

THE FOURFOLD VISION

A Study of the Relations
of
Science and Religion

by

F. SHERWOOD TAYLOR

M.A., Ph.D.

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THE FOURFOLD VISION

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PREFACE

THE intention of this book is to suggest that the knowledge and methods of science are not contrary to religion, but may indeed contribute thereto. I have endeavoured, therefore, to express myself in the language of science and have not scrupled to neglect, in large measure, those metaphysical arguments which, conclusive as they are to the philosopher or theologian, are unfamiliar and indeed unintelligible to those who are accustomed to no other data and methods than those of modern science. It is difficult to write accurately of philosophical and theological matters without using the appropriate technical vocabularies; and since I have thought it best to do without these convenient but unattractive modes of expression, I ask that the best construction should be placed upon any inexact or ambiguous language. I wish to express my sincere gratitude to the Revd. J. Leycester-King, S.J., the Revd. Victor White, O.P., S.T.L., and Professor E. T. Whittaker, F.R.S., for reading the manuscript and suggesting a number of corrections and elucidations. I am also indebted to the publishers of the "Encyclopædia Britannica" for permission to quote from the article on the Wagtail, and to Messrs. P. J. & A. E. Dobell for allowing me to reproduce part of Thomas Traherne's poem "The City."

F. SHERWOOD TAYLOR.

Museum of the History of Science,
Oxford.

CHAPTER I

THE FUNCTIONS AND METHOD OF SCIENCE AND RELIGION

I. THE PRESENT DISUNION OF WISDOM

The lover of wisdom seeks to relate himself, as widely and intimately as may be, to the whole content of the sphere of his perceptions; and wisdom is measured by nothing else than the truth, depth and extent of these relationships. There are many who are wise in this and that: Solomon treated of trees, from the cedar that is in Libanus to the hyssop that cometh out of the wall, and of beasts and fowls, and of creeping things and of fishes. And Odysseus, ready at need, who saw the cities and knew the mind of men,—he was wise; and so was Socrates who knew that he knew nothing, and Aristotle who began to know what he knew. Can even the least believing find a nobler wisdom than that of Him who preached the sermon on the mount, or of his disciple who wrote the first epistle of St. John? Nor are we to deny the wisdom of divine folly to the Fathers of the Desert and to those who suffered for Christ. And what of Leonardo da Vinci, of Michael Angelo, were they not supremely wise in the form and colour of things: and Galileo, foolish in the ways of men, was he not most wise in the mathematical speech of nature? St. Ignatius Loyola, St. Francis de Sales, Isaac Newton, William Blake, Darwin, Freud, Einstein, were they not all wise in this or that?—deeply and truly related to some aspect of the world. So at the outset let the philosopher set as his goal the love of all wisdom; let

him not seek to divide her, nor to reject as folly that in which he is not wise. For Wisdom saith "He that shall sin against me shall hurt his own soul. All that hate me love death" (Prov. viii. 36).

Therefore it is expedient to seek Wisdom everywhere; in the streets and markets, in the workshop and the studio, in the woods and fields, in the laboratory and the library, and in the upper chamber where men go apart to pray. And although we find wisdom in all of these, yet we shall not know her, for she lurks in the roots of things and in the depth of the mind, where words and images fail and give place to a certain comprehending which cannot be told to men. And he who has but touched the hand of wisdom will know that she is not bounded by any craft or discipline or science of men; he will say "Ah, ah, ah, Lord God, behold I cannot speak, for I am a child," and in that word will be the fear of the Lord that is the beginning of wisdom.

This, then, is the burden of my book. Know the pitiful incompleteness of your comprehension; understand the stupendous height and breadth and length and depth of the object of knowledge, and watch daily at the gates of wisdom and wait at the posts of her doors. Cast out the fools who say "See here, or see there, this is the only gate of knowledge," and opening every window of perception, look upward and outward and inward as far as the restless spirit of man can penetrate.

But before we can seek wisdom thus, we have an evil tradition to reject, that of the divisions of Man. Philosophers, religious, artists, scientists, men of affairs, are to-day not merely different, but opposed. Each speaks his own language, extols his own technique and mocks the others'; each follows a different road to a different goal. Yet each of them seeks to realise one potency

of the mind of man ; and it is beyond dispute that he who has actualised two or more of these has, other things being equal, become a more perfect man than he who has actualised but one. Of all these activities the least compatible with the rest is Science, and the activity to which it has proved most destructive is Religion ; if we can find a means of co-existence and collaboration for these, we shall have gone far towards the establishment of the hope of a single wisdom. For this reason, as well as for the salvation of humanity, it will be well to consider the relation between the scientific and religious activities of man and to ponder the possibilities of their synthesis.

Most of the difficulties that have arisen between the scientist and the man of religion are the consequence of their ignorance of the nature of their activities ; and it will be necessary at the outset to consider what science and religion are.

2. NATURAL SCIENCE AS KNOWLEDGE

Natural science obviously purports to be the study of the external perceptible world, and the man of science, as such, has two intentions, namely, to *know* and to *do*.

The desire to know is always a motive of science. Knowledge may be desired for itself, that is to say, for the illumination of the knower's mind : it may also be desired for the sake of its usefulness in the satisfaction of material needs : again the wish to satisfy such needs may lead to research, and bring new knowledge desirable for itself, apart from its usefulness. What kind of knowledge does the man of science, as knower, seek ? In brief, he seeks, for himself and for others, the completest possible presentment of the external perceptible world with the least possible expenditure of thought. Not

that he seeks to refrain from thought about nature; rather does he wish to give each motion of the mind so wide and general a significance that every thought shall relate to the widest class of things. Things have numerous attributes; some, such as beauty, adaptation, harmony, symbolic significance, cannot be measured or determined, nor related to measurable and determinable properties; and these are not the subject of natural science, which concerns itself only with the enumerable or measurable aspects of what we perceive. Man seeks from this study of things an *explanation*, the recognition of the familiar in the unfamiliar; and the scientist, in particular, requires a *physical* explanation, the resolving of the incomprehensible activity of a natural process into units or elements, each of which is a member of some class of simple experience which can be visualised or otherwise comprehended,—elements such as the notion of one piece of matter moving or pressing against another, attracting it or repelling it. The concise statement of the measurable aspects of nature, the discovery of physical explanations, and their fruitful application to new problems are best achieved by a mathematical mode of reasoning about our perceptions of nature. Of all kinds of statement the most concise and lucid and the least liable to misinterpretation is a mathematical formula: moreover, if we are to analyse the changes of nature into simple elements,—successions of motions of particles of matter,—we must make an intimate study of motion, which can be done only by mathematics. Science seeks then to give a concise, mathematical and comprehensible account of the world, and it selects its material with this end in view.

What is the material of science? The whole of our knowledge about what we call 'things' comes from our sense-impressions—from our consciousness of observa-

tions which were seen with the eye, heard with the ear, felt, smelt or tasted by someone at some time, whether in the field or the observatory or the laboratory. Everything in science comes from and can be reduced to these observations, and nothing that is not based on observation is admitted into science. But our observations do not tell us all about a thing; and science does not utilise all of our observations, nor indeed more than a small constituent element of any of them.

We see things, e.g. an orange, through light-quanta and nerve-impulses, which in a wholly mysterious manner result in the sensation which we consciously experience; but the fact that we have a visual consciousness of 'orange' and 'round' does not of itself guarantee that we are in the presence of a round orange-coloured external object, or indeed of any external object at all. That we may become legitimately certain of the existence and properties of such an object is undoubtedly true, but this is not effected by processes which can be externally observed and measured by the scientist. And even when we have attained such certainty, yet we have no certainty that our knowledge covers the whole of the properties of the object—on the contrary, we may be sure that it does not, and never will. For by instruments we can discover ultra-violet and infra-red radiation coming from the orange: by the microscope we can discover its more intimate structure, by experiment we can find out whether its seeds are dead or alive, but none of these things can we discover by our bare senses. We must conclude then that we cannot completely know the orange by unaided sense, and that furthermore we are gradually finding out more and more about it by the use of aids to our senses: shall we not conclude, then, that it is possible that there may be an unlimited number of things potentially to be known

about the orange and that our knowledge of it by comparison to our ignorance is as nothing? And since science can tell us nothing of the way in which that form of consciousness which we call 'seeing' is caused by the real external orange which we suppose to exist, we must conclude that our 'scientific' knowledge of it is only relative, partial and uncertain.

Everybody, however doubtful he may be concerning the validity of his knowledge, is in practice agreed that there is a large class of persons like himself making these same observations; and it is a matter of experience that when the observations studied by a number of scientists are carried out in a certain specified manner, these scientists agree closely in what they observe; and that comparison of these observations, and mathematical manipulation of them, reveals an *order* in what they term Nature—that is to say, in the observations they make.

This order can be perceived only when every effort is made to eliminate the personal factors of the observer. People may disagree concerning colours, tastes, smells, and still more concerning judgments drawn from combinations of sense-impressions (e.g. concerning 'beauty' or 'sanity' or 'intelligence'), but they do not disagree in deciding whether a pointer, stationary on its scale, is or is not between the graduation marked 1 and that marked 2. Science therefore draws its observations from pointer- and scale-readings wherever possible, so eliminating the scientist as observer of anything more complicated or subtle than the relative positions of pointers and scale-divisions. The scientist, as experimentalist liable to error, is as far as possible, but not entirely, eliminated by his repetition of the work under varied conditions, and by the reporting of it in such a way that it can be repeated by others.

