Middle Ages. The units were agricultural, self-supporting and intermittently at war with one another. Feudal society in its turn gradually developed into national states; in Europe this occurred about the fifteenth century. But this development came about much earlier elsewhere (just as, in still other parts of the world, it has not yet occurred); the great nations of antiquity were flourishing in the centuries before Christ. And society has not always passed through a feudal stage. But once that stage has been passed and there has been a rise of nationhood the barons have had to be suppressed; for war between them then becomes civil war, and as such has been intolerable to a state which regards itself as the 'natural' unit of organisation.

With this further advance in political organisation has gone still more development of trade. The old methods have become outworn. The cow, for instance, is no longer a satisfactory instrument of exchange; something smaller and more convenient is needed. A knife is handier; but there comes a time when even the knife will fail. And so we arrive at coins, probably first made in China some 3000 years ago, and consisting of small metal spades, knives, etc., made in the likeness of the *x* of the time. Coins make an extremely convenient *x*; they are indestructible, sufficiently small and light to carry about, and can be made in such a way that counterfeiting is not easy. Gold is a suitable metal for the currency, for the supply of it is fairly constant in relation to the demand. If for any reason the supply is subjected to unexpected variation it at once becomes less convenient. Some hundreds of years ago, for example, gold and silver were imported into Spain in abnormally large quantities; the result was that less could be obtained for them; the real value of the currency, expressed in terms of goods, was debased.

Mankind had to wait some thousands of years for the final stages in the evolution of money. Eventually paper replaces coins; an obvious convenience for large transactions, for coins handled in bulk are very heavy. Thus we get bank notes; they are merely paper, and their intrinsic value is almost negligible. What makes them important is that they constitute a *claim* to value; theoretically at least a five-pound bank note could be exchanged, should I desire it, for five golden sovereigns. Banks issuing notes are supposed to have sufficient gold available for such an exchange; and

should they issue notes without a satisfactory gold backing the value of those notes would fall. They were in fact so issued in England rather more than a century ago; and their value depreciated in a few years about fifteen per cent.

One important fact emerges. The value of paper money depends upon agreement; and so its use is only possible in a country, or in a world, in which a measure of agreement already exists. Paper money has no value unless other people are willing to accept it; it is our organisation which has given it its value.

In England familiarity with paper money, which had at first some prejudice to overcome, was hastened by the Great War; and the position has altered so rapidly of late years that few of the boys and girls now at school have ever seen a gold sovereign, except as a curiosity. Gold itself has fallen into the background; but, whatever developments the future may have in store, it occupies at the moment an important background. Bank notes are not issued by one central international authority; they are issued by the banks of different countries, and gold has been retained up to the present as a convenient method of equating the paper currencies of the various countries.

Large commercial transactions usually depend nowadays on a still more abstract form of paper money; they are carried out for the most part by the exchange of pieces of paper called cheques, and a record is kept of these 'promises to pay'. It is a long distance to have travelled since the days when a skin was bartered for an axe!

The important point to remember is that this development, vital though it is to the Great Society, is in a sense artificial. Money depends on agreement only; it has no value apart from what it will buy; and in default of agreement it will buy nothing. A million German marks or Russian roubles are of no value if the fabric of trade has been so destroyed that no one is willing to give a loaf of bread in exchange for them.

III

Of the many points raised by this brief analysis, we shall select two only for discussion. One is the obvious one: has political evolution reached its limit; and if not, what are the probable lines of development? But that takes us into the future, and Mr Haddock is not interested in the future; he would prefer us to begin by dealing with the other point, which bears upon him more urgently at the moment. The Great Society has deprived him, and is increasingly depriving him, of his liberty. He cannot, for example, get his favourite beverage after 'closing time', and Mr Haddock knows all about that. He thinks that there is unjustifiable interference with his personal freedom, though he does not express himself in quite those terms. In one way or another, the Great Society interferes with all of us. Broadly speaking, the price man has had to pay for civilisation is that he has lost much of his freedom. That is the next point which requires attention.

Rousseau began his *Contrat social* with the words: "Man is born free; and he is everywhere in chains". The chains bind man even more tightly in the twentieth century than they did in Rousseau's time.

We can none of us escape. The schoolboy is in chains. He cannot do what he wishes to do. He wants to lie abed in the morning and an unsympathetic parent forces him to rise: the chains of immaturity. Perhaps he will lose these fetters later? But when he is a grown man and has thrown off these chains, others take their place; now he must be up betimes, or he will lose his job: economic chains. Then surely a millionaire, who is neither young nor poor, will be free of chains? Yet even he will be summoned if he drives his motor-car on the wrong side of the road, or refuses to pay his income-tax, or contravenes the factory regulations, or assaults the bore at his club; in all these cases an outraged policeman will remind him that there are chains of the law. And those chains we can none of us escape; they are fundamental; they are the price we pay for being civilised.

But they have a double aspect; we see the liberty they take, but we forget the liberty they give. They are fettering to the millionaire; but they make the roads safe for pedestrians, help the Great Society to function, protect the factory workers from exploitation, and give his freedom to the bore. And the whole point of them is that they are designed for these very purposes. The law, which Mr Haddock complains is decreasing his liberty, really aims at increasing it—or does so aim when it is wisely constructed. Society as we know it would be impossible without law; we ought to regard it not as a tyrant but as a deliverer. The whole growth of man's organisation has made it inevitable. It was in sight from the earliest days when man began to live not for himself alone but in some

sort of association with his fellows; progress beyond a certain point was impossible until he could define in some way what was permissible and what was not. He could not play the game with other people until he had agreed upon the rules of the game. And in our complicated modern society there could be no liberty at all if there were no law: "Liberty is the child of law".

It would be an over-simplification to say that law was invented in order to preserve liberty; for law is a resultant of many complex forces. It is linked in some ways to custom, in others to the preservation of status, in others to religion; and, like religion, it has not always remained pure and undefiled. But the point to grasp is that, in its relation to liberty, law is a condition of it rather than a denial of it; it makes liberty rather than destroys it.

Society, then, has offered man advantages on the one hand and has taken some of his liberty from him in order to pay for the advantages. But it is necessary in passing to point out that it is not only society which, ultimately, provides the fetters which bind mankind. There are restrictions of quite another kind which operate to impede man's action as a free agent. He is entangled in the chains of custom and of convention. If legal fetters were the only kind, then savage tribes, beyond the outposts of civilisation, would be completely free. But quite another picture of savage life is drawn in Frazer's *Golden Bough*, which depicts a savage as bound from his cradle by tribal customs and taboos. And there is another sense in which even a savage is

not always entirely 'free'. The point has seldom been so well put as by Gilbert Murray:

If you take people . . . who have broken away from all their old sanctions, and select among them some strong and turbulent chief who fears no one, you will first think that such a man is free to do whatever enters his head. And then, as a matter of fact, you find that among his lawlessness there will crop up some possible action which somehow makes him feel uncomfortable. If he has done it, he 'rues' the deed and is haunted by it. If he has not done it, he 'shrinks' from doing it. And this not because anyone forces him, nor yet because any particular result will accrue to him afterwards. But simply because he feels Aidos.[1] No one can tell where the exact point of honour will arise. When Achilles fought against Eëtion's city, 'he sacked all the happy city of the Cicilian men, high-gated Thebe, and slew Eëtion; but he spoiled him not of his armour. He had Aidos in his heart for that; but he burned him there as he lay in his rich-wrought armour, and heaped a mound above him. And all around him there grew elm-trees planted by the Mountain Spirits, daughters of Aegis-bearing Zeus'. That is Aidos pure and clean, and the latter lines ring with the peculiar tenderness of it. Achilles had nothing to gain, nothing to lose. Nobody would have said a word if he had taken Eëtion's richly wrought armour. It would have been quite the natural thing to do. But he happened to feel Aidos about it.

Some part of the restrictions upon man's behaviour comes, then, from his moral sense. Some schoolboys actually rise early as a matter of duty; some doctors would go on curing their patients even if their economic chains were cast off; some men and women voluntarily accept a life of poverty in the service of their fellow-men. The higher the type of individual,

[1] *Aidos* = sense of honour.

the greater the restrictions he freely imposes upon himself. To pursue the matter further would be outside our present scope; the point is simply that not all man's loss of liberty is the result of the organisation of his society.

But if the ultimate intention of law is to preserve liberty, and even to create it where there was none before, its immediate effect is only too often to curtail it; and in any position of this kind it is necessary to be careful that the gains really do exceed the losses. The classic statement of the case is that law should allow the individual the greatest amount of liberty consistent with the equal liberty of others; and politics, from one point of view, should be a study of how to translate this theoretical principle into practice.

The reader is asked to take a series of laws of different kinds—Early Closing Acts, Licensing Acts, Factory Acts, transport regulations, etc.—and consider them from this point of view. He will probably find that some laws, more than he may at first be inclined to think, can be justified on the above principle, in that, though they may hamper the activities of certain classes of people, they do make for an all-round increase of liberty. But there will remain some laws as to the wisdom of which he will have grave doubts; and so he will ask himself whether the law reaches the ideal set out for it in this argument. It is probable that he will decide that it does not.

There are many reasons why law falls short of its ideal. In the past the machinery of government has often been in tyrannical hands, in which case no one

can pretend that law is likely to serve the purposes of liberty. In the modern democratic state this danger has been replaced by a new one, the danger of bureaucratic control. The drafting of regulations may become a kind of habit; in which case it will be a bad habit, not a good one. Regulations may be made on the slightest provocation. And this tendency is strengthened by the fact that there is a vested interest in law, as there is in most things; the lawyer has by no means had enough of the law when the man in the street has. The ideal is to have the minimum of regulations which will suffice, not the maximum.

There is another danger; even in a state with a democratic form of government the law may be captured in the interests of some one section of opinion. For example, it may unfairly serve the purposes of

(1) a religious sect. Note the struggles between Catholics and Protestants in Tudor times;
(2) one sex. The law in the past has been unfairly biassed against women. Is it now?
(3) one class. Whether or no it is true that the law at the present day favours the rich as against the poor, there is no doubt at all that it has done so at many periods in history;
(4) one commercial section. Perhaps this is most clearly seen in countries with a fluctuating tariff. It is possible to hold many different opinions about tariffs—to disapprove of them entirely; to tolerate them only as a means of defence against other tariffs; to approve of them as a means of protection but not of revenue; to approve of them

at a certain stage in a country's economic development; to approve of them entirely. (It is even possible, if you are a politician upon the hustings, to approve of them in the hope that they will keep out goods and secure a revenue from the very goods they exclude. This is known as making the best of both worlds.) But this is certain, that in all tariff countries there will be a constant struggle behind the scenes to capture the law in the interests of one particular body of traders. And sometimes the citadel will fall.

These are not merely theoretical dangers; they have all been realised in practice. For example, Rousseau's argument that civilisation tends to take away, not only man's liberty, but also his happiness, on the hypocritical plea of law and order, was probably true in the case of the French peasants of his time. So that there is a vital meaning in the old phrase "the price of liberty is eternal vigilance". But, while being eternally vigilant, we ought constantly to bear in mind that what we are attacking is not law itself, but those abuses which so easily creep into it unless a careful watch is kept.

Law would be no more than a fiction unless there were some kind of authority behind it to enforce its decrees. Its sanctions appear at first sight to be policemen, law courts, prisons and even the scaffold. Those are, in a sense, its immediate sanctions. But the only real justification of law is that it is an expression of the common will, and therefore its only ultimate sanction is in the force of that public opinion which created it.

For this reason there is always an element of danger in unreasonable laws, or laws too far in advance of the public opinion of their time. Public opinion will connive at infringements of such laws, and may thereby bring the whole notion of law into disrepute. The law should, first, be reasonable; and secondly, should be capable of being recognised as reasonable by a sufficiently large number of the thoughtful class of citizen. If it fulfils these conditions, then the reasonable many will observe it and the unreasonable few can be coerced by it.

What is the duty of the citizen towards the law? The ideal citizen

(*a*) must be 'eternally vigilant' against the capture of the law by any kind of vested interest;
(*b*) while always trying to improve the law must remember that, rightly interpreted, it is at present the bulwark of his liberties, so that he must also respect and preserve it;
(*c*) must work, through the various educative agencies (the pulpit, the school, the broadcasting studio, the public library, the press), for such a gradual rise in the general standards of morality and public spirit, that law becomes less and less necessary, as inner sanctions replace external ones.

IV

It remains to discuss our second question: What lies ahead of the Great Society? We have seen that the family evolved into the tribe, the tribe into the nation;

is that the culminating point of the process, or does some new development lie in the womb of the future?

We ought first to take note of the possibility that the groupings of men in the future may be of a different kind. In the early history of the world the natural grouping was on a geographical basis; a man had common interests with his neighbours, and tribes, city-states and to some extent nations expressed those common interests; they brought together individuals who were united by daily intercourse, a common language and similar experiences. But in the modern world a man's interests often transcend the frontiers of his own country; it may be imagined, for example, that an Eddington has more in common with an Einstein than with a Beaverbrook. Our Eddingtons and our Beaverbrooks live in different and to some extent non-intersecting worlds (though the parts that do intersect are important); they share a common verbal symbolism, but essentially they speak different languages. And there are some people who think that, in the modern world, national groupings are an irrelevance. Some people would argue that the real division of mankind is not into English, French, Germans and so on, but into capitalists and wage-earners, and they would say with Karl Marx: "Workers of the world, unite! You have nothing to lose but your chains!" Or again, we can conceive an extension of a tendency which is already apparent, a union of great commercial interests; for example, the formation of trusts controlling the raw materials of some particular industry, trusts which might be either national or international. These are just indications of possible ways in

which classification in the future might change its basis, becoming, as it were, predominantly horizontal rather than vertical.

But although such classifications must be taken increasingly into account it seems improbable that they will, at any rate in the near future, displace national groupings. The past carries its momentum into the present, and national spirit is a reality. Moreover, it is hard to see how some form of 'vertical' organisation can ever be dispensed with, for a geographical grouping does correspond to certain real needs of mankind. So for the remainder of this section we shall consider possible developments of the established form of organisation.

There are three main possibilities, stated in sharply contrasted form for the sake of discussion. The national state may remain permanently as it is; it may in time evolve a stage further and integrate into some form of International Federation or State, perhaps preceded by a series of partial integrations such as is represented by the British Empire; or it may disintegrate into chaos and subsequent ruin. Of these alternatives, the first seems unlikely, for there seems no inherent reason why the unit of organisation should be the modern state; and the second and third offer us a choice between Utopia and Hell.

Significant changes have been taking place in the Great Society. Just as the manor was once a self-supporting society, so the modern state in its early stages was largely self-contained. But the growth of the world's commerce has completely altered the position. Nations have very generally been unable to maintain

themselves as economic entities—Mr Haddock, we remember, was dependent for his very existence upon 'a set of foreigners'. The 'division of labour' may have been carried further than was either desirable or necessary; but there were, and are, sound reasons for some degree of it. The aptitudes of nations differ much as the aptitudes of individuals differ; one nation does one kind of work, on the whole, better than another kind; hence we get a nation of farmers, a nation of shopkeepers, a nation of sailors. Again, specialisation has made possible mass production, which is not an unmixed blessing, but has certainly led to a large increase in the number of goods available for all. And, most important of all, natural resources are not distributed evenly throughout the world; England can produce coal but not oil; Persia can produce oil but not coal; and climate varies so greatly from one country to another as to make some degree of specialisation still more inevitable. For all these reasons, the Great Society tends to be, commercially, one unit.

Now this is an entirely new situation and demands new methods. It can only be met by some degree of co-operation between states. Until recently the relations between states have been anarchic; they have rested on force and not, in the main, on law. A few hundred years ago the strong nation armed kept its goods in peace—unless its neighbour state happened to be still more strongly armed. And further back in the world's history tribes were constantly at war with one another; it was one of the ways in which they got their living. Like Sir Thomas More's Zapoletes, "they maintained their life by seeking their death". But that

was in the days when you lived by suppressing your adversary; and the new fact is that in the twentieth century you can only live by co-operating with him. War in the modern world is an anachronism; it bears no conceivable relation to war in the ancient one. International trade and commerce depend on inter-state credit; and inter-state credit depends on inter-state agreement; and war is the denial of agreement. Modern society can no more afford to tolerate war as a permanent institution than, at an earlier stage, the rising nation-state could afford to tolerate civil war among its barons. To engage in war on any large scale nowadays is like thrusting a poker into a complicated and delicate piece of clockwork; it destroys the machinery by which Mr Haddock's daily bread reaches him. War has now become a kind of racial suicide. That is not its final indictment; if this were a chapter on ethics, harder things would be said of it than that; but that is sufficient for our present argument. But war can only be ended by international co-operation, to abolish it and to set up something better in its place.

The needs of this new situation have been recognised to a certain extent. Various conferences, congresses, trade agreements and international agreements upon restricted subjects (*e.g.* the postal service) show that consultation among the nations was becoming common even in the nineteenth century. And, since the Great War has given Europe such a hideous object-lesson in the alternative to collaboration, a series of international conferences has been held, some dealing with economic questions and others with the question

of the prevention of war. Most important of all, we have taken a more deliberate step forward by the creation of a League of Nations.

It may well be that the historian of some future age, passing in review the events of the twentieth century, may pick out the establishment of the League of Nations as marking a turning-point in the management of human affairs. It is true that, although it has done much useful work in an unobtrusive way and in particular has accustomed governments to the idea of collaboration, the League has failed as yet to realise the best hopes of the idealists of our own generation. But its successes are more significant than its failures. Its failures were to be expected. Men do not gather grapes of thorns nor figs of thistles; and four years' warfare is a poor preparation for gathering together in the council chamber. Nor is it reasonable to expect that egotistic habits of thought which the nations have acquired during the course of centuries can be destroyed entirely in twelve years. But every success—and the League has a number to its credit—is a step in advance.

In itself, the League is no more than a piece of machinery; how that machinery is used depends upon the people who use it. It offers the Powers a ready means of consultation and pacification if they desire to employ it. It has just as much authority, or just as little, as the various countries choose to give it; and it is for those people, in all countries, who believe in the ideals for which the League stands, to press their own governments to give it the necessary authority. The League is no more than a beginning; but its

existence gives at least some grounds for hope that political evolution has not yet worked itself out, and makes it possible to speculate that we may one day see an intensity of international goodwill, and a machinery for making that goodwill effective, of which the present achievements of the League are no more than a foreshadowing.

The logical goal of political evolution might seem to be a World State. But to represent that as the inevitable goal of international effort would be to press the argument too far. There is nothing in human nature which makes it inevitable for men to form larger and larger groupings; they do so only as it serves their convenience, and the largest unit of organisation is not necessarily the most effective one. Even as it is, the modern state is so large that it finds it desirable to decentralise many of its functions. Nations might combine for some purposes and not for others. Co-operation might stop a long way short of fusion.

Some form of concerted international action, however, both to prevent war and to regulate inter-state commerce, is the most urgent need of our time. Yet it is by no means certain that it will be forthcoming; many things may happen to prevent it; the immediate signs are not propitious. It will require, as each advance in political evolution has hitherto required, some sacrifice; some further restriction of a minor liberty in the hope of gaining a major one. But chiefly it requires a new attitude of mind; not a denial of patriotism, but a realisation that "patriotism is not

enough".[1] At present the forces which block international co-operation are approaching a twentieth-century problem in a seventeenth-century attitude of mind. We have to learn to look at problems not solely from the point of view of one nation; we have also to consider the effect of our actions upon the Great Society as a whole. For it often happens that solutions which seem satisfactory enough from the narrower point of view become obvious nonsense when looked at from a broader standpoint.

A simple analogy may not be out of place. Suppose that in a school each class remains in its own classroom, but the teachers move on from room to room at the end of each lesson. Suppose, further (this has been known to happen in some schools), that the teacher in charge of Form III fears that a riot will follow when his restraining influence is withdrawn, and decides that he will remain there until the next teacher relieves him. From the point of view of maintaining discipline in Form III this is an admirable solution; but from the point of view of the discipline of the school as a whole it is a solution which could not even begin to work, since if every teacher stood his ground until a colleague relieved him no teacher could ever move at all. In just the same way, an Englishman may declare that the surest way to preserve peace is for his country to have larger armaments than France; an admirable solution from his point of view, until it is remembered that France (a perverse country) is equally entitled to declare that the only

[1] "Patriotism is not enough. I must have no hatred nor bitterness towards anyone."—Nurse Cavell, under sentence to be shot.

safety for France lies in having larger armaments than England.

The peace of the world, possibly even the continued existence of the world, depends on whether we can outgrow this elementary attitude of mind before disaster overtakes us. There are some optimists who believe that substantial progress will be made in our generation. Considering how fundamental is the change of attitude required, and considering also how trivial is the life of one generation when compared with the life of civilisation, the pessimists may be excused their misgivings. But just because there are at the moment specially disintegrating forces in evidence, so that the very existence of civilisation appears to be at stake, it may be that mankind, faced with a real crisis, may rise to the height of a special effort. How much effort is the reader prepared to make?

V

There remains a final point. We asked some questions about the development of civilisation: was it planned, or did it 'just happen'? Can a deliberate purpose be traced in it? In the ultimate sense of the word, we know no more of the purpose of the evolution of society than we know of the purpose of the evolution of life or mind. But the question may be asked in a more restricted sense; has society been drifting, at the mercy of chance winds or currents outside human control, or have human beings been on the bridge setting the course? Anyone describing the advance of civilisation has a tendency to 'rationalise' the process; and we must beware of reading into the mind of the

savage, or of early civilised man, purposes which would at the most only be obscurely felt. Looked at step by step, there has often been clear human purpose discernible; human society has changed as the direct result of human endeavour to change it; but the purpose has been confined to short-range policy only. Man has seen the next step; he has not seen the further steps which that one has made inevitable. In general, he has lived for to-day, and has been content to leave to-morrow to look after itself. He has acquired considerable experience in finding what is best in the short run; he has rarely considered what is best in the long run. He has met the instant's need without taking overmuch thought for the general drift of his society; which explains why society is coming more and more to resemble an elaborately constructed engine which is out of gear.

It may be that the greatest need of our time is for what may be called long-range planning. Just as, in biology, man has now reached the point at which he can begin to take conscious thought for his future as a race, so in sociology he may learn to take fully conscious charge of the Great Society. And perhaps—it seems at present no more than an idealist's dream—he might in that case build, one day, the kind of society that he really wants, one that will give full scope to his finer aspirations and desires. But that will only come about if he has imagination enough to conceive it; persistence enough to think out its full implications; and courage enough to dig the foundations of that new Jerusalem which in his generation he can never hope to see.

VI

PROGRESS

The best Thou givest, giving this
  Sufficient thing—to travel still
Over the plain, beyond the hill,
  Unhesitating through the shade,
Amid the silence unafraid,
  Till, at some sudden turn, one sees
Against the black and muttering trees
  Thine altar, wonderfully white,
Among the Forests of the Night.

RUPERT BROOKE

It matters not how strait the gate,
  How charged with punishments the scroll,
I am the master of my fate;
  I am the captain of my soul.

W. E. HENLEY

Life is like playing a violin solo in public and learning the instrument as one goes on. SAMUEL BUTLER

PROGRESS

I

We can best see the significance of the human drama we have been studying in this book if we look at some of the contrasts it offers.

In the beginning, chaos; a concourse of electric particles, the "dust of continents to be". And now, the continents themselves, with their valleys, mountains and rivers. Then, the firemist; now, the habitable world. These are not pictures of rival universes; they are the same universe seen at different cross-sections of time. The one implied the other, if Aristotle was right when he said that there is nothing in the end which was not also, potentially, in the beginning.

In the beginning, the amoeba: formless, sprawling, undifferentiated, a symbol of life at its lowliest. And now, twentieth-century man: reflective, cultured, self-conscious and increasingly the captain of his soul. Cross-sections again of the same process; the man is merely the amoeba 'with acquirements'—though the acquirements are considerable.

In the beginning, howling savages round their sacrificial victim, paying homage to a god who mirrored their own imperfections. And now, a sense of spiritual values and the worship of a God who dwelleth not in temples made with hands. Two things which could hardly be more different: yet both represent the reaction of the human spirit, at different times, to that non-material order of which man is dimly conscious that he is a part.

It is when we think of things in this contrasted way that we can pick out one essential characteristic of the drama: change. "Everything flows and nothing is stagnant." Nowhere can we find permanency; neither in man nor outside him. Even the everlasting hills have their day and cease to be. Only they do not really cease to be; they reappear on the stage in another rôle.

But the change is from the amoeba to man, not from man to the amoeba; it is change in a definite direction, even though we may find it difficult to define, in precise terms, just what that direction is; we think of it as growth rather than decay, as progress rather than deterioration.

We have seen that growth as coming out of the interaction between man and his environment. That environment has enormously influenced him. If the physical environment, for example, had been different, we should have been different. Man is a land animal; suppose that land had not been thrown up over so large an area of the globe. Man's civilisation has reached one of its most complex forms in Europe; suppose that Europe had been a volcanic region. Man needs, if he is to advance to culture, some measure of relief from a too harsh environment; suppose that the Ice Age had persisted. We do not know what would have happened in any of these cases; but we do know that man is what he is because the environment has been what it has been. At all stages it has conditioned his advance; it has made his progress take a certain form.

That, however, is only half the truth. For man has not been the blind sport of his surroundings; he has

met them and conquered them. They influenced him; he in turn influenced them. When the river did not flow where he wanted, he learned how to deflect its course. When the malaria microbe threatened to make the tropics uninhabitable for him, he retaliated by making the tropics uninhabitable for the microbe. He learned how to make the soil produce the crops he wanted; he changed the face of the world.

It is this increase of control over the environment that a biologist would stress as being one of the main features of the drama. Yet we note that it never seems to bring man security. Man runs a race, as it were, with his environment; and with all his running he never seems to do much more than draw level with it. For his increased power over his surroundings itself changes those surroundings; it confronts him with new problems, with difficulties hitherto unknown; and he has now to begin once more to master these difficulties. The savage had relatively little control over his environment; but, up to a point, his control was an adequate one. He was not, for example, dependent upon a money system which showed signs of collapse. He was a stranger to gunpowder; and so ran no risk of having his habitation blown up. He ate only the simplest foods; but he does not seem to have been a prey to some of the diseases of civilisation. He was so ignorant that he had never even heard of an atom; we have gained such control that we think we may eventually be able to release the energy stored up in it. And when we do, we may bring our civilisation tumbling about our heads in ruin. Man has certainly gained increased control; but that increase has, in its

turn, created an environment which it taxes all man's powers to overcome.

We have seen in this book that the agent which has won for man that increased control has been mind. The slow growth of mind—slow, for it took aeons of years—is perhaps the leading feature of the drama. Or, to change the metaphor a little, it even seems as if mind was one of the producers of the drama: not a producer in charge of a play whose book of words was already written, but an experimental producer, trying first this, then that, handicapped all the time by players who could not rise to the height of the argument, and yet gradually producing scenes possessing more and more of unity and design. Whatever our metaphor, there seems no doubt that mind is fundamental to the drama. It is true that it develops in association with body; in so close an association, indeed, that a sharp distinction between mind and body is often difficult to make; but mind is now the senior partner in the collaboration, and there are some psychologists who deny that it has ever been anything else.

So far, then, the features of the drama appear to be: change; change coming out of the action between man and his environment; change in the direction of increased control over the environment; and mind, insecurely in charge, influencing change.

What the ultimate direction of that change is, we do not know. But we think we are justified in speaking of that change as Progress. To define exactly what we mean by Progress, in this broad sense, is a matter of real difficulty; we shall be content to beg the question

by thinking of progress as the direction of the change which leads from simple structures to more complicated ones: from the amoeba, almost mindless, to the man whose chief glory is his mind.

II

That raises a very important point; the rate of progress. We like to think of the drama of life as marked by slow, steady, remorseless advance; but if we look into the details of the drama we see that the steady rate of progress is an illusion. We like to think of man's history as if it were a constant automatic movement up an inclined plane; a comforting picture, since if the progress is automatic it shifts from our shoulders the responsibility of doing anything to help. But what takes man up that inclined plane is an urge within him; if he lacks the urge he may slip back; and even when he has the urge he may be baffled for long years.