Thus the material of science is, ideally, the observations of the readings of scales and is wholly amenable to treatment by mathematical methods, consisting as it does of expressions either of quantity or of position or order. That the biologists do not express much of their science in these terms does not mean that it covers any wider field. Their descriptions are merely more diffuse and less exact, but none of them are more in essence than the descriptions of the shapes and motions of things: ideas of purpose, adaptation and the like are the judgments of the individual biologists and do not follow necessarily from the observations.

It is evident, then, that the materials of science are exact numerical observations of numbers, lengths, masses, times—or secondary quantities derivable from these, such as temperatures, velocities, forces and the like.

When numbers of observations upon the same or similar objects are compared, they are found to be related in an *orderly* fashion. Thus if we time the swings of a number of different pendulums we discover that the time of swing (t) is related to the length of the pendulum (l) in such a way that l has always the same ratio to t^2 . This only appears if all relevant conditions are the same throughout the series of observations and if all disturbing factors are absent. We can express this rule as a scientific law; thus, having suitably defined length, period, oscillation and pendulum, we can state *that the square of the period of oscillation of a pendulum is proportional to its length*: in the concise language of mathematics this becomes the formula $t^2 = kl$, where k is a numerical constant.

Having arrived at this scientific law, we now find that not only does it apply to the pendulums we studied, but also to every other similar pendulum we may con-

struct. We find, in fact, a uniformity in nature, and a regularity or order in our observations. Moreover, if we stick to the rules of scientific observation and reasoning, there are scarcely any numerical observations which we can make about any set of phenomena that do not exhibit some such order. The philosopher feels the need to ask where the order has come from; for we all feel that things which come about by chance, that is without the direction of intelligence, are unlikely to be orderly. Is the world of things-in-themselves an orderly world arranged according to the laws of mathematics? Does God geometrise, as Plato long ago and Jeans to-day have supposed? Or are we to suppose, as Eddington sometimes appears to say, that we choose a regular and orderly set of sense-impressions from our perceptions of a disorderly and chaotic world of things-in-themselves; that we put in the order and are then surprised to find it? Is the order from God's intelligence or from ours? Science can give no answer, for all that it offers us is a mass of numerical results: even the conclusion that there is order in the world that science studies is not a conclusion of science, but a personal judgment of the scientist on philosophical or other grounds. The Christian, however, sees this problem as also illumined, if not solved, by revelation. He knows that God intends in part to be known through the world he has made (Rom. i. 20): that He has created a world which can reveal its Creator to the human intellect which He has likewise created: and he therefore concludes that the order is in the external world and that the human reason has the means of apprehending it. But this, as such, is a conclusion of faith (or, it may be, of metaphysical reasoning) and is just as little supported by science as are any of the other theories put forward.

The study, then, of a vast number of scientific observa-

tions has led to the establishment of a number of scientific laws in which they are summed up. These laws are simply brief mathematical statements of the relationships which have invariably been found to exist between observed quantities of a particular kind, e.g. the lengths and times of oscillation of pendulums, or the times of fall and velocities of bodies dropped from a height. Thus the law of gravitation, as held in 1900, told us that in every case studied, the force of attraction between two bodies had been found or inferred to be proportional to the product of their masses and inversely proportional to the square of the distance between them. In mathematical speech :

$$F = \frac{c \cdot mm'}{d^2}$$

where F is the force of attraction, c a number called the gravitational constant, m and m' the masses and d the distance between them.

This law does not express or imply the necessity that every body *must* 'obey' it, only that no body has not, and very many bodies have, been found to do so. When, in fact, cases appeared which did not agree with the law, and were duly substantiated, it was modified; for no finality whatever attaches to this or any other scientific law. *Laws describe past observations*: it is only by our assumption of the uniformity of nature that we apply them to similar cases that have not been observed. We have little reason to doubt the uniformity of nature, but we may often doubt the similarity of cases, and unless all the relevant circumstances are the same we cannot rely upon scientific laws to indicate what happened in the unobserved past or what will happen in the as yet unobservable future. We may calculate from the law of gravitation the place in the heavens which Jupiter

will occupy at noon on January 1st, 194,400, but will it, in fact, be there? Only if the law of gravitation is quite unchanging, which we do not know to be true, and only if the planet is undisturbed by any new factor, such as the near approach of a star to the solar system. Nature's laws are inexorable in the strict sense of the word, for they will not conform to our requests; yet so far as we have been able to formulate them they do not control the future, but rather describe the past.

Laws are combined, explained and unified into scientific *theories*. Such a scheme as the Atomic Theory makes intelligible a great part of chemistry and physics. All the laws about chemical combination, solution, pressure and volume of gases, heat-engines, etc., have been deduced from the observed phenomena or could have been so deduced; but the idea that matter consists of moving atoms with certain specified weights and other properties links all these isolated laws into a single intelligible scheme. By picturing to himself matter as a swarm of swiftly moving particles of various kinds, the scientist constructs a useful mental model, very unlike the real thing even as revealed by his mathematical formulæ, but still useful as enabling him to use a sort of mental experiment in conjecturing how matter is likely to behave in unfamiliar circumstances. In the region of the very small he may have to abandon his models and be content with the laws, because all the models he can devise or picture are derived from his experience of large-scale matter and so cannot behave in the same sort of way as, say, an electron or a quantum of light, which are totally different from matter as we know it.

Science, then, in so far as it is knowledge, describes in general terms what has been quantitatively observed concerning the external world. The scientist assumes

that things have behaved in the past and will behave in the future as they do now, and so deduces what has happened, is happening, or will happen in places and times not subject to observation ; and as long as he takes due care to see that all relevant factors are unchanged, his success is usually most striking. So much for the content of Science : what lies outside its field ? For the present we will answer briefly : all things and all aspects of things that cannot be numbered, weighed or measured, or at least described in terms concerning which there is universal agreement.

3. NATURAL SCIENCE IN ACTION

The knowledge of science tells us, then, how things may be expected to act in certain circumstances. Applied science endeavours so to manipulate and arrange these things and circumstances that man's will shall be done. It is superfluous to chronicle its achievements. Compare the external world of 1745 with that of 1945 and the difference is substantially the result of the application of science. Knowledge constantly increases, and man is constantly thinking of new tricks by which he can bend that knowledge to his use.

Broadly, we may say that there are no theoretical limits to the manipulation of matter. Science gives man the power to work his will on the material universe, including the material aspects of himself and his fellows. Science could to-day abolish want and most of the world's sickness, if men regarded these ends as supremely desirable. It may be expected, if the world lasts, to abolish all ill-health, greatly to postpone old age, and possibly, by micromanipulation of the germ-cells, to transform out of all recognition the bodies of domestic animals, and even that of man himself. Man will gain power over epidemics : he will learn the means of

combating virus-diseases and of transforming them to new plagues of unexampled deadliness. To assess the potentialities of science, think of anything that could, within the framework of known scientific laws, by a sufficiently refined technique, be done to matter, dead or living; and, however difficult it may seem, there is no saying that science will not accomplish it. We do not know the limitations of applied science: but at least it is clear that science is concerned with the manipulation of matter in accordance with the predictions of scientific laws. Unless something constructive, rather than destructive, can be done to man's brain, which seems improbable, it would seem that nothing could be done to improve man as a conscious rational being: and even if modification of the brain would effect this (which is not foreshadowed by any experimental evidence), the prospect of being able to effect it in practice seems fantastically remote. At the present time, at any rate, there is no indication that science is making better men or worse; but it is very clear that it is affording the well-intentioned great opportunities to preserve life and the ill-intentioned great opportunities to destroy it.

It is obvious that the activities of applied science in transforming human life are directed by the will of men so as to accomplish what they desire—money-making, power, amusement, the relief of want and so forth. The selection of these objects of desire is in no way connected with science, which, since it is a mere statement of the relationships between observations, cannot possibly recommend any course of conduct. You cannot put masses, lengths and times on one side of the equation, and find love or hate, wisdom or folly, on the other.

So we must conclude that science gives man gigantic

power, and that if the world is to have any stability or peace, man must not use his power in certain ways. It is possible that science might indicate to mankind the consequences of indiscriminate exploitation of natural forces, but science can never give him guidance as to what he should desire for himself and for others. Science cannot deal with man's affections and strivings, with beauty and love and worship, nor can it prescribe any end as good and to be desired above all others. It is, therefore, impossible that any man should depend wholly upon science, for if he did so he would have no purpose or desires. The scientist, therefore, must either follow the desires that come unbidden to his mind, or adopt some code of prudence or custom, or some system of philosophy, ethics or religion.

4. THE FUNCTION OF RELIGION

The word religion is used in many senses, but for the purpose of this chapter the definition of St. Thomas Aquinas cannot be bettered. *Religio importat ordinem ad Deum, ad quem ordinat hominem.* The word religion means that ordering to God to which God orders man. Thus anything done by us with respect to what we believe is God's will is a part of religion, and that which is not religion comprises only that which has no relation to God.