Automatic progress is an illusion. Viewed from the outside, man's march has gone by sudden jumps. He moved further in a few hundreds of years at the beginning of our era than in some hundreds of thousands of years of our primeval history. Earlier in this book we saw something of the growth of man's knowledge of the universe: ignorance in the saddle for thousands of years; a glimpse of the truth by Pythagoras; a period of groping in the dark once more; and then a triumphant advance starting only a few centuries ago.

Man seems always to have had to wait for a tool. He waited untold ages for the invention of fire; once

in possession of the secret, he moved forward at once. He spent most of his existence on earth as a wanderer; the discovery of agriculture changed him from a nomad to a settled cultivator, and civilisation sprang to life almost before he knew what was happening. Blind stumbling for hundreds of thousands of years; and then the sudden seizing of the way that led forward. He waited in the Middle Ages for the rebirth of the ancient wisdom; suddenly the Greeks from Constantinople made the treasures of their libraries available for him, and the glory of the Renaissance burst upon the world. And then, his inner urge expressing itself in another channel, he was baffled once more; till one man saw the significance of a combination of lenses, and the telescope unlocked the mystery of the heavens for him. Progress is a clear enough reality; uniform progress is a myth.

Fire, agriculture and a hundred other inventions were possibilities lying latent in the world for ages; it needed a few gifted individuals to bring them to birth; lacking those individuals, the race would have made little progress. Humanity, it seems, has gone forward on the shoulders of a small number of exceptional people.

But though progress has depended on a relatively small number of people, those people themselves have depended upon an inheritance from the past. Galileo, born a thousand years earlier, could not have invented the telescope; Newton, born a thousand years earlier, could not have written the *Principia*. The way had to be prepared, the stage set, if the genius were to make a fruitful discovery. And once the stage was set the

discovery in time would come; which explains why advances have often been made by two or more individuals independently. Newton and Leibnitz invented the calculus almost simultaneously; Adams and Leverrier discovered Neptune simultaneously. These discoveries were in the air. The advance was conditioned by the intellectual atmosphere of the time.

Progress, then, is not a movement at a steady rate; and the history of man's civilisation brings out some further facts about it. For civilisation has not been a connected whole, going on from strength to strength; there have been many civilisations; empire after empire has grown, consolidated itself, and decayed. The Egyptians were once in the van, leading an organised and not uncultured life at a time when the inhabitants of Great Britain were mere savages. Yet later they lost the leadership. The Romans were one of the outwardly successful of the world's races, practical, level-headed, virile; yet the wave that bore them forward has subsided. And if we think that this was because they lacked the creative, imaginative, speculative gifts, we must remember that these qualities permeated the city-states of the Greeks; and Greek civilisation also declined.

Now it is true that, in a sense, each of these civilisations contributed something to progress; they left something behind them: dying, they yet handed on the torch of life. Egyptian civilisation produced agriculture. When the Roman wave subsided it left behind it not merely a series of roads running across England to-day, but a genius for organisation which lived on

long after the Romans were dead. And so great was the influence upon posterity of the Greek thinkers that it is hardly possible to name any branch of human thought at the present day which has not been affected, directly or indirectly, by ancient Greece: in a very real sense, they live on in us. But that is all we can say. It is not true, either that the contributions were equal, or that each civilisation is a mere summary of those that have gone before it, or even that each civilisation is necessarily better (whatever that vague word may mean) than its predecessor. Each civilisation has had a character of its own, expressing its own point of view.

Modern European civilisation has its distinctive character; in fact, it has certain very marked characteristics; it has not summed up in itself all the best experience of previous ages. It might be described as an age of Machines; a civilisation marked by a series of impressive discoveries, an astonishing tribute to the inventiveness of man. Yet if an ancient Greek saw it, he might describe it in disgust as a civilisation worshipping at the shrines of Vulgarity and Noise; he might be bewildered by its architecture; he might think we had strayed far from the Greek conception of the 'whole' man. If a Florentine of the Renaissance period saw it, he might be forgiven for wondering whether we have really improved upon the art of his time. And if a Chinaman saw it—not a Chinaman living in some cosmopolitan coastal town, but a member of that proud and ancient civilisation still existing in the heart of China—he might think that we are so absorbed in the task of making money that we have no

time to do the things which are really worth while; so engrossed in living that we do not ask ourselves what life is really about. This is Lowes Dickinson's imaginative account of what such a Chinaman might be provoked to say to an Englishman:

A rose in a moonlit garden, the shadow of trees on the turf, almond bloom, scent of pine, the wine-cup and the guitar; these and the pathos of life and death, the long embrace, the hand stretched out in vain, the moment that glides for ever away, with its freight of music and light, into the shadow and hush of the haunted past, all that we have, all that eludes us, a bird on the wing, a perfume escaped on the gale —to all these things we are trained to respond, and the response is what we call literature. This we have; this you cannot give us; but this you may so easily take away. Amid the roar of looms it cannot be heard; it cannot be seen in the smoke of factories: it is killed by the wear and the whirl of Western life. And when I look at your business men, the men whom you most admire; when I see them hour after hour, day after day, year after year, toiling in the mill of their forced and undelighted labours; when I see them importing the anxieties of the day into their scant and grudging leisure, and wearing themselves out less by toil than by carking and illiberal cares, I reflect, I confess, with satisfaction on the simpler routine of our ancient industry, and prize, above all your new and dangerous routes, the beaten track so familiar to our accustomed feet that we have leisure, even while we pace it, to turn our gaze up to the eternal stars.

A modern Englishman could, of course, find much to say on behalf of his own civilisation. He would dwell on the advantages connected with the age of Machines; he would point out that the smell of petrol is at any rate better than the smell of decaying garbage,

and that our civilisation is at least secure from the ravages of cholera. He would also argue that we are not so entirely given over to material affairs as to be indifferent to claims of another kind; that we live in an age of humanitarianism, with a growing social conscience—though he would argue this most confidently in the presence of people who had never seen a London slum. And he might plead that our civilisation, like any other, should be judged by its successes, not its failures, since it is the successes which show what possibilities of development the system contains: when we think of Greece we think of Socrates, not of the Greeks who got so tired of him that they had him poisoned. Or he might adopt a different point of view and plead that our civilisation is less concerned to produce outstanding excellence in a few than it is to raise the general level of all its members; that it tries to take thought for the ordinary man. All this, and much more, could be said in defence of modern civilisation. But the argument is not that we are better or worse than others, but simply that we are different. The point to remember is that different civilisations have stood out for different reasons; they have specialised in diverging directions; and this introduces another qualification into our view of progress. It is not uniform advance in a straight line; it is not even an irregular advance in a straight line; it is advance in different directions. And perhaps advance must inevitably be of that character, until we become aware of the ultimate goal.

There are still further facts about Progress which suggest to us a series of oscillations. There are traces

of a rhythm in the process. Just as in the literature of a country we can see a Romantic Age giving place to a Classical Age, to be followed in time by a Romantic period again, so in history we can discern a period of adventure and discovery, followed by a period of rest and consolidation, followed again by a further period of adventure. It looks like an ebb and flow of the wave of progress; it is in the adventure period, we think, that man goes forward; the alternating period looks like a period of decay. But in fact it may be an essential constituent of the process. Man the adventurer makes a raid into the unknown; he then needs to pause while he strengthens his lines of communication. In that quieter period he makes a link with the past; the new knowledge and the new achievement are fitted into the old framework, or rather that framework is modified to receive them; and tradition grows strong. Having captured a new territory, man now organises it, and brings it into fruitful relation with the rest of his estate. And if that, or something like that, is a true description of the way in which man advances, we can see how it happens that, when we try to measure human progress by any kind of external footrule, we conclude that the process goes by sudden jumps.

But if the uniform progress up the inclined plane is an illusion, it is a worse illusion still to think of man as blindly oscillating between two fixed states. If we are not automatically 'going forward', neither are we chained to a wheel whose spokes go round unceasingly. We get a better metaphor from the advance of the waves upon the seashore: the individual waves ebb and flow, but the tide as a whole is coming in. If at

times we doubt the reality of human progress, that is because we concentrate our gaze upon too small a period of time. Looked at over long periods, the trail of man's progress is a rising trail; and his growth is a growing-up.

VII

THE USE OF MAN'S MIND (I)

Men fear thought as they fear nothing else on earth—more than ruin, more even than death. Thought is subversive and revolutionary, destructive and terrible; thought is merciless to privilege, established institutions, and comfortable habits; thought is anarchic and lawless, indifferent to authority, careless of the well-tried wisdom of the ages. Thought looks into the pit of hell and is not afraid. It sees man, a feeble speck, surrounded by unfathomable depths of silence; yet it bears itself proudly, as unmoved as if it were lord of the universe. Thought is great and swift and free, the light of the world, and the chief glory of man. BERTRAND RUSSELL

Most of our so-called reasoning consists in finding arguments for going on believing as we already do.

J. H. ROBINSON

THE USE OF MAN'S MIND (I)

I

No one who looks with an unprejudiced eye upon the spectacle of man's organisation as it now exists can feel very sure that all is for the best in the best of all possible worlds. The more sensitive he is, the more he will be tempted to think that all is for the worst in the worst of all possible worlds. And yet the record of human achievement, to date, is a solid and impressive record. There are certain things which man has done admirably. He has built bridges, hospitals and cathedrals. He has constructed a social organisation which serves many at least of his more obvious needs. Our friend, Mr Woolsack, gets many benefits from that organisation. He is able to get his food, shelter and clothing. There are also facilities for satisfying his other needs; he can obtain books from public libraries, study pictures in public galleries, and see plays acted in theatres. If he wants to speak to his brother in Manchester, he can do so by means of an instrument called a telephone—and before very long an instrument may be devised which will show him his brother's features as well as allow him to hear his brother's voice. Or he can send a letter, which will be delivered in twelve hours' time. If he wants to visit Paris it will cost him only a few pounds to book a passage in an aeroplane. Few of these things would have been possible a bare century ago. If he wants some natural product not grown in England, such as rubber, he knows whereabouts in the world it is to

be found and how it is to be got from its natural habitat to London. If the supply offered by Nature seems insufficient for his needs, he can probably devise methods of increasing that supply.

What this means is that, in general terms, man has harnessed the forces of Nature to his command, and the occasional famine or earthquake which may still disturb his peace serves but to throw up in sharper contrast what he has achieved. If he has not yet entirely conquered Nature, he has made remarkable progress in that direction.

Now this increasing control over his physical environment, this mastery of the material world, might well be supposed to present his most difficult problem. Yet there are other problems which at the moment baffle him completely; other directions in which his organisation has met with a check. When he is dealing with inanimate Nature he succeeds; when he is dealing with human beings he fails. He gets from Nature all the corn, vegetables and minerals he needs; and then he cannot distribute them equitably. A few men get far too much; most men get far too little. Some work too hard and others do not work at all. In England there are at the moment several millions of people for whom our organisation is failing to find work of any description; and even in the times which we call prosperous there is always a substantial marginal population of unemployed people. Much of the work we do find is uninteresting, and perhaps more so than it need be, for since the time of the industrial revolution we have succeeded in divorcing a sense of responsibility from it: the creative impulses, the crafts-

man's joy in his art, find little outlet under the standardising methods of the modern factory. The competitive system on which work is organised is so exacting that it leaves a man with little leisure to develop other sides of his personality; he has excellent opportunities of becoming a good factory hand, but poor ones of becoming a vital human being. He cannot cultivate as he should the capacities for art, poetry or music which may lie latent within him; and most men are offered so wretchedly inadequate an education, finishing as it does at the age of fourteen, that they would not at once know how to use their leisure very worthily even if they had any.

Our political organisation is, if possible, even worse than our industrial one. We have become grouped in a series of separate nations, suspiciously watching each other; at intervals our suspicions appear to be justified, and we engage in fratricidal warfare in which our losses—physical, mental, moral—are catastrophic, and against which it is almost impossible to set any counterbalancing gains.

Those who feel that this is altogether too pessimistic a view have a choice of two lines of reply. It may be argued, first, that the picture is overcoloured; that the dark patches predominate because the light ones have been deliberately omitted; that no mention is made of all the friendliness, the acts of kindness, the impulses of decency and of mutual help, which make life not only tolerable but beautiful. These things, however, cannot fairly be called the product of man's organisation; they are rather the reactions of the human spirit against it. Our social organisation did

not produce them and does little to encourage them; it has merely, so far, failed to exterminate them. The unquenchable spirit of man, the humanity of man, does nothing to justify the waste, confusion and disorder which mark the Great Society; it merely makes the chaos more tolerable than it could otherwise be, and gives some ground for hope that man will eventually evolve a better scheme.

The second line of reply is to admit the indictment, but to ask for man to be discharged under the First Offenders Act. For man is only now beginning. Only yesterday he was a cave-man; and it is less than a century since he began systematically to educate all members of his race, as distinct from a favoured few. In the course of a long, slow, uphill struggle he has conquered one field after another; but as for the problem of social organisation, he has hardly given it a thought as yet. We should be grateful for the distance he has travelled rather than appalled at the distance he has yet to go.

The main conclusion, however, is unaffected. Man has conquered Nature but (as yet) has made but 'a shameful conquest' of himself. Master of his physical environment, he is not yet lord of himself. In his attempts to study the workings of Nature he has neglected that part of Nature which is Man. It happens to be the most important part. He has studied pure science and neglected an important branch of applied science—the science of human beings and their organisation. Physics and chemistry and biology he has learned; he has hardly as yet mastered the alphabets of psychology and economics and political science—

those sciences which deal with the fundamentally important art of living together.

The extent to which we judge man to have failed depends upon our imagination: the higher our vision of what the world might become, the less we shall be content with what the world actually is. But one fact is beyond dispute, that we live in an evolving world. Change of some kind or another must come; it is our problem to influence that change in the right direction.