It is obvious that private and public worship is religion, and that the ordering of the conduct of a religious person is a part of religion, and that any and every act may have a religious significance in respect of its motive. On the other hand, matters in which God is not in question are not religious. It would be absurd to speak of a religious road-bridge, but it would not be at all absurd to suppose that such a bridge might be built with a religious motive. Science, since it relates

measurements to one another, as such cannot be religious ; but the scientist may well have a religious motive, whether it be the seeking of God in Nature or the ordering of material things to some beautiful or charitable purpose.

The essential factor that makes anything to be religious, then, is the conscious relating of it to God. There are a number of systems of beliefs and precepts which are termed 'religions,' and the essential feature in all of them is this conscious orientation of man to God. The system of religion which will be discussed in this work is the Christian religion, and the principles of that religion will be taken to be the doctrines defined by the Catholic Church, which must be accepted by any person who claims to be a Catholic and are therefore essential to that system of belief. Unessentials, such as particular beliefs that may be profitably but need not necessarily be held, will not be discussed, and still less need evanescent political or philosophical fashions concern us here.

It is evident that science is not in itself religious, and so has no bearing, negative or positive, upon man's turning to God ; but it may conceivably conflict or appear to conflict with a system of beliefs, if these concern quantitative aspects of material bodies. Of this more hereafter. Religion, as a system of beliefs, might forbid the practice of science : for a religion might hold that a man should turn himself entirely inward and away from the material universe. This view may be disposed of at once, for Christians believe that God is to be recognised through the universe He has created, and therefore the Christian might use the study of science as a part of religion. On the other hand, according to the Christian, God transcends the material universe, and can and must be studied elsewhere. The Kingdom of

God is within us ; God is a spirit and is to be worshipped in spirit and in truth. It seems then that the religious man is free to study or to disregard the material universe, according to the guidance of his desires and the aptitude of his faculties.

5. THE METHOD OF RELIGION

Apart from the fact that in both fields man is acting as a rational agent and is employing his intellect, it is clear that there need be nothing in common between the methods of religion and science, concerned as they are with wholly different purposes and data. We are not to exclude from the consideration of religion any of the sense-impressions that come to us from without, but the treatment of these is widely different in science and religion respectively. In the scientific method the elements of quantity, order and position are abstracted ; in the religious process, if so it may be termed, the whole experience is utilised and there is an especial concentration of the mental powers upon the element of purpose, upon the end to which the experience conduces. Not only is the abstraction different in either case, but so also are the faculties applied to the abstractions. In the scientific method, certain data are presented to the intellect, and conclusions are drawn strictly and exclusively in the light of what is thus presented. The will is allowed to play no part save that of applying the mind to the consideration of the data. But in religion, will and intellect act as it were in a closer concert, aided by divine grace. As man turns to God, he catches a glimpse of a vast unity encompassing a complexity of values and relationships reaching far beyond the possibilities of the quantitative and positional registration of science, and the intellect thrusts along the path of investigation energised by a will already

in love with what has been revealed in the brief flash which, for a moment, lit up intellect's final goal.

Consider then for a moment the mind of a man without religion in the act of turning to God. Such a turning may come about in a thousand different ways, according to the infinite diversity of souls, of circumstances, and of God's intention. But let us consider such a case as the writer can describe, because it is within his own experience. In order to turn to God, there is needed a will turned towards God, and this turning of the will requires the grace of God to effect it. This will towards God leads to the desire to know how God may be reached, to recognise That to which the will already desires to direct the faculties, and this need for knowledge involves the exercise of reason for the answering of certain vital questions. Does the universe display to human perception and reasoning the evidence of a divine creator and preserver? Are the writings of the Christians true and divinely inspired? Here is your task, your supreme labour and toil. Science can tell you very little, for you are not concerned with matter and motion but with the causes and purpose of things, and the desire of the soul for it knows not what. Whence is light to be sought? There are those who seem to know, and they tell us they have gained that light through prayer. The Saints saw the handiwork of God in nature and in man, yet they were not content with such an exterior view, but continually sought for God by reading, meditating, and above all by prayer. Here is the kernel of the matter. How are you to pray to God of whose existence you have no certainty—and how are you to obtain certainty until you know Him in prayer? This difficulty is real, but not, in the actual living, insoluble. For while the seeker for God, yet doubting, is applying himself to the

study of God's work in nature, His glories in man, His attributes in the Scriptures,—so he is forming an idea of God. And to this idea he gives some degree of assent, as he yet gives some degree of doubt: and, as the search continues, the inclination to assent increases until there are moments when it seems clear that God created, preserves, disposes all. And in those moments he is able to pray, to ask God for light, as one might call to a darkened house, not knowing if any were therein. So with alternations of belief and doubt come moments of prayer and hours of silence.

At this time comes a terrible realisation of what it means to believe: the lusts, desires, malices, that we enjoy, the pride of place or mind that keeps our heads up in the world, are shown to be filthy or worthless in the light of the idea of God. He may see that to believe is to give up all the toys that can be enjoyed in the worldly life, and may not yet be strong enough to do without these solaces and to take to himself a single purpose as the sole end. But it is a law of the spirit that one must die in order to live, for unless the grain of wheat falling into the ground die, itself remaineth alone. But if it die it bringeth forth much fruit. He that loveth his life shall lose it and he that hateth his life in this world keepeth it until life eternal.

So may he come to hate his life in this world, nor is it needful to believe in God in order to do this. He needs only to set his life beside the lives of the good—let alone of the Saints or our Lord Jesus Christ—in order to hate all of it that is not redeemed by that blessed charity, of which no life is wholly destitute.

Then when he has called upon God with 'perpetual knockings at his door, tears sullyng his transparent rooms,' and when he has come to the point of hating his life and being prepared to live only for and with

what God may give him—then doubtless God will do what He has done before, give the free gift of faith, by which the seeker not only sees the whole aspect of the matters he has studied in a new light, but wherein he is a different person, a new creature. He was a doubter, he is a believer: he was a slave to his desires, now he is free: he knew not what he was, now he knows himself an instrument in the hand of God. No revelation has been made to him, no vision, but he himself is made new: what was impossible becomes easy. A miracle has been worked in his own heart.

Yet even then he will at first be grossly ignorant, dull-witted and blind to spiritual things, like a man brought out of a dark prison, where he has dwelt from birth, into a land of light, wherein he yet knows not so much as the names of the trees and rivers, hills and meadows. And the gaining of spiritual wisdom, the gift by which we can attain to an ever nearer knowledge of God who cannot ever be fully known, yet can so be known as to fill every man with light up to his capacity to receive it—that will be the history of the rest of his life. As long as he continues in the supreme research, so will he gain wider apprehension of God. I do not call it knowledge, which to the world means that which can be written down in words and learnt by others; for God is not known only thus, but far more through love: He may be known as He who has done great works and wonderfully contrived man and the universe, but He is likewise apprehended as He who loves and is loved. And to those who continue in that blessed pursuit, intellect and love become one in a desirous uplifting of the soul to Him. Here let another take up the tale.

“If we be faithful, we have already arrived at the way of faith, and if we do not abandon it, we shall without doubt arrive at not merely so great an understanding

of things incorporeal and unchangeable as cannot in this life be grasped by all, but even to the height of contemplation, which the Apostle calls 'face to face.' For some of the least ones, who yet perseveringly walk in the path of faith, come to that most blessed contemplation: while others who have that knowledge of what invisible, unchangeable, incorporeal nature is, but refuse to follow the path leading to the abode of such happiness, which seems folly to them, namely Christ crucified, are not able to come to the shrine of that quiet, although their mind is already, as at a distance, touched by a ray of its light."²

But what need to tell of the lives active and contemplative that open before the believer—for to such are open the unspeakable riches of the words of God and His servants. This book is but an exterior view of the city of God: once at the gate you shall not lack for guides.

6. CONTACTS BETWEEN RELIGION AND SCIENCE

How, then, is this method of religion related to that of science? Where is the area of contact?

First of all, science may be, and often has been, an obstacle to our belief in certain propositions which form a part of a religious creed: it may, moreover, appear to bar the approach to religion completely by setting up a system of the world totally incompatible with the religious account. With these difficulties the two succeeding chapters will be concerned.

Secondly, science may present, confirm, or contribute to a view of the world, in which God is seen to be its cause, provider and last end. The last two chapters of this book endeavour to point the way to the establishment of such a view, and the conversion of common knowledge of science into an individual wisdom.