The first step on the road to reform is to *desire* to cure the evils of our society. It is undeniable that not everyone does so desire. Some criminals, presumably, are content with the world as it is, though others would prefer an organisation which would give them opportunities of earning their living in more honest ways. And there are people, not of the criminal class, who gain, or who think they gain, by our disorder; such people have a vested interest in the leaving of things as they are. No doubt an armaments manufacturer makes profits out of existing society which in a better organised world he would have to seek in other ways; and the reader will probably feel himself quite competent to draw up a long list of persons whose occupations might vanish in a better ordered world. There is also a large class of people who are purely indifferent or selfish, and for that reason have no part in any movement for the betterment of human conditions. All these classes of people exist; and there are some who think that this is the real root of the trouble. Man is in his present state, they think,

through his own selfishness; and until he learns to be less self-centred he can never hope to build a better society.

Now if that is the ultimate diagnosis of the trouble, if, in other words, the problem is at the bottom exclusively a moral one, then it is beyond the scope of any analysis which can be given to it here. This discussion can only proceed on the assumption that man is not wholly or invariably selfish, or even indifferent, that there is pure grain mixed with the chaff, and that there are forces of goodwill in the world which, if they could only be harnessed to the problem, would furnish a real motive power in social reconstruction. That they would be sufficiently powerful to overcome the vested interest of man's greed is, of course, another assumption.

But even when we have made these large assumptions we are only at the beginning of our difficulties. For 'meaning well' and 'doing well' are not the same thing. When we say of a man that he 'means well' we are generally trying to excuse him for having made a hopeless failure of some undertaking. It is one thing to desire to solve the problem of social justice; it is quite another thing to know how to set about it. We know, for instance, that the products of human labour are inequitably distributed, and we should like to alter this. But we can also see that the simple remedy of confiscating the possessions of the rich and giving them to the poor is, in our complicated society, in which the poor depend on the rich and the rich depend on the poor, to a large extent impracticable. And even if it were practicable it would not be perma-

nent, for the same fundamental conditions (whatever they may be) which produced an inequitable distribution in the first place would in a generation's time produce the same kind of distribution once more. No one who is in sympathy with the general argument of this book, which shows the past as living in the present, is likely to feel that naïve solutions such as confiscation touch the roots of the difficulties at all. Society is a living organism, and if it has grown wrongly it must be re-educated before it can grow rightly; we cannot cut off a limb which is functioning badly and expect it to function well if we graft it on somewhere else. That is not surgery but butchery. It might be a short cut; but it would not be a short cut to heaven. And the more vivid our realisation of that gradual process by which the present has come into being, the greater will be our sense of the magnitude of the problem. We shall mistrust short cuts, and we shall think in terms of gradual evolution rather than sudden revolution. For there is only one kind of revolution which, in the last analysis, is likely to be productive of progress: a revolution which starts in our own minds. And if it starts there, no one can tell where it will end.

It is impossible, in a book of this kind, even to enumerate those problems in sociology and economics which lie at the roots of our present disorder, still less to suggest concrete ways of solving those problems. What may be possible, however, is to indicate the attitude of mind on which progress depends. Before we can reform the world we must reform our minds.

II

Man's most hopeful weapon with which to attack his problems is his mind. The history of the human race is the history of the gradual development of intelligence. In the beginning man, like the serpent, was "more subtil than any beast of the field". Otherwise he could hardly have survived, since in other directions he was less well equipped than they. It is his mind which has brought him thus far; it is his mind which must take him the rest of the way. He has to use his mind first to find the facts, and then to deal with the facts when found; and each of these problems presents enormous difficulties. For the facts are far more complex than they appear to be on the surface.

There is a profound platitude of Samuel Butler: "Things are what they are. Their consequences will be what they will be. Why then should we seek to be deceived?" Our first duty is to find out what the facts are. Until we do that all our attempts at social reform are so much sound and fury. What is needed is some hard thinking.

The concept of 'hard thinking' is apt to conjure up in our minds a picture of a passionless being, a kind of thinking machine, devoid of all kind of emotion. It is an unattractive picture; and in point of fact few saviours of mankind have been of that type. It has been when men have been armed with "that human reason which is also human charity" that they have prevailed. For we have already seen that man's impulses—his best ones as well as his worst ones—spring from his emotions. There is a 'feeling' which acts as a

spur to intellectual work; we call it 'interest'. Some of the finest experiences of life, those which we judge to have most value, those in which we feel that we are most truly ourselves, seem indissolubly connected with states of high emotional feeling. A life without sentiment (which is not the same thing as sentimentality) would be, we think, a poor life, devoid of much of its real meaning. It is not 'feelings' in themselves which are wrong; they are essential; it is only when feeling usurps the place of reason that it leads us astray. Man's emotions provide the spur; the reformer is roused to action because he *feels* the waste and degradation of much of our present civilisation so acutely. But when feeling has roused him to the point of action its function is finished. Feeling by itself will not take him five per cent of the way on the journey he must now make: he must *think* his way through his problems. It was a celebrated surgeon, who left the world deeply in his debt, who once said: "pity as an emotion must cease in order that pity as a motive may come into play".

The triumphs of man's intellect have been achieved in precisely those fields in which he has been able to control his emotions. In the field of pure science his feelings have not hampered him. The physicist does not want his electrons to move in one orbit more than in another; he is quite unbiassed about it. And consequently he is in the ideal state of mind for observing the orbit in which in fact they do move.

What, then, are the obstacles in the way of the efficient use of the mind?

III

The first difficulty is that we do not realise sufficiently the way in which the mind works. It has a remarkable capacity for self-deception. Before we analyse how this happens it will be well to consider a concrete example.

Tomkins is a schoolboy, a champion of the interests of that down-trodden class. He has strong views on the subject. Schoolboys, he says, are in danger of losing their rights. Their principal oppressors are prefects, who punish them too frequently and too severely. If the prefects were more persuasive and less coercive they might not find anything to punish at all; for their aggressive manner is itself the cause of most of the insolence to which they object. They make a god of petty little rules and regulations, most of which serve no real purpose; the school would in fact be better disciplined if it had no rules at all. And if prefects were abolished, friction in the school would be abolished too. It is generally the wrong sort of person—the prying, toadying sort—who gets elected as a prefect; and if by the head master's oversight a decent fellow becomes one, he is soon spoiled by the power he has to use; for in time the exercise of authority spoils everyone.

Tomkins makes great play with these and similar arguments. He sees himself as the champion of the under-dog, as a kind of scholastic Hampden, in fact; and he derives considerable satisfaction from the picture. He thinks that these arguments have caused him to take up his present position. But that is precisely where he is wrong.

The trouble with Tomkins dates back some two years. What really happened to him was this. About that time he developed rather an awkward habit of lying in bed too long in the morning; this caused him frequently to be late for school; he was reported to the prefects of that time and punished. This was probably no more than he deserved; he was getting rather slack; but to admit that, even to himself, was more than Tomkins was prepared to do. So his mind set to work, quite unconsciously, to justify his position. What does three minutes more or less matter anyway? he asked himself. It is absurd of the prefects to make such a fuss about a trifle. But that is like prefects; fussy people, always trying to stop a fellow from enjoying himself. Are they themselves so much better than anyone else? And Tomkins soon invented all these reasons for disapproving of prefects which we have set out above.

Now some of the reasons so eloquently expounded by Tomkins are quite good reasons in themselves. Prefects have no monopoly of wisdom; some of them do undoubtedly deteriorate if allowed too much power; and others of them may have as muddled an idea of their duty as Tomkins has of his. But the point is that these reasons, whether right or wrong, do not in fact provide the real explanation of Tomkins's attitude to prefects. He does not dislike prefects because of these reasons. He has constructed these reasons because he dislikes prefects.

If Tomkins were fully aware of this then he would be simply a dishonest humbug, and there would be no more to be said about him than that. But it is exceedingly likely that by now he will have entirely forgotten

what it was originally that caused him to take up his present position. He is by now firmly in the grip of a set of ideas which he calls his 'principles', and he would be honestly indignant if anyone were to suggest that they were really his prejudices.

The case of Tomkins is, *mutatis mutandis*, the case of all of us. Our minds work just like Tomkins's mind; we end by believing just what we want to believe. The mind cannot endure mental conflicts; it is always striving after a harmony. If ideas and thoughts come to it which are destructive of that harmony it sets to work at once to repel them; and the process is carried on almost automatically. We desire, for example, to do something which, if we were to argue the matter out openly with ourselves, we should know at once we ought not to do; the desire is an unworthy one. To face the real reason would bring disharmony into our minds; for we like to retain a good opinion of ourselves, which we cannot do if we know that we are doing wrong. So the mind invents reasons for justifying the course of action to ourselves; so that we can proceed to do what we really want to do, and yet be free from the disturbing knowledge that it is wrong.

Probably there is no human being who, if he is prepared to be quite honest, cannot at times detect this kind of process working within himself. While the process remains conscious, while we are deliberately 'making excuses', we may deceive others but we are not deceiving ourselves. But sooner or later the process becomes unconscious; the reasons we desire to find present themselves to the mind with no conscious effort on our part to search for them; and we think

our actions are dictated by reasons which, if only we were able to analyse our mental processes, we might find have really nothing to do with them at all. The belief does not grow out of the reason; the reason has been constructed to justify the belief.

When Darwin, one of the most honest of scientific thinkers, was speculating about the origin of species, he used to keep special notebooks in which he would immediately write down any objection to his theories which occurred to him. He found that, if he did not do this, his mind had a habit of forgetting all the objections. For the objections introduced disharmony into his mind; and his mind pushed them out again as quickly as possible.

If Darwin was subject to this mental failing the reader may take it for granted that he is subject to it too. It will be a salutary exercise for him to search his own mind. It will be, in some respects, an unpleasant search. But, if only he will carry it out honestly, there is no single thing which is likely to do him more good.

The harm done to our political thinking by this defect of the mind is incalculable. For it gets excellent opportunities of manifesting itself in modern politics. A system of party politics has become established under which it is almost inevitable that politicians should 'speak to briefs'; and 'speaking to a brief' means determining beforehand whether one is going to advocate or oppose a given course of action, and then marshalling all the reasons that can be found in support of one's position. The same is true of political journalists. The *Daily Blank* is a Government organ and the *Daily Blanket* supports the Opposition. Hence

the *Daily Blank's* editorials are almost always composed of (more or less) cogent arguments in support of the Government's position, while the *Daily Blanket* proves conclusively (to its own satisfaction), day after day, how fundamentally unsound are their proposals. And the journalists are only doing, on a large scale, what the rest of us do on a smaller one.

It is easy enough to see examples of this failing in the political party to which one is not attached oneself; but it is not a failing confined to any one party. How many Conservatives are there whose opposition to Socialism can be traced to their dislike of a system under which they themselves might have to give up something? How many Socialists are there who are opposed to the present order because they themselves suffer from its maladjustments? These reasons, however, are rarely avowed; Conservatives and Socialists alike would be indignant if they were suggested. They have genuinely forgotten all about them. They are each firmly convinced that their creed is the result of a series of dispassionate intellectual judgments. But, in fact, many of them took sides first and found the arguments afterwards. They probably did not even have the trouble of inventing the arguments themselves, but took them ready-made from the newspapers.

But "things are what they are" and not what we deceive ourselves into thinking they are; and their consequences will be what they will be. A sound political policy can only be framed by taking account of the "irreducible and stubborn facts"; we do not dispose of these facts by constructing arguments to make ourselves believe that they are non-existent.

There is no remedy except to exercise a constant vigilance over one's mind, and resolutely to check the rationalising process in its early stages, when we may be able to recognise it for what it is.

"There is no alleviation of the sufferings of mankind", said T. H. Huxley, "except veracity of thought and action, and the resolute facing of the world as it is, when the garment of make-believe with which pious hands have hidden its uglier features has been stripped off." But the pious hands are usually our own.

After two thousand years, there is no better advice which can be given to those who want to find the truth than the advice carved over the temple of the Greek oracle at Delphi: Know thyself.

IV

A second difficulty in the way of clear thinking is connected with the first: we are all of us apt to be led astray by our emotions. Now it has already been suggested that emotion, in its place, is essential; it provides our driving power. It is in its place, for example, in a poem, which expresses moods and fancies and makes a deliberate appeal to the emotional and aesthetic tendencies of our minds. (Not that good poetry is purely emotional: but that is another story.) But good poets do not necessarily make good political scientists; and emotion becomes dangerous when it usurps the place of thought. And unfortunately this is what it often does; it is constantly colouring and biassing our ways of thinking. We all know that anger is a bad counsellor, but we forget it when we are angry

ourselves. The more inflamed we become, the less capable we are of making even the simplest judgments accurately. As emotion increases, the critical sense declines. When Henry V was encamped before Agincourt with a dangerously small army, the Earl of Westmoreland was heard to remark, with obvious good sense:

> O! that we now had here
> But one ten thousand of those men in England
> That do no work to-day.

To which Henry replied:

> What's he that wishes so?
> My cousin Westmoreland? No, my fair cousin:
> If we are mark'd to die, we are enow
> To do our country loss; and if to live,
> The fewer men, the greater share of honour.
> God's will! I pray thee, wish not one man more.

In plain English, what this means is that it is a good thing to go into battle with a small army rather than a large one, since the result is predetermined and will not be affected by the size of the army. If Henry really believed this he must have been a comic-opera type of soldier, and entirely unsuited to conduct a real campaign. But probably he did not believe it at all; he only thought it was "the stuff to give the troops". And the troops would be in so emotional a state that perhaps they would even swallow it.

If the reader should find himself objecting to the last paragraph he might ask himself whether the real ground of his objection may not be that he dislikes to read anything which may seem to belittle such a famous Englishman as Henry V—or, alternatively,

William Shakespeare. He may console himself with the reflection that Henry's speech was no doubt excellently suited to the circumstances. Henry was not trying to decide whether or no he ought to give battle; he meant to do that in any case; he was simply trying to put courage into his men; and the point of the illustration is that almost any argument, however bad, would pass muster in the highly charged atmosphere of the moment.

We may take a more recent example. In the year 1931 the Chancellor of the Exchequer had to introduce a Financial Statement embodying proposals for a drastic restriction in expenditure. In his speech the Chancellor explained his proposals soberly and carefully, stating his arguments to the best of his ability. But feeling apparently the need for something a little more heartening for his followers, he produced the following as his peroration:

All our past proclaims our future: Shakespeare's voice and Nelson's hand,
Milton's faith and Wordsworth's trust in this our chosen and chainless land,
Bear us witness: come the world against her, England yet shall stand.

There followed, of course, scenes of indescribable enthusiasm on the part of those who approved of the Budget; and scenes of equal but impotent rage on the part of those who did not. The passage was quoted next day, with marked approval, by most of the press, as though it was the high-water mark of the speech instead of a pure irrelevancy. What, in fact, does it say?

All our past proclaims our future:

This is a dangerous half-truth. And the Chancellor, of course, was thinking of the creditable portions of our past, and forgetting the rest. He did not mean to imply that, as we had been living outside our income in the past, so we should go on living outside it in the future. If this bearing of the quotation had struck him he would no doubt have chosen another.

> Shakespeare's voice and Nelson's hand,
> Milton's faith and Wordsworth's trust . . .

This is an emotional attempt to corner the great names of English history in support of the Chancellor's financial proposals. Shakespeare, Nelson, Milton and Wordsworth were as much a part of his opponents' heritage as they were of his own; and, as a matter of fact, some of them were more usually to be found in opposition to the general opinion of their times than in harmony with it.

> . . . in this our chosen . . .

"Chosen land" is a delightfully satisfying phrase; it makes us feel that all's right with the world. But in fact it either means that our land was 'chosen' by the Almighty, in which case the phrase is unpleasantly suggestive of the megalomaniac utterances of the German militaristic caste before the war; or else it means 'chosen' by ourselves, which is a little stupid, seeing that we are all of us born into our respective countries without any say in the matter.

> . . . and chainless land,

So high was the emotional tension by now that the

Chancellor even got away with the adjective 'chainless', although the purpose of the Budget was to bind still more closely the economic chains fettering practically all classes of the community.

> Bear us witness: come the world against her, England yet shall stand.

The right comment seems to be that England is more likely to fall than stand unless something better than irrelevant rhodomontade is forthcoming at a time of special difficulty and strain, when nothing is so much needed as calm and careful thinking.

The reader may feel that to analyse poetry in this meticulous way is to miss its real spirit and meaning. That may be true of poetry as poetry; but not of poetry imported into politics. The quotation in question is an excellent example of the kind of oratory which does not help, which solves no problems, but which merely heightens feeling and so plays its part in producing an emotional atmosphere in which the problems become more and more difficult to solve. The quotation could, of course, be used to support a false argument quite as well as a sound one; and the Leader of the Opposition might have retorted by stating his side of the case as soberly as he could, producing the same peroration at the end, and getting *his* followers to cheer. Unfortunately he did not think of it. What actually happened was that an Opposition member rose and ejaculated "Dick Turpin!", which was not a very valuable contribution to the debate.

That is really the final condemnation of this kind of emotionalism; it can support falsehood just as well as

truth. Emotions, genuinely good in themselves, become as easily attached to the wrong argument as to the right one, and people will support the wrong case with a passionate conviction that they are right. Their intentions are good; they *feel* right; so they conclude that their arguments must be right.

When emotion comes in at the door of an argument reason flies out at the window.

The supreme example of a high emotional atmosphere destroying the capacity for accurate thinking is seen, of course, in time of war. "When war is declared, truth is the first casualty." So intense was the emotional tone during the Great War, in all countries, that the facts themselves were grossly distorted; and, in some cases, entirely falsified. One well-known example will suffice. It consists of five quotations from newspapers:

When the fall of Antwerp got known the church bells were rung [*i.e.* at Cologne and elsewhere in Germany]. *Kölnische Zeitung.*

According to the *Kölnische Zeitung*, the clergy of Antwerp were compelled to ring the church bells when the fortress was taken. *Le Matin.*

According to what *Le Matin* has heard from Cologne, the Belgian priests who refused to ring the church bells when Antwerp was taken have been driven from their places. *The Times.*

According to what *The Times* has heard from Cologne, via Paris, the unfortunate Belgian priests who refused to ring the church bells when Antwerp was taken have been sentenced to hard labour. *Corriere della Sera* (Milan).

According to information to the *Corriere della Sera* from Cologne, via London, it is confirmed that the barbaric con-

querors of Antwerp punished the unfortunate Belgian priests for their heroic refusal to ring the church bells by hanging them as living clappers to the bells with their heads down. *Le Matin.*

And this was the way in which the peoples of Europe, in the greatest war in history, got their knowledge of the actions, thoughts and motives of their opponents. In that war eight millions of men were killed.

All this, in our calmer moments, we generally recognise. (Some of us spend most of our calmer moments in trying to rectify the harm we have caused in moments which were less calm.) What is not so often recognised is that the appeal to emotion, instead of the appeal to reason, can be very much more subtle than has been suggested so far. Two men can relate what are substantially the same facts and, by a different choice of epithets, give an audience two entirely different impressions of those facts. A favourable or unfavourable impression can be created by slight modifications of the words used; for words have an emotional tone which may colour the whole of an argument in which they occur. Our own soldiers, for example, we call 'valiant'; the enemy we call 'bloodthirsty'. What we really mean is that both sides fight vigorously; but the emotional reactions to the two words are entirely different.

There is a well-known saying: "I am firm; thou art obstinate; he is pig-headed". The three words describe a certain quality which we might call 'steadfastness', or, as that has a favourable ring about it, 'immobility'. The quality which is a virtue in me is

represented as a vice when it is displayed by my opponent.

A correspondent of the *Manchester Guardian* once illustrated this point very well by compiling two lists of phrases, one set suitable for our side in politics, the other for our opponents:

Your own party makes a *challenge*; the others make *attacks*.
Your own party makes an *appeal* for votes; the others make a *bid* for them.
Your own party conducts a *campaign*; the others indulge in *tactics*.
Your own party issues a *message*; the others raise a *cry*.
Your own party *indicts* the others; the others *threaten* yours.
Your own party makes a *pledge*; the others make a *claim*.
Your own party is faced with a *problem*; the others are in a *dilemma*.
Your own party *replies* to its critics; the others *retort*.
Your own party *maintains* its attitude; the others *persist* in theirs.
Your own party deals in *facts*; the others have a monopoly in *fallacies*.
Your own party makes a *powerful* move; the others make an *insidious* one.
Your own party *warns* electors against the others; the others *prejudice* them against yours.
Your own speakers are *eloquent*; those of the other party are *emotional*.
Your own party is *spirited*; the others are *panicky*.
Your own party makes a *vindication*; the others make a *defence*.
Your own party *riddles* the others' plans; but they *pick holes* in yours.
Your own party's aims are *revealed*; the others are *exposed*.
Your own party, in short, is "seeking the good of the country"; the others merely electioneering.

And yet things remain as they are, not as we are pleased to colour them; and their consequences will be what they will be, not necessarily what we desire them to be. Until we can import into the discussion of our political problems an attitude of mind as unemotional as that which the scientist brings to his problems, we cannot hope that our progress in social science will compare with his progress in physical science.

V

In the last section we have seen how ready we are, when under the influence of strong emotion, to accept as true a statement or an argument supported by false, or quite inadequate, evidence. But many people have so slight a critical faculty that they are disposed to believe any confidently asserted statement, even when their emotions do not enter into the matter at all. We call them suggestible. Their minds are passive rather than active. The mere reiteration of a statement produces an effect upon them; they hear the statement so often that in the end they come to believe it.

People who write advertisements play skilfully upon this weakness of the mind. I read an advertisement: "Caruso's Capsules are good for you". The advertisement does not tell me why Caruso's Capsules are good for me; it does not attempt the herculean task of explaining just how it is that Caruso's Capsules will cure all the forty or fifty different complaints the advertisement specifies, from anaemia at the top of the list to varicose veins at the bottom. It just tells me that they

are good. It hopes that if the statement is repeated sufficiently often, if I see the assertion staring at me from hoardings and plastered on the outsides of buses, I shall come in time to believe it. And very likely I shall.

"What I tell you three times," said the Bellman, "is true." He would have made an excellent advertising agent.

A more serious exploitation of this mental weakness occurs in newspaper propaganda. For papers do not confine themselves to their acknowledged function of disseminating news; they disseminate opinions as well; and although some of them endeavour to hold the balance fairly between differing opinions, and try to give an unbiassed hearing to all sides of a question, others of them are simply organs of propaganda. Such papers make little attempt at impartiality; they present both their news and their comments in the way which they think is most likely to influence their readers to take their side of any controversial question. A paper of this kind may belong to a political party, or a group of men, or a single individual, deliberately using it in order to impress some particular view upon the public. And very often such efforts are successful. For to many people the printed word has not entirely lost the magic which it was natural for it to have in those early days when printed words were rare. They do not stop to reflect that one man's opinion is not necessarily more valuable than another's just because the printing press enables him to circulate it to millions of people; they think that "if you see it in the *Daily Blank* it must be true". And in this way the opinions of a small number of people

can frequently exert an influence which is out of all proportion to their real importance.

One remedy for this state of affairs is for the reader to make a practice of seeing at least two newspapers, as far as possible of opposite opinions. It is not a completely satisfactory solution, however, since two wrongs do not make one right, and two misstatements do not always cancel one another out in such a way as to leave the truth. What is needed in addition is that the reader should adopt a definitely critical attitude of mind to what he reads. Before subscribing to the truth of a newspaper editorial he might, for example, try the effect of saying to himself something of this kind: "This article had to be written last night in rather a hurry, between ten and eleven o'clock. It was probably written by a rather tired man, of good but not outstanding education, with a natural or acquired gift of fluency, and with a quick but not necessarily a profound mind. If he is really interested in this subject and has thought about it at his leisure, his opinion may be entitled to more weight than mine; on the other hand, his knowledge of it may be quite superficial. But the worst of it is that I do not even know what this very ordinary individual really thinks. For he is obliged to do his thinking in blinkers. If he is writing for the *Daily Blank* he is probably not free to say what he thinks about Free Trade; if he is writing for the *Daily Blanket* he may hesitate to express his real opinion of Empire Free Trade. So, although I will follow him as far as his argument wins my assent, I will refuse to allow him to stampede me into giving up my own judgment.

Nor will I be shaken out of my opinion if I read a similar article to-morrow in this paper; for he will probably write that too. Nor if I read the same sort of argument to-night in an evening paper; for both papers may be owned by the same proprietor, and two puppets can dance to the same tune. Nor if the man sitting next me in the train tells me the same thing; for there are a million copies of this newspaper in circulation, and he is probably one of its readers. Nor if this newspaper tells me that its policy was enthusiastically supported by a large audience at a meeting last night; for there are some people who are so swept off their feet at a political meeting that they will cheer almost anything; and there are some journalists who count so badly that three men and a boy appear to them a large audience. No! I will think out this problem for myself."

If the reader will adopt a healthy scepticism of this kind it may happen that he will sometimes err in the opposite direction, and do less than justice to the work of some conscientious journalist, who may have seen further into the question at issue than he has. But at least he will not be 'carried about with every wind of doctrine'; at least he will be exercising his sovereign right to think for himself; he will, in short, be a man.

VI

Even when we have done our best to get rid of our preconceptions and to keep our feelings under control we shall still be liable to make errors in the reasoning process itself. Textbooks of logic classify the

various types of mistake which we can make; for example, the argument

> Handsome men are slightly sunburnt;
> I am slightly sunburnt;
> Therefore I am a handsome man,

though it may lead to an impeccable conclusion, is, as an argument, false, since the first statement does not rule out the possibility that the class of sunburnt men may contain others besides handsome people. To be slightly sunburnt is, in fact, what the mathematicians call a "necessary but insufficient condition" for being handsome.

On the other hand the argument

> Slightly sunburnt men are handsome;
> I am slightly sunburnt;
> Therefore I am a handsome man

is sound, because we are justified in taking the first statement to mean "All slightly sunburnt men are handsome". In fact, a more reasonable statement would have been "some slightly sunburnt men are handsome"; and if this had been the premiss the conclusion would not of course have followed. The reader will find that many errors arise in practice through confusion of the words 'some' and 'all'. It is confusion of 'some' and 'all', indeed, which leads us into the common fallacy of generalising from particular instances. When Mr X says "I don't like Bonadventurists;[1]

[1] It may save the reader trouble to be told that Bonadventurists do not exist. If the class of person mentioned had been Italians, or Liberals, or Baptists, or Bolsheviks, or Schoolmasters, his own prejudices might have prevented him from paying sufficient attention to the nature of the argument.

they are dirty people", he would feel considerably aggrieved if an unsympathetic friend, knowing Mr X, were to set out his argument thus:

> Mr X knows two Bonadventurists;
> Mr X thought those two were dirty;
> Therefore Bonadventurists are dirty people.

It is probable that errors in pure logic, which can be guarded against with a little care, lead far fewer people astray than the kinds of error previously dealt with in this chapter. Something, however, might be said about one important class of argument: argument by analogy. This kind of argument is always dangerous and often false. Butler once said, "Protect me from the Evil One and Analogy".

When we argue by analogy we are really inferring that, because two sets of circumstances are alike in certain particulars, they will also be alike in other particulars; which may or may not be true. *A priori*, we cannot tell. We are prone, for example, to draw analogies between past and present events: thus comparisons were made in 1918 between the Russian Revolution and the French Revolution. If the circumstances of these two revolutions had been identical, then the general development would have been on similar lines. But in fact the actual circumstances of two events are never precisely the same, and it requires a skilled historian to make a reasonable forecast of the future from a study of the past. And even skilled historians are sometimes wrong. It was a well-known student of history who said, "When a man begins 'History teaches us . . .', I say to myself, 'that man is going to tell a lie'; and he generally does".

Examples of false analogies abound. The government of a state, for example, is compared with the control of a business. This kind of comparison is made: "A business, which fails or succeeds according to the degree of its efficiency, is rarely democratic in its organisation; there is an individual at the summit called the Boss; hence a state will flourish best if it is controlled by a Dictator. Democracy is thus a bad form of government." But the conduct of a business and the conduct of a state are not really comparable things. A business organisation works in a different kind of medium, which is alone sufficient to bring the analogy under suspicion. Further, it has more restricted objects. If in the course of making money it should stunt the interests and narrow the outlooks of its employees it would still be called 'successful'. But the aims of a state are wider; it is thinking, or should be thinking, in terms of the betterment of its individual members, and their betterment is not wholly a matter of finance—either their own finance or the government's finance. The analogy simply does not hold.