CHAPTER II

SCIENCE AND RELIGIOUS BELIEF

I. APPARENT CONFLICT OF SCIENCE WITH PARTICULAR RELIGIOUS BELIEFS

The Christian religion acknowledges as 'true' a body of writings known as the Holy Scriptures. In view of the literary conventions and modes of instruction which were customary when the oldest of these writings were composed, it is recognised that their authors did not always intend their readers to understand by their words the meaning which to-day they superficially appear to imply. These writings recount much that is miraculous—events that cannot be attributed to the normal agencies which science studies, but have a cause not perceptible by science, namely God himself. It is possible to hold that some of the wonderful events narrated in the Scriptures were not due to miraculous agency properly so called. In certain other cases, there are grounds for supposing that the writer concerned had no intention of giving an historical account of events which actually took place, but was employing the well-known method of telling a story in order to illustrate a moral truth. But it is also quite clear that in most cases the scriptural writer intended to give an historical account of events which actually happened, and which were strictly speaking of a miraculous nature. To these, the Christian is bound to give assent, and it is immaterial for the purposes of our present discussion whether such events be few or many. So far as the discussion of the relation between science and the

miraculous is concerned, the choice of miracles to be accepted does not matter—if any miraculous event has ever occurred, there is no theoretical, as distinguished from historical, reason to deny any other such event.

Ever since natural science became the prevailing mode of investigating nature, and wherever this science is most in vogue, men have found difficulty in believing that miraculous events have occurred. It is not only materialists that have this difficulty; for even the normal man of science, who has no preconceptions about the ultimate constitution of his world, instinctively applies to every physical event the criteria and assumptions which the scientific method has accustomed him to adopt. In examining a supposed miracle, he will consider that throughout the course of science no unexplained deviations from the findings of scientific law have been observed, and that he has no evidence (of the kind that science is wont to accept) that such deviations have ever taken place: therefore he prefers to reject the narrations of these events, considering their falsity to be more probable than the deviations from scientific law that they imply. This, then, is the attitude that it behoves us to examine.

2. THE LIMITATIONS OF SCIENTIFIC OBSERVATIONS

Scientific laws are founded on nothing else than scientific observations. No observations are perfect and between the region of the perfectly observable and the non-observable lies the whole of scientific fact. No event is perfectly observable in all its aspects, though a single aspect may be so. Thus the positions of all the ultimate particles in a steel ball are unobservable, its velocity when falling is observable within a certain

range of experimental error, while the fact that there is precisely one steel ball present is perfectly and fully observable. We know how much we can observe concerning a body, but we do not know how much we cannot.

Thus the observations on which scientific laws are or could be founded are a very small part of even the perceptible phenomena of nature ; and we may chronicle the defects of observation as follows :

(i) *Technical limitations.*

There is much that might be observable but which the scientist of to-day cannot for technical reasons observe, e.g. the nerve-paths of a thinking brain, or the structure of a protein molecule, or the conditions prevailing in the deep interior of the earth. As science progresses this limitation will recede, but can never disappear.

(ii) *Restriction to the measurable and experimentally determinable.*

The health or mental stability of a patient are legitimate matters for scientific study, but they are not definable by numbers of units, nor is there any means of assessing them except by opinion, thereby introducing a further unreproducible element into already unreproducible observations. The best that can be done, as a rule, to assess changes in these quantities is to class patients as 'improved,' 'unchanged,' or 'worse'; and no doubt two doctors surveying the same patients would arrive at a conclusion only approximately the same. None the less, with large numbers of patients and large numbers of observers, this method of assessment, sensibly applied and utilised, is sufficiently accurate to yield useful results.

As the property under investigation becomes less easy to assess numerically or a matter of less general

agreement, so its scientific treatment becomes less useful. Thus our attempt to connect artistic genius with mental instability would not be worth our time and paper, because these qualities are the subject neither of measurement nor of general agreement. A scientific man forced to attack this problem would transform it to a numerical one. Thus he might correlate P and D , where P is the average number of pounds sterling per square foot paid for a picture painted by the artist, and D is the number of days spent by him in a mental hospital. This method would not give an answer to the problem posed, but to one somewhat resembling it. Men of science attack problems concerning indefinables by substituting the nearest definables, but they do not always know or say that they have done so. Thus an 'intelligence test' is a test of the ability to do intelligence *tests, and this quality is now becoming identified with intelligence; but it would be a mistake to suppose that it is identical with what we called intelligence before such tests came in. Attempts to apply scientific methods to inexact or indefinite material may be valuable, if the approximate and partial character of the results is realised, but it is a capital error to attribute the accuracy and certainty of physical science to the result of applying scientific methods of reasoning to uncertain data.

Furthermore a large number of exceedingly important aspects of human life have to be totally excluded from consideration of science because they are both unmeasurable and incapable of being reported or even of being observed from without. The mystical states are conditions which transform the whole mind as iron made incandescent in the fire. In such a state a mind cannot separate into observer and observed: and the condition cannot be known from recorded observation but only

by living the experience: this is a part of the realm of religion, and by its very nature it is excluded from science. The scientist may, for this reason, come to treat this loftiest and most intense of human experiences as non-existent or illusory.

(iii) *Inability to observe the complex.*

Science has very limited powers of dealing with complex events. In practice it is quite impossible to observe and record the whole of the factors bearing on a natural phenomenon as distinguished from an experimental set-up, e.g. to determine the position, lighting, air-supply, moisture, temperature, etc., of the leaves and roots of a tree: or the surface irregularities and air-currents that determine the place at which an autumn leaf reaches the ground. Possibly the most complex of all phenomena are those that occur in the human brain, which are not only technically unobservable (Art. i), but, we may conjecture, are such as to involve thousands, probably millions of nerve-cells in the simplest mental operation, besides possibly a good deal of the rest of the body. It is perhaps theoretically possible to know the exact position and previous history of each independent unit in the brain, but there is no prospect of being in this position; so until a technique begins to appear, its action must be treated as an unobservable.

Science tackles complex problems by isolating one or two aspects for study, in fact, by constructing a similar but much simplified problem which may throw light on the complex ones: e.g. the fall of the leaf would not be studied, but the fall of thin surfaces of known geometrical form in uniform known air currents would probably give useful approximations and, in a certain sense, an explanation of the fall of leaves. Whether such an approximation is useful to us depends on our

purpose, but it is, in any event, not a true or integral account of the phenomenon.

(iv) *Imperfections due to the refusal of science to attempt to record certain phenomena.*

There is a mass of phenomena on the borderline of the investigable, which if shown to be correctly reported would compel the abandonment of a mechanistic view of nature. Who does not know an alleged true-dreamer, seer, fortune-teller, astrologer, clairvoyant? Who has not in his experience something which is apparently supernatural? Only in the rarest instances does science try to take cognisance of these phenomena: it must not, therefore, make any affirmation or denial of their evidential value.

(v) *Imperfections arising from the incompleteness of the scientific world-picture.*

It is a necessary feature of scientific evidence that it should contain nothing which has disappeared from the past without leaving a physical record, and nothing of the future. The world has been in existence for a long time and looks like being here for a time which is, to say the least, indefinite. Science must needs draw its facts from a narrow slice of time near the present; it may send *inferences* into the far past and future with certain precautions, but its *materials* are exceedingly imperfect in time. How dangerous, then, to reach absolute laws and definite conclusions from this small scrap of space-time—a process equivalent to reconstructing all vegetation from a single section of a single twig. It is truly answered that science does not form absolute laws and definite conclusions: it is truly rejoined that second-class scientists and the camp-followers of science have been very ready to do so.

3. THE LIMITATIONS OF SCIENTIFIC LAWS

From materials having these imperfections in greater or less degree, men of science have constructed certain rules, called *laws*, which sum up the information they have gained from their observations. On page 15 we have given an example of the manner in which a scientific law is constructed, now we are to consider in what manner it should be applied. We have deduced from what we have observed concerning certain pendulums that $t^2 = kl$; what does this tell us about the things which we have not observed?

In fact, the man of science assumes that his scientific law is a general rule: in the above case he supposes that the conclusion $t^2 = kl$ deduced from the pendulums he has studied is applicable to *all* pendulums, and he announces the *Law that the square of the time of swing of any pendulum is proportional to its length*. Is this assumption justified, and is this law necessarily reliable?

He is, in effect, saying that if the pendulums he has studied behave in a certain way, other and similar pendulums will behave in the same way. This is simply an assumption that everyday experience and scientific studies have justified. We may express it by saying that there is no effect without a cause and that the same causes always produce the same effects.* This is tacitly accepted as a foundation for all science; it is not mathematically proven, but is experimentally established as being of practical use. No scientific law can be more reliable than the above assumptions, which are simply derived from long experience, but have no absolute certainty.

We are not often called on to question the validity of

* This may be a metaphysical necessity for the philosopher, but the man of science derives it from experience.

scientific law in general, but we are very often entitled and required to doubt the validity of the way in which particular scientific laws are established and applied.

Thus it is quite clear that if the same effects are to result, the causes must be the same; in other words, *a scientific law cannot be relied upon unless the phenomena to which it is applied are in all relevant aspects similar to those from which it was deduced.* Thus, if the above law were deduced only from observations of pendulums consisting of spherical lead weights hung upon long light strings, it could not necessarily be taken as applying to pendulums consisting of long iron bars hung by one end from a hook. So in applying any scientific law we must be sure that the relevant conditions are the same as in the experiment from which the law was deduced, and it is only by further experiment that we can discover which of the myriad conditions are relevant. Experiment cannot be applied to past events: consequently the information that science can give us about these must be at least questionable.