Again, the state is commonly compared to an individual, a tempting but misleading analogy. It is a serious over-simplification of the facts. Burke warned us that we could not draw up an indictment against a whole nation. We say, "France thinks . . ." or "India desires . . .", as though France, for instance, was a single individual who thought, instead of a complicated integration of millions of men and women no two of whom think exactly alike. There are many streams of thought in France, not one, and this kind

of analogy conceals the vital fact that French thought is not united. It is a vital fact, because if a statesman of another country wished to influence public opinion in France, it is precisely this fact of which he would take advantage. He would aim at strengthening the hands of those people in France whose ideas were most sympathetic to his own.

This kind of analogy is frequently given a biological twist, the state being compared to an organism. Just as mankind has developed, it is argued, as the result of a struggle for existence in which no quarter is given and the weaker go to the wall, so each state should be prepared to fight all rivals—each state for itself and "the devil take the hindmost".

Even if this view of the 'struggle for existence' were correct the analogy would be false, because it ignores the enormous evolution which has now taken place; it ignores the new factor, human wisdom; and it suggests that man should place himself on a level with the beasts whom he outgrew. Thus it entirely overlooks the fact that, in modern civilisation, interdependence is a marked feature. The Cornish fisherman grows strong with the help of his so-called adversaries; he depends on them; he does not flourish by exterminating them. And if we are to have an analogy at all, it is better to compare the modern state with the modern man rather than with a prehistoric man or beast.

But it may be doubted whether, in any case, those who make much of this particular analogy always understand what the 'struggle for existence' has implied. There is co-operation in Nature as well as com-

petition. A mother stoat, regardless of her own safety, will defend her offspring to the death. A male baboon will risk his life by succouring a youngster left behind in a retreat. Trees flourish better in association than they do in isolation. Nature is not always "red in tooth and claw".

It is difficult to describe the course of natural events without comparing Nature to a human being. For example, in a previous chapter we were content for the moment to describe Nature as trying a series of experiments, culminating in Man. At once the assumption is made that Nature, being a human being, is purposeful, working to some definite end. Now this may be true; but it is one of the objects of philosophers to test this hypothesis; and we cannot test it if we begin by assuming it.

Some use of analogy, however, is almost inevitable. How is a scientist to picture his protons and electrons, the ultimate constituents of the atom, unless he visualises them to himself as something like minute specks of dust? But in so visualising them he may be unconsciously endowing them with properties which specks of dust possess but electrons do not.

Moreover, argument by analogy is not only to some extent inevitable; it has one great advantage. It is extraordinarily suggestive; it will indicate lines of thought which might otherwise be overlooked. This book contains a large number of such arguments; the reader should pick out some of them and examine them carefully; he will probably find ample scope for criticism. The wise course is to accept all the help which analogy can give in starting a train of thought

but to refrain from pressing the analogy too far. The suggestions derived from it should never be accepted as true unless independent testing and verification are possible. Analogy becomes a good servant only if it is kept in its place.

VIII

THE USE OF MAN'S MIND (II)

If the Truth is big enough to be worth anything, it is probable that we can only see a bit of it. E. F. BENSON

It takes two to speak truth,—one to speak it and another to hear. R. L. STEVENSON

It's not so much men's ignorance that does the harm as their knowing so many things that ain't so.

American humorist

I beseech you, in the bowels of Christ, think it possible you may be mistaken. CROMWELL

THE USE OF MAN'S MIND (II)

I

WE have seen in the last chapter various ways in which our thinking may go astray even when we start from some knowledge of the facts. We have said nothing so far about the initial difficulty of determining what the facts really are.

The phrase 'finding the facts' is used in two senses. It may mean no more than deducing certain facts from some other data. For example, we may be asked to determine whether left-handedness and squint are two characteristics of human beings which have a tendency to go together, which are thus in some way connected. In such a case we have to take certain data collected by other people—*e.g.* tables of results furnished by doctors, psychologists, etc.—and subject them to a mathematical analysis. In the end we shall have extracted from the original data all the information they contain which bears on our problem. This process will have been a process of inference, and as such will have been liable to all the kinds of error to which inference is liable. In this case 'finding the facts' really means 'inferring the facts', and there is no more to be said about it. But 'finding the facts' is also used in the sense of 'becoming aware of the facts in the first place'—that is, observing them; and this presents fresh difficulties for discussion.

At first sight the difficulties are not very obvious. If it is only a question of observation: well, we all think

that, given a reasonable opportunity, we can observe the facts carefully enough.

But we cannot. We cannot even tell the truth about what we see with unfailing accuracy.

It is commonly supposed that the difficulty about telling the truth is a moral one; that people could tell it if they wanted to, but that they do not desire to do so. It would be more accurate to say that most people do desire to tell the truth, but have no notion of how to set about it. They lack the power rather than the will. When we swear in a law court to tell "the truth, the whole truth and nothing but the truth" about some facts which have come under our observation we rarely have any idea of the real difficulties of the task which we have undertaken.

If my version of a certain event is challenged, I say, "But I saw it happen with my own eyes". What I really mean is that I 'saw' something and deduced something else from what I saw. I 'saw' a little and inferred much.

I say, for example, that, as a matter of observation, my study table has a rectangular top. That, however, is not what I see; it is what I infer. Rays of light proceeding from the table fall upon the retina of my eye; my optic nerve conveys a stimulus to my brain; in consequence I judge the table to be rectangular. But in fact the rays of light form an image upon the retina which is an irregular quadrilateral, not a rectangle at all; and from that I infer a rectangular top. The appearance of the table depends on the position of my eye; if I lowered my eye until it became on a level with the top of the table I should 'see' the

top as a straight line, not a two-dimensional figure at all; but it is still quite likely that I should infer that the top was a rectangle. My mental organisation is of such a kind that with these sets of light stimuli I immediately associate the idea of a rectangular top.

An artist, who is not attempting to draw the table as he really judges it to be but only as he sees it, will actually depict the top as though none of its angles was a right angle.

Even a simple observation of this kind, then, has an element of inference bound up with it; and the inference drawn in such a case is like all inferences—liable to error.

In what we roughly call an 'observation' there are two things to be distinguished:

(1) the sense-impressions received. These form the raw material of the observation;
(2) the inference we make from the sense-impressions.

There is also another thing to be noted about an observation. There is present in our minds an emotional reaction to the occurrence, sometimes strong, sometimes faint, but rarely entirely absent. This 'feeling' element has already been discussed; it often affects the inference we draw and thus distorts our impression of the observation.

Now the sense-impressions themselves, and the inferences drawn from them, are easy to confuse. The sense-impressions include anything of which I become aware through my senses—touch, sight, hearing, smell, taste. These are the only direct sources of knowledge I have of the external world. That is, I

only 'know' it through the pressures it exerts on my fingers, the impact of light waves upon the retina of my eye, the impact of sound waves upon the drum of my ear, and so on. All the rest of my knowledge consists of a more or less complicated series of inferences drawn from these sense-impressions. What we call knowledge is thus our interpretation of our sense-impressions. And my interpretation of them depends on the kind of mind I have, and how much previous knowledge is there.

Suppose, for example, that I listen to the gramophone record of a song. It is not a good record and, at the first time of hearing, I cannot pick out the words. I only know that something or other is being sung. I hear the record a second time, and now I am able to distinguish a few words, something which sounds like "mother of all three". I at once infer that the record is "Land of Hope and Glory", the words of which I happen to know. When the record is played for the third time I hear it much better; a few more times, and it becomes perfectly plain; and if a friend of mine hears it for the first time when I am hearing it for the tenth I shall be surprised at his difficulty in identifying the words. If his hearing is as acute as mine we shall receive substantially the same sense-impressions; but my experience enables me to make swifter inferences as to what those impressions 'mean'.

I can master the contents of a page of English in two minutes, a page of French in five, and a page of Latin in thirty. A page of Russian, on the other hand, I cannot master at all. The sense-impressions in all

cases are about equally complicated; my mind makes quicker inferences in some cases than in others.

I look at a sheet of music and can make nothing whatever of it. Smith, whose eyes are no better than mine, looks at it and can understand it immediately. There is previous knowledge in his mind and he can interpret his impressions at once. That is, his mental organisation is better equipped to deal with this stimulus.

There are advantages at times in not making one's inferences too quickly. For example, an artist, anxious to experience the colour effect of a distant landscape, will sometimes take up an unusual posture and look at the landscape through his legs; he is thus to some extent freed from the grip of inference and has more chance of seeing the landscape as a mass of colours rather than as a collection of meadows and trees.

For this reason most authors like to have the proofs of their books read by some friend. For the author, reading the proof, remembers something of what is coming and hence is apt to infer the vital word of a sentence even if, owing to a printer's error,[1] it is not in the proof at all. Hence he is likely to overlook mistakes. He is thinking of what he meant to say, not of what the printer has made him say. But his friend has less in the way of clues to guide him; he will be more likely to read what is actually in the proof. Even the friend cannot dispense with inference —he makes, in fact, enormous use of it; but he will rely on it less than the author. In this respect, the

[1] By a well-known convention, all errors in a book are due to the printer.

more the reader knows of the subject matter the more he will be handicapped. If, on the other hand, he is obliged, through ignorance of the subject, to compare the proof with the manuscript symbol by symbol and word by word he will detect a slip more easily. If a boy finds in his school-leaving testimonial the remark "He should make an excellent proof-reader", he should not take it entirely as a compliment.

Inference, then, is bound up with all observation, sometimes so very subtly that it is a matter of extreme difficulty to detect its presence; and this is the reason why so many of our observations turn out to be mistaken. "Seeing is believing"—but the belief may be quite unjustified.

Mr Winston Churchill, in *The World Crisis*, describes how, on the morning of November 11, 1918, he heard Big Ben toll the hour of Armistice. In point of fact he could not have heard it, since Big Ben was out of action at the time. What he heard, presumably, was some other clock, perhaps that of St Martin's in the Fields; he inferred Big Ben.

Here is another illustration, also taken from life, though from a less exalted circle. Miss Jackson (only that is not her real name), looking out of her study window one afternoon, remarked "There goes Molly Fishwick". Someone venturing to query this statement, Miss Jackson repeated it in more positive terms. It admitted, she said, of no doubt whatever; she *saw* Molly. But after investigation it turned out not to be Molly at all, but a young woman unknown to Miss Jackson. The explanation is instructive. What Miss Jackson saw was a woman wearing a mackintosh.

But (*a*) Molly was in Miss Jackson's mind at the time, since she had just been mentioning her to a friend; (*b*) the unknown was about Molly's height and build; (*c*) her mackintosh was of a somewhat unusual colour, similar to one which Molly was known to possess; (*d*) there were independent reasons for thinking that Molly would walk past Miss Jackson's window about that time. The inference was irresistible; hardly anyone could have avoided making it. But it was quite wrong. The story gains point from the fact that Miss Jackson herself was an accomplished historian, trained in weighing evidence, and thoroughly well aware of the tricks played by the mind. It may be said that, her assertion being challenged at the outset, Miss Jackson should have been willing to admit the possibility of error. But, in fact, at the second attempt to recall her sense-impressions she would not recall the impressions themselves—that is, what she actually saw; she would recall her interpretation of the impressions; that is, what she thought she saw. And as she had formed the practically instantaneous judgment that the unknown was Molly, all her efforts at recollection henceforward would lead her back to Molly herself.

II

The practical conclusion to be drawn from this analysis is that there is some possibility of error in almost everything; and the moralisers can hardly miss their moral here. It is wise not to be too dogmatic, and, as Cromwell besought his readers on a famous occasion, to think it possible that we may be mistaken.

The analysis raises some interesting theoretical questions as well. What kind of knowledge do our sense-impressions give us of the physical world? Is it possible to be certain of the existence of anything which is external to ourselves? The reader with a taste for this kind of speculation should follow up these questions, and see whether he can avoid the conclusion that sense-impressions give us a knowledge of 'appearances' only, and that what lies behind those appearances we cannot tell. These questions, however, though they are important to philosophers, are irrelevant to our present argument. That argument has been that man can only solve his social problems by the method which has served him so well in his scientific ones: he must *think* his way through them. We then saw some rocks which beset his path. He does not realise the capacity of his mind for self-deception, for believing what it wants to believe; he is not intellectually honest with himself; he 'rationalises' obscure and unworthy desires in an effort to make them respectable; he is led astray by his emotions and attaches feelings to the wrong things; he is suggestible and accepts without enquiry the views of other people; he is a creature of prejudices, which can be excited in very subtle ways; swayed by his prejudices, he will fall into logical errors which he might otherwise avoid; he confuses inference and observation and is thus misled as to the facts.

We have discussed these pitfalls at such length that we may be in danger of thinking that intelligence is the only quality required for the building of a better social order. But to think that is to miss the point of

the argument. Intelligence has no moral quality; it may lead us wrong as easily as it may lead us right; it may show us an inexpensive way of blowing up our neighbours as readily as it may show us how to combine effectively with them for some common purpose; or it may split the atom, and in so doing split the world. It is no more than a tool, though the best tool we have. The mainspring of our action as social reformers is something quite different. In the last chapter we called it by the general name of goodwill. Stated more particularly, it might be a passion for social justice, or the scientist's desire to bring order to a disordered world, or a burning sense of the inadequacy of our present institutions to express the spirit of man. Whatever it may be, intelligence is the agent through which our purpose works.

But intelligence has a wider function; it heightens our appreciation of the motives which inspire us, and it has reactions upon the spirit in which we pursue our ends. If we are to transform our society in any worthy way, we need two things in full measure: ideals and courage; ideals to point out our goal, courage to sustain us on our journey toward it. And we shall find that intelligence will invest both with a deeper meaning. It will convert our idealism into an informed idealism and will show us how we may use our courage to best advantage.

We will consider first the effect of intelligence upon our ideals. All reformers have ideals. Man is so made that he cannot rest content with pulling down; he finds no lasting satisfaction in destruction; he must build too. Goaded to anger, he may destroy; or he

may destroy quite deliberately as a first step towards reconstruction; but a mere sense of what is wrong will not help him to lay the foundations of a just social order. For that, he needs a sense of what is right. Only a positive imagination, which can discern, however dimly, the outlines of that building which is yet to be, will have real power to inspire him.