No scientific law can be known to be more accurate than were the observations which were used to establish and confirm it. We suspect that $t^2 = kl$ is perfectly true, but we do not know it. If our pendulums were timed to the nearest hundredth of a second, the law established from those times could be shown to be accurate to a hundredth of a second, but not to a ten-thousandth. No law of science can be proved to be perfectly accurate in any single case, because the measurements that establish and check the laws of science cannot avoid the possibility of error, albeit a very small one. Thus a law for which the highest accuracy is claimed, the law of conservation of mass and energy, states that "the total quantity of mass and energy in any closed system is constant, one gram of mass being equivalent

to 9×10^{20} ergs of energy." From this law no departure has as yet been observed* ; this is not necessarily an assurance of its truth, which can rest only on the accuracy and number of the tests which have been applied to it. This law is assumed in literally millions of scientific experiments of ordinary accuracy (error 1 part in 1,000 or 10,000) : and a few very accurate experiments (with error 1 part in 1,000,000 or more) have revealed no departure from it, but this can give us no certainty that it is universally applicable.

4. PROVISIONAL CHARACTER OF SCIENTIFIC LAWS

We can say of the Law of Conservation of Mass and Energy that it has been very well tested to a certain limit of accuracy, and for many widely different classes of phenomena ; but we are not entitled to jump to the conclusion that it is absolutely true everywhere in time and space. Forty years ago the Law of the Conservation of Mass, which stated that "In a closed system there is no loss or gain of mass" was taken by all but the most cautious as being perfectly true, and even these cautious had no reason to suspect it ; but the study of radium proved that this element was transformed into helium, lead, and energy ; and that one gram of radium was converted into *less* than one gram of helium and lead. A new class of phenomena had been discovered to which the Law of the Conservation of Mass did not apply, and it had to be replaced by the Law of Conservation of Mass and Energy, set out above.

Now it is clear that the discovery of a new class of

* There are difficulties here owing to the fact that the measure of energy depends on the observer and the accurate form of the statement is hardly intelligible to one who is not a mathematician. None the less, the argument applies with equal force to any accurate statement of the law in question.

phenomena has here caused us to modify one of the most thoroughly tested and most fundamental laws of science; and the universe being of infinitely greater extent in space and time than the minute portion of which we have made a very partial study, it must contain a great many classes of phenomena unknown to us; and consequently any of our scientific laws may one day need to be revised; wherefore we must conclude that *no law of science can be more than provisional*.

Provisional laws of science are just as valuable, if used with due caution, as absolute laws would be, if any such existed. But to treat provisional laws as eternal and immutable is a dangerous mistake too often made by the scientific amateur and the second-class scientist. It is obviously exceedingly unwise to base upon scientific law religious conclusions, positive or negative, which *ex hypothesi* relate to the omniscient and eternal, and have eternal consequences. Thus there is little doubt that in the nineteenth century some men were led to reject the miracle of Cana by the following argument :—

1. The transformation of water into wine involves the conversion of some part of the chemical elements, hydrogen and oxygen, which constitute water, into the chemical element carbon, which is contained in alcohol.

2. Chemical elements cannot be transmuted one into another. Hydrogen, oxygen and carbon are chemical elements.

3. Therefore the transformation of water into wine did not take place.

The second term of the argument was in part false, and in part not known to be true. The scientific evidence then available justified the statement that the transmutation of chemical elements *had not yet been observed*, not that it was impossible. It was not even certain at that

time that hydrogen, oxygen and carbon were chemical elements, for this conclusion rested only on the fact that they had not at that time been decomposed into anything simpler. To-day we have sound evidence that hydrogen, oxygen and carbon are what we define as chemical elements; but it has now been proved that the transmutation of elements is theoretically and practically possible, and indeed is continually occurring. So the nineteenth-century scientist who was influenced in his religious beliefs to however small an extent by the supposed impossibility of the transmutation of elements was making an error from which a knowledge of the provisional character of all scientific law might have saved him. It is true that we cannot know or even conjecture the mechanism by which a human or divine fiat could cause this or any change in matter, and we have no reason to assert that the miracle of Cana involved any such transmutation as science has observed; but we shall be careful not to deny the possibility of such a change on the grounds that it contravenes some scientific law.

5. RELEVANT CONDITIONS MUST BE IDENTICAL IF SCIENTIFIC LAWS ARE TO APPLY

We have briefly touched on this point on page 35, but its importance demands some further development. A scientific law is a brief statement of relationships between certain events. It is derived always from experiments and observations, and it can be confidently expected to give correct predictions concerning other events, provided that those other events are not significantly different from those which were studied in deriving the law. Science is concerned with those events which can be repeated at different times and in different places, all the circumstances except time

and place being identical in every repetition. The less nearly the events studied by science conform to this ideal, the less certainly can scientific law be applied to them, while unique events which cannot be repeated are outside science in so far as they are unique.* Thus Boyle's law, *that the volume of a gas varies inversely as the pressure upon it*, is a close approximation to the truth for most gases under the conditions which prevailed when the law was deduced, i.e. for gases at pressures up to about 100 lbs. per square inch and at temperatures much above the liquefying-point of the gas; but at high pressures and low temperatures the law completely fails to represent the facts. So in drawing any important deduction from a scientific law it is necessary to be sure that the objects and conditions which are in question are within the range of those which prevailed when the law was deduced. To take a point very apposite to our inquiry, it is a medical law of great certainty that "Human limbs when removed are not regenerated." Let us suppose, however, that we are told that some holy man has, by means of his prayers, been the occasion of the growth of a new hand upon the arm of a man whose wrist had been severed by an axe. Now the law of non-regeneration was derived from observation of many thousand maimed persons: but none of them in association with the prayers of a holy man. The law is therefore not applicable to the case in question until it has been decided whether the prayers of a holy man constitute a relevant condition—i.e. whether they can affect the issue.† But this is the aspect of the question

* The necessity for this definition will be evident when it is remembered that all science is an application of the Theory of Inductive Probability.

† I do not intend to imply that prayers can be a necessary cause of healing, as for example hammering is the cause of a horse-shoe: I maintain only that scientific law cannot exclude the possibility of abnormal physical events following upon the activity of certain human minds.

concerning which we are interested inquirers; and reference to a law, deduced under other and ordinary conditions, has told us nothing. The only scientific method of treating the matter would be to experiment with healing under conditions where supernatural aid is to be expected. This is far from easy, because these matters follow no known regularity or law; and in any case few, if any, scientific men care to pursue such inquiries, for if they became aware of an event which they thought to be supernatural they would either have to sin against their light by suppressing it, or have to face the loss of scientific reputation.

No one has produced any *evidence* that the mental processes of great spirits are not the occasion of alterations in the course of natural phenomena. There is a mass of evidence—not, it is true, of the type the man of science cares for—that they do so. We may conclude, then, that *scientific laws deduced under impersonal conditions cannot be an absolute guide in personal questions.*

6. THE WORD 'LAW'

The use of the terms 'law,' 'natural law,' 'law of nature,' to signify the general principles of science is unfortunate. In the first place 'natural law' has a different meaning in scholastic philosophy; and the word 'law' retains the meaning of the Latin *lex*, a command imposed by a conscious being. The phrase 'laws of Nature' seems to have been used by Galileo metaphorically, but later to have come into use under the influence of the idea that the principles of science were in fact commands addressed by God to matter and obeyed by it. This idea is no longer present in science or theology. No one imagines, I suppose, that God commanded copper sulphate to be blue and that it

remains blue only because of its obedience. We imagine rather that a necessary mechanism connects molecular or atomic structure with that absorption of certain light waves which leads finally to the perception of colour. A rule capable of predicting the existence of colour in metallic salts has been found—namely that salts of metals whose atoms, in combination, have an incomplete inner group of electrons are coloured. But we do not suppose that this is a law imposed by God upon light and atoms, any more than we think that the law that peas, but not potatoes, will go through a $\frac{1}{4}$ -inch sieve is a law imposed by God on sieves, potatoes and peas. The scientific man who believes in God may well suppose that in the beginning He created a first matter, the inner constitution or nature of which implied *in posse* all the material universe, past, present and future; in which case scientific laws, as they really exist in the divine fabric and as seen by the divine mind, can be regarded as remote consequences of the divine fiat, and the existence of even the imperfect scientific laws that we can enunciate may be a consequence of the divine Reason manifest in Creation. But to attach the dignity of divine commands to any of man's imperfect abstractions from partial and inaccurate observations of matter is to take a blasphemously optimistic view of his powers of observation and reasoning; and to identify scientific law as we know it with God's law is a dangerous fallacy. The non-believer must *a fortiori* regard the word 'law' as a mere anachronism and meaningless survival; to him the principles of science should be wholly unconnected with any command imposed on anything. To either believer or non-believer such a phrase as "carbon dioxide at -20° C. disobeys Boyle's law' must appear absurd, the correct statement being that Boyle's law is not applicable to carbon dioxide at -20° C. By

taking care to phrase such statements accurately we could soon extinguish the still surviving fallacy that there is something *compelling* about scientific laws, that they have force and are not merely descriptions. Persons are still to be found who will absolutely reject certain historical evidence on the ground that it recounts occurrences which appear 'to transgress the laws of nature': this is a good reason for further investigation, where possible, but not for denial.