Man feels, for example, a deep sense of the unworthiness of war; and that feeling may lead him to invent some kind of machinery which may delay war for a time or perhaps prevent it entirely in his own generation. But it is a negative feeling only, and therefore not one with which he can eventually rest content. For the final banishment of war he needs a sense, not of what is wrong, but of what is right. He needs a truer conception of the possibilities of peace. When he arrives at that conception, when he learns to make of his peace a creative and vital thing, when he can contrive a peace which will develop human personality rather than thwart it, a peace with a positive quality of its own, war will disappear because it makes no further appeal. The warlike impulses will find their satisfaction in the service of peace. "It is because our peace is so bad that we fall into war. But every war makes our peace worse."

As with the question of war, so with more general questions. Let man but have a vision of a good society and he will not rest content until he moves towards the fulfilment of his vision. For in the long run it is always the ideal that wins—man being what he is, a creature that lives by the light of distant stars.

But the idealism must be an informed idealism: it

must be controlled and conditioned by facts. That is the only kind of idealism which can be of any immediate use. Otherwise idealism tends to be sterile: a day-dream, with no chance of taking root in fact. A sentimental idealism, based on a vague desire for something better, will have no kind of contact with reality and will furnish no basis for building. It may be beautiful but it will also be ineffectual, and will beat its wings in vain against hard fact.

It is at this point that intelligence will play its part. It will control man's imagination and help him to lay his foundations in the light of the 'irreducible and stubborn facts'. It will make an effective imagination out of an ineffective one. It will cause man not merely to think of what might be, but to think of it in relation to what can be. It will force him to study ways and means; it will impel him to learn how what Is has grown out of what Was; will tell him what kind of weight must be attached to man's heredity; and will remind him that he must not forget Man the Ape in his struggle to achieve Man the Angel. It will lead him to distinguish the conventional and the transient in our present society from what is of permanent value.

It happens with many people that the deeper understanding which results from an informed idealism causes them to look with a more tolerant and charitable eye upon the social ferment of our time. They are no longer so ready to see society as sheer exploitation —whether exploitation of the down-trodden classes by the capitalist or exploitation of the middle classes by a workman concerned only to draw his dole. They see it rather as a confused muddle; they see capitalist and

labourer alike, not as Machiavellian schemers, but as ordinary decent human beings who have somehow lost their way. They see the capitalist (or the workman), for example, not as a monster of iniquity, but as a creature very like themselves, playing his own hand, perhaps rather selfishly, in a civilisation so organised that it invites him to play his own hand, since it tells him very clearly that, if he does not, no one else is likely to play it for him. And they come to reflect that, if he is like them in that respect, perhaps he is like them in other ways too, and would be genuinely anxious to make a better world if only he could find out how to do it. He, like them, is the victim of a bad system; and they must learn how to construct a better one, not in order to defeat the wiles of capitalists or working men but in order to give them both a better chance.

Yet another thing an intelligent idealism will do for us. By forcing us to look more closely at the problem it brings up its complexity in sharp relief; it shows us the deadweight of wrong ideas; it shows us how little can be done until we can get the right ideas more widely spread, how small an amount of really fruitful change is possible while men continue to think as they do. So it will lead us, as most reformers are eventually led, to the need for a deeper and better kind of education than anything which we have attempted so far. For the service of the future will make demands upon all of us which our knowledge and our wisdom are both as yet inadequate to meet. We shall need a longer education; we shall also need a better one: not an education whose chief object is the collection of exami-

nation certificates guaranteeing the accumulation o facts but not the digestion or understanding of them nor (worse still) an education of the kind constantl urged upon us by those who think of education merel as a preparation for business, and whose ideas of curriculum are limited to what they call 'practical subjects. We need an education of a much broade kind; an education in which the acquirement of tech nical skills is a beginning, not an ending; which wil give man a knowledge of his ancestry, put his presen problems in the right perspective, free him fron prejudice, leave him alert, thoughtful, intellectuall curious, with an appetite for things of the spirit; a education, in fact, which might unlock the best im pulses, and release for the service of humanity th infinite potentiality of the Common Man. When w can bring to birth an education of that kind some a least of our social problems will solve themselves. Bu we do not as yet see clearly what is the best metho of realising this ideal.

Intelligence will not merely give us a better under standing of how to realise our ideals; it will have it reaction upon the ideals themselves. That which w once thought to be an ideal will no longer conten us; the ideals themselves will undergo a transforma tion, and their last state will be different from th first. But it will be a better state, because the idea will now mean more; they will be charged with significance they formerly lacked.

There are some people who affect to despise idea ism, as being out of touch with 'the hard facts'. An sometimes ideals *are* illusions; it all depends on th

extent to which they are fertilised by intelligence. But the right kind of ideal is not an illusion; it is one of the hardest of hard facts; for it is the stuff out of which progress is made.

III

Intelligence will also transform our courage.

It is true that there are some forms of courage with which intelligence has little to do. Situations arise in which man feels impelled, if he is to retain his self-respect, to fight a battle which he knows is all too likely to be lost; and in such situations he may be able to summon to his aid a courage which will take him unafraid to defeat and death. "To fight to a finish; knowing you must be beaten," says a Galsworthy character, "is anything better worth it?" Probably nothing is better worth it. This kind of courage creates a value of its own; intelligence can neither add to nor subtract from it. But there is all the difference between a courage which persists to the end, failing because success in the circumstances is impossible, and a courage which fails through neglect to master the difficulties of the task it has undertaken. The first is often intelligent courage, though it has a quality which goes far beyond the province of intelligence; the second is unintelligent courage. The first is an adult virtue; the second is a mixture of virtue and vice.

In fact, much that passes for courage in the world is of this second kind. It is courage unfertilised by thought and doomed for that reason to miss its goal. It is wasted courage.

We live in a society in which the waste of courage is immense. In time of war the courage of half of us cancels out the courage of the other half; because our collective intelligence is not yet equal to the task of devising a society in which courage can be utilised effectively for common ends.

Violence is generally (some people think invariably) a form of wasted courage. It has some serious defects. The nature of violence is to provoke counter-violence, and the victory will go to the side that has the big battalions, which is as likely to be the wrong side as the right. Hence to resort to violence is, in general, an unintelligent way of pursuing one's ends. It generates an atmosphere in which intelligence is at a discount. "It is worse than a crime; it is a blunder." And then violence is apt to lose its way: it is not without reason that we call it 'blind' violence. It is a negative thing, not a positive; it has no constructive quality, and we cannot build with it.

We play with the idea of a 'little' violence, just enough to realise some aim on which we have set our hearts. But violence has a momentum of its own; it does not stop when we want it to stop. The genie has been let out of the bottle and will not return to it. "You can do anything with bayonets except sit on them"; policies of violence have a habit of over-reaching themselves.

It is true that revolutions, like wars, seem often to have achieved their ends (though it is also true that they often do nothing of the kind). But the highest claim that can be made for revolutionary violence is that it succeeds in destroying another violence; and

that in itself does not take one very far. When revolutions have brought about the birth of a better society it has not been because of their massacres but in spite of them; it has been because they have been inspired by a ferment of the human spirit which not even violence, though it may disfigure, has been able to destroy. When revolutions succeed they do so because of the ideal behind them. Their connection with violence, though definite, is casual; their connection with idealism is fundamental.

We live to-day in a world largely given over to violence. Nazis and Communists in Germany, Fascists in Italy, three or four conflicting armies in Ireland, unrest in India, revolution in Russia, war in the Far East, are all symbolic of a world which has forsaken the harder path of reason, persuasion and understanding and is trying to take the Kingdom of Heaven by storm. And all these armies have recruited, as violence always does recruit, large numbers of soldiers who are not even aiming at the Kingdom of Heaven, but who propose to do a little looting on their own account. What makes this violence so superficially attractive is its appeal to some of the best impulses of adolescence: vigour, determination and, above all, courage. The Happy Warrior is an attractive figure. But when he goes down the blind alley of violence he leaves an unhappy trail behind him. And the hot fit is succeeded by a cold fit, and there comes a reaction of disenchantment and disillusion. He has to ask himself whether his violence has really advanced him on his journey; whether, indeed, it has not resulted in a subtle debasement of his ideals.

Violence is a misapplied courage. If we invest in so speculative a stock we must be prepared to get no dividends, and shall be fortunate if our original capital of ideals remains intact.

If we wish to advance our ideals, our courage must take other and more difficult forms. We must have the courage to reject mere violence; to examine carefully the 'short cuts' offered to us, and to reject them if they cannot stand the scrutiny of our intelligence; to remain unmoved by flamboyant appeals to emotion. We must outgrow the unreflecting, elementary kinds of courage and go forward with a courage which is less spectacular but more mature. We need a courage which will refuse to be the slave of any catchwords; a courage which will dare to think; a courage which will take the uphill path of persuasion and understanding knowing quite well that it is an uphill path. When we

> . . . can meet with Triumph and Disaster
> And treat those two impostors just the same

we shall begin to know what courage really means. And that kind of courage might transform the world.

The world is in sore need of transformation. We live to-day in a civilisation that is sick. Some people think that it is sick nigh unto death; others think that the spirit of man can yet make of that civilisation what it will. It is certainly a civilisation teeming with urgent and unsolved problems. Without courage we cannot hope to meet its challenge; yet an unintelligent courage is a sword which will break in

our hands. We shall have to venture upon uncharted ways; yet it is our duty to chart them as far as we can. New difficulties will have to be overcome with new methods; we must refuse to be shackled by the past; yet we cannot shake it off, for it is built into our bodies, our minds, our institutions. The past is at once an inspiration, a guide and a fetter; we must beware of those who would use it chiefly as a fetter. They will tell us that this is impossible, that that is dangerous, that "it can't be done"; we must tell them that they are expressing "the old instinct of the herd, that makes a god of its own feebleness and bows down before it". And if we have sufficient faith, sufficient intelligence and sufficient courage we may be able to repeat in our generation the recurring miracle of the past, and show once more that man is the sort of being who converts to-day's 'impossible' into to-morrow's 'inevitable'.

APPENDIX A

LIST OF BOOKS RECOMMENDED FOR FURTHER READING

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LIST OF BOOKS RECOMMENDED FOR FURTHER READING

CHAPTER I

The Children's Encyclopedia. Sections on Astronomy.

Earth, Air and Sky. C. H. Dobinson. An easy treatment of astronomy suitable for those who know none at all.

The Spangled Heavens. L. Edwards. Easy. Deals chiefly with the planets.

The Universe Around Us. J. H. Jeans. A much more advanced treatment, though not a mathematical one. In some respects this large book is easier than the smaller *Mysterious Universe* of the same author.

Stars and Atoms. A. S. Eddington. Gives some vividly written accounts of discovery in astronomy. Should not be too hard for a reader who is prepared to take some trouble.

On the abstract nature of Mathematics see *An Introduction to Mathematics. A. N. Whitehead*; and on the abstract nature of Science see *The Nature of the Physical World. A. S. Eddington.* This, though probably too hard for any but science specialists, is one of the great books of our generation.

An account of Galileo's experiment with the inclined plane is given in *The Science of Mechanics. E. Mach.*

The reader might also consult the Gollancz 'Outlines' (*An Outline of Knowledge* and *An Outline for Boys and Girls and their Parents*). These books need not be read right through, but could be consulted in connection with most chapters of the present book.

CHAPTER II

The Children's Encyclopedia. Sections on Nature Study.

Two booklets in the Benn 'Sixpenny Series' will be found useful: *Heredity* (*Crew*) and *Embryology* (*McBride*).

Sir Arthur Thomson has written many popular books upon natural history and biology: *e.g.* the easy book, *Everyday Biology.*

The Evolution of Man. Elliot Smith. An authoritative work. Some parts are technical; others can be understood by the general reader.

The Search for Man's Ancestors. Elliot Smith. Although this book was only published in 1931, later information about Peking Man is already available.

Science of Life. Wells, Huxley and Wells. A large book useful for reference purposes.

Animal Biology. Haldane and Huxley.

Biology of Human Life. Gruenberg. A textbook.

Causes of Evolution. J. B. S. Haldane. Hard. It shows (among other things) how mathematics is now creeping into biology.

CHAPTER III

Several chapters in the Gollancz 'Outlines' should be consulted here. Refer also to the Wells' *Science of Life*, to Elliot Smith's *Evolution of Man* and to Thomson's *Everyday Biology.*

How You Work, I. Wilson; and *The Gateways of Knowledge, J. A. Dell*, are easy introductions; the first is intended for young children.

Psychology. W. McDougall. Home University Library. This little book is the easiest of its author's books upon psychology: the student who specialises in the subject will want to read them all.

Among more advanced books may be mentioned:

The Will to Live. J. H. Badley. Not an easy book, but one which repays careful study.

Psychology, a Study of Mental Life. Woodworth.

General Psychology. W. S. Hunter.

Mind in Evolution. L. T. Hobhouse. A standard book for many years and still extremely valuable. The latter part of the book will probably be found too difficult.

Development and Purpose. L. T. Hobhouse.

Animal Intelligence. E. L. Thorndike.

CHAPTER IV

The standard book on primitive religion is Sir James Frazer's *The Golden Bough*; it runs into many volumes, but a one-volume summary is now available. Estlin Carpenter's little book on *Comparative Religion* (Home Univ. Library) will be found useful; and there is a delightful (though by no means easy) chapter on Mysticism in Eddington's *Nature of the Physical World.*

The literature of the subject is enormous, and the reader must thread the jungle for himself according to his own inclinations. I hope his inclinations will lead him to Francis Thompson's poem, *The Hound of Heaven.* He should balance such books as Julian Huxley's *Religion Without Revelation* and *What I Believe*, which express an interesting modern point of view, against such books as *The Good Life, Gore*; and *Christianity, Bevan*, which express more generally accepted points of view.

Other suggestions are:

Jesus of Nazareth. Gore.

Life and Teaching of Jesus Christ. Headlam. An authoritative account from a modern Christian point of view.

The Jesus of History. T. R. Glover.

CHAPTER V

Outline of History. H. G. Wells. Perhaps the most widely read book on history there has ever been.

Ancient Times. J. H. Breasted. A fascinating world history.