7. SCIENTIFIC LAW AND INTELLIGENT BEINGS

It is particularly difficult to apply scientific laws to intelligent beings. Their actions properly observed are not exempted from scientific treatment, for any material which can be classified, enumerated, or measured can be put through the logical mill of the scientific method, and a reasonable accuracy is possible when large masses are treated statistically. Thus while no prediction could possibly be made as to the likelihood or date of the marriage of Miss Jones, the probability that the number of marriages which will take place next year in England will be between 450,000 and 550,000 is such as to justify a bet at odds. The fact that nearly all men and women have a similar physical constitution and have certain fundamental needs such as marriage-partners and babies ensures the degree of constancy which is noticeable in the marriage figures: yet even here it may be found that habits and wishes change. Who in 1870 could have predicted a fall in birthrate from the 36 of that year to the 14 of 1940?

But the attempt to formulate laws applicable to the conscious life of *individuals* is far more difficult; we do it, of course, in a rudimentary way in all our human relationships, but we never regard these rules as more than the roughest of guides. If Smith were a machine,

the fact that he had had a bath on each of the last five hundred mornings would be very reasonable ground for the law *Smith baths every morning*. But to-morrow Smith may decide otherwise. The operations of a machine are determined by its external environment and its mechanical construction, but Smith has an inner environment of desires, memories, habits, etc., which is unobservable by anyone who would wish to formulate scientific laws about him; moreover, many of us believe that man's mind is subject to direct influences from the spiritual world of which science gives no account.

But if laws that limit the operation of individual man, who is but half-conscious of himself, are fallacious and untrustworthy, how much more absurd would be any law that pretended to lay down or limit the operations of all-conscious and omnipotent God? So if any attempt is made to prove or attest the existence of God by events which purport to have been directly caused by Him and which are commonly called miraculous, it is not open to the opponent to argue that scientific law renders or demonstrates these 'miracles' as impossible, for in using this argument he is in effect assuming that non-existence of God which he seeks to prove; for, if God exists, He can cause any phenomenon to take place under any conditions,* and scientific law is no

* Provided of course that the phenomenon in question is not metaphysically impossible as involving inherent contradiction (God could not cause a square surface to become circular while retaining its actual squareness); and that the phenomenon is not necessarily destructive of the very conditions in which it is to be produced (God could not produce a body in empty space while still maintaining that space in a state of emptiness, though He could, of course, suspend the field of force which, under merely natural or 'scientific' conditions, would be caused by the presence of such a body). All this does not however imply any limitation to the divine power, since it would be manifestly derogatory to the divine truth and self-identity to produce something to which mutually exclusive descriptions could be truly applied. God is what He is, and cannot be other than He is, and all things created by Him are what they are, and cannot be at the same time the contradictory of what they are.

guide to the actions of God. The only evidence that can be brought against the miraculous is that historically it *did* not occur, not that theoretically it *could* not occur.

8. SCIENTIFIC LAW AS FOUNDATION FOR A JUDGMENT

Scientific law can very rarely give the means of forming a precise and wholly certain judgment about a particular event, past, present, or future, which has not been subjected to scientific observation; and this for several reasons.

In the first place the observations on which scientific laws are based are subject to errors, the probable extent of some of which may be known by examining a range of observations, but the actual extent of which is not ascertainable. That all scientific statements are made 'within the limits of error' is well-known to every man of science, but is often neglected by those who draw conclusions about the range of 'natural law.' These errors may be very unimportant and where they amount only to, say, 1 part in 10,000 they are obviously less likely to conceal exceptions to the supposed law than if they amount to 1 part in 10.

Secondly, scientific laws which state what an object will do are predicting the behaviour of a vast concourse of rapidly moving atoms the individual motions of which are neglected because they generally almost cancel out. But it can be shown that the atoms may so move as to produce detectable effects upon material bodies, and that this will occur frequently or even continuously with very minute bodies and increasingly rarely with larger bodies. The fact remains, however, that local unpredictable irregularities of atomic motion introduce a small factor of uncertainty into most scientific con-

clusions and may prevent us from asserting that a particular event which we have not observed did in fact take place in exact agreement with our scientific conclusions. Objects large enough to be visible have so enormous a number of atoms and molecules then that probability of the minute individual irregularities combining to produce a perceptible effect is vanishingly small, but it is to be remembered that physiological events of the highest importance such as the mutation of a heredity factor, possibly the inception of a nerve impulse, may concern only a few dozen atoms and we must not expect a high degree of stability and permanence in very small-scale phenomena.

Lastly, the law relied upon may not only be subject to error but may be subject to exception. The evidence for every scientific law is based on observations which cannot include all cases. The more the observations which have been made, the more chance of including the aberrant case, if any, and *vice versa*. The proposition or 'law' that "all cats have tails" might easily be arrived at from the study of several hundred cats taken at random, but as soon as a Manx cat was included in the field of study either the law or the definition of 'cat' would have to be revised. So with all scientific laws. It is not possible to examine all cases and there is never any certainty that there does not exist an exception hitherto unobserved: and the case concerning which a decision is required may be that very exception. Thus the law "chemical elements are immutable" seemed absolutely certain, until radium was discovered and was shown to be a chemical element which was in fact decomposing. Certainty may indeed be attained under certain conditions as a conclusion to a process of induction in virtue of certain philosophical principles which the scientist as such refrains from using.

It follows that if we wish to look back to the past and use scientific law to decide the question, "Did this event, which certain writings attest, actually occur?", we must remember, first, to ascertain that the event was of the kind described in the scientific law we apply to it. This is usually unascertainable, for we cannot investigate a unique past event to ascertain that the objects taking part in it were normal, i.e. identical with those which were used to establish the particular scientific law. Next, we are to recollect that the scientific law when applied even to these 'normal' cases gives no more than a high probability that the result it indicates did in fact occur.

So judgments about the past based on scientific law are fundamentally unsafe. Those who use them to argue against religious tradition commonly employ loose but pompous phrases about the 'reign of scientific law.' This is a philosophic notion, and implies that all events take place in accordance with certain general principles which are applicable throughout space and time, and that events do not take place in a chaotic or irrational manner. The scientist may indeed accept this as a hypothesis, or even as an article of faith, but the scientific method can never demonstrate its truth.*

But the second-rate followers of science not only assume the necessary truth of the above notion, but irrationally and fallaciously go on to identify 'the reign of scientific law' with 'the reign of the particular scientific laws which are stated by modern science,' concluding in effect that because all bodies may reasonably be

* That events do not, as a matter of fact, take place in a chaotic or irrational manner is quite certain, but this certainty is only attained by an excursion into philosophy. If the scientist makes such an excursion, he may reasonably be asked to prolong it sufficiently to study the implications of this certainty—he would then be saved from the faulty and over-facile reasoning to which we are here drawing attention.

supposed to behave in some ordered manner, that the particular conclusions of modern science are universally applicable—an argument obviously false.

It is clear, then, that even if we exclude the operation of the supernatural (which for the moment we will define as factors, not directly observable by science, and of the nature of mind) science cannot lay down the law absolutely about a past, or for that matter even a present event, but can only present a *probability* that the event did or did not occur. This probability must be assessed from a great number of considerations and only in very few, if any, cases could it be expressed numerically.

9. EXAMPLE OF FALLACIOUS REASONING FROM SCIENTIFIC LAW

A friend who had a fair elementary training in and knowledge of physiology wrote to me not long ago and asked how I could believe in the doctrine that Christ was born of a Virgin, for such an event was a biological impossibility. This is so typical an example of the fallacies which hinder students of science from becoming Christians, that it is worthy of closer consideration.

First, is parthenogenesis (virgin conception) in man a biological impossibility?

(1) We know very little about human conception. The fertilisation of a human ovum has never been observed under natural conditions and all our knowledge about it at present is that, since human reproduction in its known aspects does not differ significantly from other mammalian reproduction, it may be supposed not to differ in this matter. Personally I have very little doubt that it does not so differ, but the argument rests on no more than analogy.

(2) We have very little, indeed almost no idea as to

how a sperm causes an ovum to be fertilised. It is therefore absurd to suppose the invariable necessity of the sperm except on strict experimental evidence.

(3) But the evidence is actually in the contrary direction. The work of Reimann and Miller* may be instanced. These workers caused an unfertilised human ovum to commence development by mechanical stimulation in human blood-serum containing a trace of ethyl acetate. G. Pincus caused rabbit ova to begin to develop by cooling them, and transplanted them to another rabbit's uterus, where they developed, and one female actually came to maturity. This rabbit had no father and was born of one who was not its mother! If the means adopted by these workers were a substitute for spermatozoa, how can we assume that a change in chemical environment within the body or ovum could not be so; or even that a powerful act of faith such as will cause physical changes in the body (evidence is plentiful in the study of hypnotic phenomena) might not bring about this change? I have, of course, no intention to advance this as an explanation of this sacred Mystery, the physical operation of which we can never know; but rather to indicate that no argument against it can be drawn from the supposed impossibility of human parthenogenesis, as asserted by my inquirer and her like.