The Story of Mankind. H. W. Van Loon. Another world history: very simply written.

In the Beginning. Elliot Smith.

How We Live. J. A. R. Marriott. An easy book showing the interdependence of modern civilisation.

The Living Past. F. S. Marvin.

Liberty. J. S. Mill. A classic.

Liberty in the Modern State. H. J. Laski.

Work, Wealth and Happiness of Mankind. H. G. Wells. Has several relevant chapters.

The Growth of Civilisation. W. J. Perry. Discusses the theory that civilisation started in Egypt and spread elsewhere.

Interesting reconstructions of the early life of primitive man are given in Wells' *Outline* and in several books of Elliot Smith; and there is a well written imaginative account in Heard's *Emergence of Man*; though this is in other respects too difficult.

On the subject of Internationalism anything of Lowes Dickinson's is good; e.g. *The Choice Before Us.* See also *C. Delisle Burns: International Politics.*

On the League of Nations see:

The Dawn of World Order. N. Smith and Maxwell Garnett. Contains also a bibliography.

The League of Nations at Work. Noel Baker.

Recovery. A. Salter. A study of world economics.

CHAPTER VI

Physics and Politics. W. Bagehot.

The following are a few suggestions for those wishing to study the contributions of different civilisations:

Revelation in Civilisation. Flinders Petrie.

The Making of the Western Mind. F. M. Stawell and F. S. Marvin.

The Greeks. Rosalind Murray. Easy.

The Greek Commonwealth. A. E. Zimmern.

Essay on the Civilisations of India, China and Japan. G. Lowes Dickinson.

Appearances. G. Lowes Dickinson.

See also the books by Breasted and Wells (mentioned above).

CHAPTER VII

The Mind in the Making. J. H. Robinson. Develops an argument similar to the argument of this chapter.

Straight and Crooked Thinking. R. H. Thouless. An easy and stimulating book. See especially the admirable conversation in the appendix.

Art of Thought. Graham Wallas. An acute but rather difficult book.

The Great Society. Graham Wallas. Hard.

The Art of Study. T. H. Pear.

Know Your Own Mind. A little book of practical psychology. W. Glover.

Certain sections in Badley's *The Will to Live* already referred to.

CHAPTER VIII

Problems of Philosophy. Bertrand Russell. Will help the reader to follow up the philosophical questions hinted at in this chapter.

Education: Its Data and First Principles. Nunn. Not an easy book, but will amply repay any reader who is prepared to work hard.

Justice and Liberty. G. Lowes Dickinson. Contains a moving piece of writing on the relation of ideals to facts.

APPENDIX B

SOURCES OF QUOTATIONS USED IN THE TEXT

In the references to the Bible, the text of the Authorised Version has been followed.

APPENDIX B

SOURCES OF QUOTATIONS USED IN THE TEXT

CHAPTER I

Page 16. "The stars", she whispers, "blindly run."
Tennyson. In Memoriam. Stanza 3.

,, 16. Dialogue between Plato and Philalethes.
G. Lowes Dickinson. After Two Thousand Years.
This passage is quoted by kind permission of Messrs Allen & Unwin.

,, 21. "Without form and void."
Genesis i. 2.

,, 25. "At last she tried a being . . ."
Sir A. S. Eddington. Science and the Unseen World. Section I.

,, 27. "Parturiunt montes, nascetur ridiculus mus."
Horace. Ars Poetica, line 139.

,, 28. "Drest in a little brief authority."
Shakespeare. Measure for Measure. Act II, Scene II.

,, 28. "When I consider Thy heavens . . ."
Psalm viii. 3-4.

,, 32. "So fast that it cannot be moved."
Cf. *Psalm* xcvi. 10. *The Book of Common Prayer*: "It is he who hath made the round world so fast that it cannot be moved".

,, 33. "Eppur si muove."
Commonly attributed to *Galileo*, but its earliest known appearance is in the Abbé Irailli's *Querelles Littéraires.*

,, 36. "Nasty, poor and brutish."
Cf. *Hobbes. Leviathan.* Chapter 13: "Poor, nasty, brutish and short".

,, 40. "The light that never was, on sea or land."
Wordsworth. Elegiac Stanzas, suggested by a Picture of Peele Castle in a Storm.

Page 40. "We are the music-makers."
A. W. E. O'Shaughnessy.

„ 40. "The fountain-light of all our day."
Wordsworth. Ode on Intimations of Immortality from Recollections of Early Childhood.

CHAPTER II

Page 44. "Life, like a dome of many coloured glass,
Stains the white radiance of eternity."
Shelley. Adonais.

„ 47. "For the hardness of men's hearts."
Cf. *St Matthew* xix. 8.
St Mark x. 5.

CHAPTER III

Page 74. "Cogito, ergo sum."
Descartes. Principia Philosophiae.

„ 74. "Qu'est-ce qu'une chose qui pense?"
Descartes. Méditations.

„ 74. "Creative intelligence . . ."
J. H. Robinson. The Mind in the Making. Section II.

„ 92. "A chief was one day going over a mountain path."
Quoted in *Walter Bagehot. Physics and Politics.* Number 6.

„ 101. "A man's life consisteth not . . ."
St Luke xii. 15.

„ 101. "I too will something make."
Robert Bridges. I Love all Beauteous Things.

CHAPTER IV

Page 106. "The Pilgrim they laid in a large upper Chamber."
Bunyan. The Pilgrim's Progress. Christian's Bedchamber.

„ 106. "There are some to whom the sense of a divine presence . . ."
Sir A. S. Eddington. The Nature of the Physical World. Chapter XV. Science and Mysticism.

Page 108. "Of the earth, earthly."
Cf. *St John* iii. 31: "He that is of the earth is earthly".

,, 108. "He was yet able, it would seem, to lift up his eyes to the hills."
Cf. *Psalm* cxxi. 1: "I will lift up mine eyes unto the hills".

,, 112. "And Jacob vowed a vow."
Genesis xxviii. 20-22.

,, 112. "God created man in his own image."
Genesis i. 27.

,, 117. "Never does hatred cease by hate. . . ."
Buddha. The Dhammapada.

,, 117. "Thou shalt have no other gods before me."
Exodus xx. 3.

,, 118. "Leviticus for example . . ."
Cf. *Leviticus* xix. 18-19: "Thou shalt love thy neighbour as thyself . . . thou shalt not sow thy field with mingled seed; neither shall a garment mingled of linen and woollen come upon thee".

,, 118. "Those who tithe mint and anise and cummin."
Cf. *St Matthew* xxiii. 23: "Woe unto you, scribes and Pharisees, hypocrites! for ye pay tithe of mint and anise and cummin, and have omitted the weightier matters of the law".

,, 119. "What happened, for instance, to Saul of Tarsus?"
Cf. *Acts* ix. 1-22.

,, 123. "Whoso has felt the Spirit of the Highest."
F. W. H. Myers. Saint Paul.

,, 125. "The best is yet to be."
Browning. Rabbi Ben Ezra.

,, 125. "The station brook, to my new eyes."
John Masefield. The Everlasting Mercy.

,, 125. "The men! O what venerable and reverend creatures . . ."
Traherne. Centuries of Meditations.

Page 126. "Bring me my bow of burning gold!"
Blake. 'Milton'.

,, 127. "It is a spirit blowing where it listeth."
Cf. *St John* iii. 8: "The wind bloweth where it listeth . . . so is every one that is born of the Spirit".

,, 127. "The experience is brought to earth, so that it may become flesh and dwell among us."
Cf. *St John* i. 14: "And the Word was made flesh, and dwelt among us".

,, 128. "To this man or to that . . ."
G. Lowes Dickinson. After Two Thousand Years.

,, 130. "An evil and an adulterous generation seeks after a sign."
Cf. *St Matthew* xvi. 4.

,, 130. "What is natural is divine."
Max Müller. Preface to Collected Works.

,, 132. "The Zoological Gardens."
A remark made by the late Lord Salisbury.

,, 134. "Wisdom will die with him."
Cf. *Job* xii. 2: "No doubt but ye are the people, and wisdom shall die with you".

,, 134. "From those strong Feet that followed, followed after."
Francis Thompson. The Hound of Heaven.

,, 134. "And yet, whatever it might be . . ."
The passage from *Joan and Peter* is quoted by kind permission of Mr H. G. Wells.

,, 135. "Careful of the fashion of his crook."
James Russell Lowell. Bibliolatries.

,, 135. "Holy, holy, holy is the Lord God Almighty."
Blake. A Vision of Judgment. From the Rossetti Manuscript for the year 1810. Additions to Catalogues of Pictures.

CHAPTER V

Page 138. "We are all members one of another."
Ephesians iv. 25.

„ 140. Topsy "just growed".
Cf. *H. Beecher-Stowe. Uncle Tom's Cabin.*

„ 143. "Where falls not hail, or rain, or any snow."
Tennyson. Morte d'Arthur.

„ 144. "Where every prospect pleases."
Reginald Heber. From Greenland's Icy Mountains.

„ 145. "Every tale should be adorned with a moral."
Cf. *Samuel Johnson. The Vanity of Human Wishes*:
"He left the name at which the world grew pale,
To point a moral or adorn a tale".

„ 149. "Man has not always lived . . . by bread alone."
Cf. *St Luke* iv. 4: "Man shall not live by bread alone".

„ 155. "If you take people . . . who have broken away . . ."
Gilbert Murray. The Rise of the Greek Epic. Chapter III.
This passage is quoted by kind permission of the Oxford University Press.

„ 158. "The price of liberty is eternal vigilance."
Cf. *John Philpot Curran.* Speech upon the Right of Election, 1790: "The condition upon which God hath given liberty to man is eternal vigilance".

„ 160. "Workers of the world, unite!"
Karl Marx. Said in 1848 when he was in exile and present at the Rising in Paris.

„ 162. "The strong nation armed."
Cf. *St Luke* xi. 21: "When a strong man armed keepeth his palace, his goods are in peace".

„ 162. "They maintained their life . . ."
Sir Thomas More. Utopia.

CHAPTER VI

Page 170. "The best Thou givest . . ."
Rupert Brooke. The Song of the Pilgrims.

„ 170. "It matters not how strait the gate."
W. E. Henley. Invictus.

„ 170. "Life is like playing a violin solo . . ."
Samuel Butler. Essays in Art, Life and Science.

„ 171. "The dust of continents to be."
Tennyson. In Memoriam. Stanza 35.

„ 171. "A God who dwelleth not in temples made with hands."
Cf. *Acts* vii. 48.

„ 172. "Everything flows."
Heracleitus.

„ 172. "Even the everlasting hills have their day."
Cf. *Tennyson. In Memoriam.* Introductory stanza:
"Our little systems have their day;
They have their day and cease to be".

„ 179. "A rose in a moonlit garden . . ."
G. Lowes Dickinson. Letters from John Chinaman.
This passage is quoted by kind permission of Messrs Allen & Unwin.

CHAPTER VII

Page 184. "Men fear thought as they fear nothing else."
Bertrand Russell. Principles of Social Reconstruction. Chapter V.

„ 184. "Most of our so-called reasoning . . ."
J. H. Robinson. The Mind in the Making. Section II.

„ 188. "A shameful conquest."
Cf. *Shakespeare. King Richard II.* Act II, Scene I.

„ 192. "More subtil than any beast of the field."
Cf. *Genesis* iii. 1.

„ 192. "Sound and fury."
Cf. *Shakespeare. Macbeth.* Act V, Scene V.

Page 192. "That human reason which is also human charity."
A favourite phrase of Lowes Dickinson.

„ 198. "Irreducible and stubborn facts."
Letter of William James to his brother. Quoted by *A. N. Whitehead* in *Science and the Modern World.* Chapter I.

„ 199. "There is no alleviation of the sufferings of mankind."
T. H. Huxley. Quoted by *R. A. Gregory* in *Discovery.* Chapter I.

„ 200. "O! that we now had here . . ."
Shakespeare. King Henry V. Act IV, Scene III.

„ 201. "All our past proclaims our future."
Swinburne. England.

„ 204. "When war is declared, truth is the first casualty."
Cf. *Kommt der Krieg ins Land*
Gibt Lügen wie Sand.

„ 204. The quotations about the fall of Antwerp are taken from *Falsehood in War-Time*, by kind permission of the author, *Lord Ponsonby.*

„ 206. The *Manchester Guardian* correspondent was *Miss Margaret Cross*, who has kindly given permission for the reproduction of her paragraph.

„ 208. "What I tell you three times is true."
Lewis Carroll. The Hunting of the Snark.

„ 210. "Carried about with every wind of doctrine."
Ephesians iv. 14.

„ 215. "Nature red in tooth and claw."
Tennyson. In Memoriam. Stanza 56.

CHAPTER VIII

Page 218. "It takes two to speak truth."
R. L. Stevenson. Virginibus Puerisque. Truth of Intercourse. Quoted from *Thoreau. A Week on the Concord and Merrimack Rivers.*

Page 218. "I beseech you, in the bowels of Christ . . ."
Letter from Cromwell to the clergy of the Scottish Kirk before the Battle of Dunbar in 1650.

,, 228. "It is because our peace is so bad . . ."
G. Lowes Dickinson. After the War.

,, 229. "It may be beautiful but it will also be ineffectual."
Cf. *Matthew Arnold. Essay on Byron.*
Essays in Criticism. Second Series: "Shelley, beautiful and ineffectual angel beating in the void his luminous wings in vain".

,, 232. "To fight to a finish . . ."
John Galsworthy. The Mob. Act IV.

,, 233. "It is worse than a crime; it is a blunder."
Memoirs of Joseph Fouché, 1763–1820, Napoleon's Prefect of Police.
The remark originally was "It is more than a crime; it is a political fault", and was first made, according to some authorities, by *Boulay de la Meuthe.*

,, 234. "A world which . . . is trying to take the Kingdom of Heaven by storm."
Cf. *St Matthew* xi. 12: "The kingdom of heaven suffereth violence, and the violent take it by force."

,, 234. "The Happy Warrior is an attractive figure."
Cf. *Wordsworth. The Happy Warrior.*

,, 235. "Triumph and Disaster."
Rudyard Kipling. If.

,, 236. "The old instinct of the herd."
Romain Rolland. Au-dessus de la Bataille.