(4) There is no evidence that in the normal course of nature, one conception in 10,000 or more is not a virgin conception; for were it to be so we would be very unlikely to discover it. There is at present the small positive evidence that girls of good character are occasionally known to allege this occurrence in their own cases (I know of two instances). They are, of course, disbelieved;

*"Arch. Path.," 1939, xxvii, 412-418.

but only on grounds of analogy, not of positive proof. Such proof might, of course, be supplied by examination of the chromosomes of the children. In the case of unmarried women of loose morals, or married women, no abnormality would even be suspected.

All these arguments go to show that human parthenogenesis is not a biological impossibility, and *may* be a rare natural phenomenon. They have, however, no real bearing on the case of our Lord's birth, for the essence of that event was its supernatural character. But I am not entitled to assume that my reader will acknowledge that supernatural character, so I say :

(5) All historical records show that persons who are spiritually very remarkable are associated with alterations in the common order of nature. The evidence may not be such as to allow of a scientific conclusion that this is so, but is there any scientific reason to deny it—i.e. to doubt the records because they assert such alterations? I do not here beg the question of the nature of Jesus Christ, for no one will deny his greatness; and if the divinity of Christ be granted all our difficulties disappear.

(6) In fact the Virgin Conception is denied by scientists because they don't believe it. They say "I see no evidence for parthenogenesis in man, *therefore* it does not occur, *therefore* any evidence in its favour is false." The same circular reasoning has in the past led to denial of the reality of globe-lightning and of anæsthesia by hypnosis, both now experimentally proven.

10. PROBABILITIES NOT USEFUL IN MATTERS OF VITAL IMPORT

We have seen that arguments drawn from scientific law cannot decide with absolute certainty whether a

past event occurred or a future event will occur. If all the circumstances of the supposed or expected event are known, and are identical, or nearly so, with the circumstances under which the law was deduced, the probability of the correctness of our inference may be very high, though always unknown and never amounting to certainty: if these circumstances are not known it will be lower and even more uncertain. In the case of past events a further factor of probability is added by the question of the credibility and accuracy of the witnesses, authors, copyists, etc. Consequently a decision by human reason as to whether a unique past event is truly asserted to have occurred is a matter of weighing probabilities which are never known with exactness. This is what we do, indeed, when we make up our mind about any of the matters of ordinary human existence: here we never expect scientific proof or disproof of anything. The difficulty in the case of matters of religion arises from the intense importance of arriving at a correct decision: and where a decision is absolutely vital, men cannot or do not content themselves with a weighing up of imperfectly known probabilities of truth and error. A probable judgment on matters of infinite import is useless. If it were possible, as it is not, to decide that the odds were five to two that the Divinity of Christ were an illusion, what good were that? For, as a matter of fact, Christ was either divine or not divine, and we have to take action here and now, and cannot postpone a decision. Neither historical nor scientific evidence can give a decisive answer, and it matters intensely whether your ideal is to be Adolf Hitler, H. G. Wells, or St. Ignatius Loyola. It is, then, most important to decide whether a number of matters, concerning which evidence is scanty and experimental demonstration impossible, are in fact

correctly reported. What are we to do? Where scientific reasoning fails, we have no recourse but to turn to other human faculties.

What do we do in ordinary life about problems that matter and are insoluble? If a beloved husband does not come home one night, and turns up next day with an odd story of having missed a train, do you say "the chances are six to one against the Scotch Express being late, and it is ninety to seven against my husband telling a lie . . . and finally I conclude that the odds are forty-five to nine that my husband is telling the truth and was not staying the night with an old flame. . . ." No, if such a thought enters your mind at all, you say "I love him and believe in him," and you continue to rejoice in his love undisturbed by any possibility of his deceit.

So it is in religion. Until you are converted you can but weigh probabilities with small satisfaction, but once God gives you the grace that enables you to love and trust Him, you will think anything more likely than that He is allowing you to be deceived.

It is a dangerous fallacy, however, to place in a creation of man this trust which we may place in God. The materialist is apt to say "This fabric of reasonable inference from accurate observation which I call science is so noble a creation that it is impossible that it should fail to give me an answer to any question." But in saying this he is forgetting the foundations and limitations of this science, which *cannot* give an answer to the questions such as we have discussed. The outside observer will deduce that the Christian may be deceived, if there is no God such as he has faith in; but he will also deduce that the man who makes science his God and asks of it questions outside its scope, not only may, but must be deceived.

II. SCIENCE AND THE MIRACULOUS

It must be concluded, then, that science does not give reason to reject the miraculous. It tells us that its observations to-day require for their explanation only the agencies at present studied by Science. It does not study the phenomena in which other agencies are to-day supposed to act, and it cannot study unique past events. The frequency with which physical agencies explain the apparently miraculous will give us a healthily critical attitude to supposed miracles, but it can never lead to a certainty that miracles do not occur, still less that they have not occurred in the past.

MATERIALISM

I. THE MATERIALISTIC CREED

We have dealt with the destructive criticisms that can be directed by scientific men against particular religious beliefs; we have next to consider the constructive opposition of a materialist world-view to the religious. Man is not content with mere criticism, but must have some philosophy or scheme in the light of which he can put in order his observations of himself and the external world; and, accordingly, those who regard natural science as the only method of investigation which can yield reliable results have constructed a theory of the world in which no entities are postulated other than those which can be studied by natural science. That creed is materialism.

Materialism is said to be dying, and among philosophers this may be true. But among scientific men, and especially among those who have studied nothing but science, it is a common, and indeed the prevailing belief, and that which is characteristic of the present age. No materialistic creed has, to my knowledge, been defined; and as the words materialist, mechanist, rationalist, are used sometimes in the same, sometimes in different senses, the tenets of the variety of that form of materialism which is held by many men of science will be set out before its validity is discussed.

(i) The only data useful in constructing a view of the world are those afforded by observation and experiment. Data which are not capable of being checked

by independent observers, directly or indirectly, are of negligible—or at least no more than incidental—value. Data that cannot be numerically expressed are of inferior value.

(ii) What is not observable in the above sense is to be treated as non-existent.

(iii) All that is observable, when its investigation has been pushed to the furthest limits, will prove to be expressible in terms of mass, length and time (i.e. of matter and energy); and every characteristic of everything that could be perceived could be explained by the mass-length-time relationships of the object, of the intervening media and of the perceiving brain, provided that a sufficient knowledge of all these were obtainable.

(iv) All that is not now explicable in terms of mass, length and time and their combinations, such as force, matter, energy, etc., is to be set aside pending explanation. It is presumed that anything that cannot now be explained in those terms will, when science has advanced further, become susceptible of such explanation; so it can never be necessary to assume any other principle, such as a soul or spiritual substance. Thus any explanation in terms of mass, length and time, no matter how improbable it may appear, or even the refusal to attempt any explanation, is to be preferred to an explanation involving the intervention of a spiritual principle.

(v) Man is a phenomenon differing only by his complexity from simple biological phenomena, which differ only from the inorganic by their complexity and order (e.g. as a clock differs from a box full of wheels and springs). The operations of living matter, if understood, could theoretically at least be explained in terms of mass, length and time, and their derivatives. Man's physiological and therefore, on this hypothesis, his mental behaviour is determined by the position,

structure and motion of his machinery ; and as we believe that in material nature the motion of particles is rigidly determined by the previous position, structure and motion of them and their neighbouring particles, then man's behaviour at each moment follows necessarily from his state at the moment before and consequently he has no free will. As the above system allows of no survival after death, no supernatural intervention during life, and no choice of conduct, there is no OUGHT in the materialistic philosophy. No absolute ethical or moral laws exist apart from individuals who hold them, and the supposed laws which we commonly followed are either the result of irrational autonomous associations of ideas or are rules of conduct by which societies are enabled to exist.

(vi) The notions of purpose and design are obviously absent from such a world. Man is not in the world *for* any purpose. He may deduce from his bodily structure that if he does not gather food and get children, there will soon be no more men, but there is no reason, external to man, why he should adopt any particular course of life or conduct.

Such is the materialist philosophy, which is, I venture to think, the fundamental view of most of the instructed—I will not say educated—population of Europe. No doubt few men and fewer women carry it to the unacceptable conclusion of paragraph (v) above, because in fact the majority of men have not integrated their personalities. They have adopted a world-view which should lead them to the conclusion that there is no reason why everybody should not do what suits him best ; at the same time they have received a Christian education, and they have affectionate impulses, just as a dog has ; with these they somehow muddle along to their death-

beds. But we are speaking of philosophies, not parcels of inconsistent notions accidentally associated in an individual mind. The reason, almost the necessity, for the holding of such inconsistent views by materialists is the uselessness of their philosophy as a guide to human relationships or to any mental operations outside science and mathematics. Their philosophy simply omits these from its view and leaves its adherent to deal with them by any rule-of-thumb method he may choose to adopt.

2. THE BASIS OF THE MATERIALIST CREED

It is not possible for the materialist to allege anything that may be called a proof of his hypothesis, which he presents as being the simplest tenable view of nature. He might, however, say to an enquirer :

"In the building-up of science a great many phenomena which once seemed to require the assumption of some special form of being other than matter or energy have come to be explained in terms of matter and energy alone ; and up to now, science has not found it necessary to assume that there is anything else in the world. Science has had a gigantic success in rendering the world intelligible, and in solving some of its darkest mysteries ; and science is the only method of investigating the world that I acknowledge. True that there are many matters it has not explained, such as life and consciousness ; yet I do not despair that it will throw light on them."

"Let me quote," continues our materialist, "one of your own Catholic philosophers, who tells us that *Entities are not to be unnecessarily multiplied* ; on this principle science will continue to try to explain the world in terms of these two fundamental entities. Indeed," he might say, "what more can science do? It has established,

and is established upon, the laws of matter and energy, but it could not apply its laws and methods to a vital principle or a soul. Science deals with number, measure and weight—how can it apply these to this thing you call soul or spirit, which has neither mass nor energy, nor even extension?"

"No," he would say, "I shall stick to the scientific method and data. I know that living organisms are in some respects like machines; thus, if you eat an ounce of sugar, it will produce as much heat in your body as it would if you burnt it on the fire. The eye is a camera, the heart is a pump, and they obey the laws of optics and hydraulics. If I suppose that a living creature is a hugely complex machine, and that thought is in some way a product of the machine, a mode of motion, I set up the ideal of a complete, simple and universal order of nature, based on the two principles of matter and energy, which some day may be reduced by us to a single universal entity."

3. MATERIALISM AND DETERMINISM

Materialism naturally involves determinism, the denial of free will to man as to all else. Science finds no evidence of free will in matter and energy. There is no reason to suppose that an apple ever *decides* to fall upwards, and that light ever *decides* to deviate from a straight line, and in general we find similar things in similar circumstances behave in a similar fashion. So we have come to believe that in the material world studied by science a given set of conditions can have only one outcome. There is but one path for the bullet shot from the gun. So if the body and brain is, as the mechanist supposes, simply a vast complex assemblage of moving and vibrating atoms and electrons, its state

and external circumstances at the present instant implies its state at the next instant as inexorably as the position of the bullet an instant hence is determined by its present motions and external conditions. In short :—

Matter and energy, however organised, have no free will. So, if man consists of nothing else than matter and energy, then, man has no free-will.

The materialist, like everyone else, has the experience of free will and acts as if he were free, for no one could live without so doing ; but he regards this sensation of free will as an illusion. He feels as if he had *chosen* to put on black shoes instead of brown, but he believes that the very fact that he *did* put on black shoes proves that he could not have put on brown, for to put on brown shoes would have implied a different physical brain-condition from that which he possessed when he put on his black shoes, and he could have only one physical brain-condition at one moment. He supposes, therefore, that he had no choice, but only an illusion of choice.

4. MATERIALISM NOT SELF-EVIDENT

Materialism is a doctrine common among men of science, for these, dealing continually with the manifestations of matter and energy, are most susceptible to the charm of simplifying all things to those two entities. Hence, probably, arises the fallacy that materialism is proved or even supported by the findings of science correctly applied. The rejection of materialism is clearly a necessary preliminary to the acceptance of religion, and it is therefore worth while first to consider its arguments in detail, with a view to discovering if it is soundly based, then to consider other arguments drawn from its consequences.

Materialism must not be allowed to take its place as an axiom, a self-evident truth, to which status those who hold certain political views would exalt it; for, broadly surveying human history, we find in men of nearly all ages and races some form of belief in God and in a human soul separable from the body. The contrary view, namely that there is no God and that all mental activity ceases at death, has been held only by a small number of Greek and Roman philosophers, notably Lucretius, and by a steadily increasing number of persons in Europe from the late seventeenth century until to-day. It is in each case associated with the scientific view that all perceptible phenomena are brought about by a reshuffling of permanent, separate, minute units—the atoms of Lucretius—and the ultimate particles, electrons, protons, etc., of to-day.

So regarding humanity in space and time, the mechanistic view must appear exceptional. The general calibre of man's judgment and wisdom does not, on literary evidence, differ greatly from age to age, so unless we can justify materialism from the new scientific knowledge not available to other ages and races, we must regard it with suspicion. In any event materialists are called on to prove their case, or at least to allege probable reasons: they are not entitled to say as they often do, "the mechanistic view is obviously the sensible one in which all clear-headed people naturally concur."

5. FALLACIES OF MATERIALISM

The fundamental and glaring error of materialism is to say that *because science has not required the assumption of other entities than matter and energy in order to explain what it has already explained, there is no need to assume anything further in order to explain what it has not yet explained.* This

is so irrational a leap that it passes muster with those who expect no such effrontery from men who pose as exponents of reason. The materialist is entitled, if he will, to try to explain all phenomena in this fashion : but since in fact he has explained only a very small part of them, his hypothesis remains not only wholly unproven but improbable. By the assumption of matter and energy alone it is possible to explain a great part of the phenomena of non-living things, and some part of the phenomena associated with life, while no light whatever has been thrown on the nature of thought and human mental activity. One must not be deceived by the existence of the science of psychology, which, though it seeks to study the relationship between mental processes and other events, in fact makes no assumptions as to the nature of thought.

In studying phenomena which have not been explained, it is open to the materialist to try the materialistic explanation and to the believer in a mind or soul to try his ; but until all, or even some, phenomena where mind appears to operate have been explained in materialistic fashion, materialism has not begun to prove its point, for it gives successful material explanations only to what even the religious have for centuries agreed to be material phenomena. We may say, then, to the materialist, "You have deduced materialism and determinism from experiments conducted upon non-living matter. On your own confession you can explain neither life nor mind. How then are you justified in arguing that the limitations you have observed in non-living matter apply to these unique phenomena? Furthermore, if you do not believe that in life and mind something more than matter and energy are operating, then explain them in terms of matter and energy ; or, since I know you can't do that, show how an explanation

can conceivably be given. Try to give me some idea how my sensations of colour, beauty, harmony, can result from the interaction of atoms and molecules. If you can't even outline the possibility of an explanation and you know that colour, beauty and harmony are real things, are you not being utterly unscientific in denying or refusing to seek other explanations while advancing no explanation of your own? Your belief that matter and energy can produce mind is simply an exercise of faith; and if you are going to hold theories on faith, why not hold the fruitful theories of religion which will enable you to modify and improve mind, instead of a barren one which reduces it to a shadow of an unknown mechanical process?"

6. MATERIALISM AND ALLEGED SUPERNATURAL PHENOMENA

Materialism is here objected to simply on the ground of its adequacy to explain mental phenomena of which we have everyday experience, and which, since they are the very stuff of our being, cannot be ignored. There is, however, a large class of phenomena of the type considered to be the field of 'psychical research' which seems to be peculiarly obdurate to any material explanation. How does materialism deal with these? In an earlier section (p. 33) it appeared that science did not regard these phenomena as fit matter for investigation. The materialist indeed regards the whole field of psychical research, from telepathy to apparently supernatural instances of healing, as dangerous nonsense and will have nothing to do with it. But the man who says "Anything that, if true, would confute my theory is thereby proved to be false and unworthy of investigation" at once renders his theory unworthy of consideration.

THE FOURFOLD VISION

7. THE MERITS OF MATERIALISM

No theory is long held that has not some sense in it, and the sound kernel of the materialist doctrine is simply Occam's razor 'Entities are not to be unnecessarily multiplied.' Whatever can be explained in terms of matter and energy is better explained in such terms without adding occult or supernatural forces, because our methods of arguing about matter and energy have great power and fertility in suggesting ways of usefully manipulating material things by material means available to all. The question "Why is grass green?" can be answered truly by saying "Because such is the will of God," but it is more profitably answered "Because it contains chlorophyll, which absorbs certain rays of light . . ." inasmuch as this answer leads to a number of fruitful discussions about photosynthesis and the relation between the colour and structure of organic compounds. But the first answer is not made untrue by the second. If we had asked "Why is green grass so beautiful?" then our first answer would be considerably better than any we could attempt in terms of matter and energy.

8. SCIENCE, AGNOSTICISM, MATERIALISM AND RELIGION

It should now be clear that science makes no pretence to give the answers to any of the ultimate questions for which we pressingly need a solution in order that we may guide our lives. It cannot tell us directly whether there is a soul or a God, whether we have free will, whether minds can influence other minds or matter without a physical connection. It cannot give any explanation of the quality of our perceptions or the beauty we draw from them; it cannot afford any guide to the principles that should govern the conduct of

human relationships. To religious and materialists alike it answers "I neither affirm nor deny what you assert. You may infer from my account of the world that God is or is not behind it, that you are souls or machines. Such inference is not the business of science."

Materialism and religion are both faiths, for to disbelieve, as to believe, is to pass beyond the facts presented, and *assent to a system*. Agnosticism of the true Victorian brand is simply a refusal to pass beyond the scientifically observable facts, or to give any judgment on a subject where evidence of the type accepted by the agnostics does not exist. There are plenty of materialists and religious, but very few agnostics, for it is not in human nature to forgo an answer to its central problems. The case for the agnostic therefore needs no proving, for there is nothing to prove: he says "I will not go beyond the facts of science" and the only answer is "Very well; stay where you are."

The materialist's case, being negative, is likewise not susceptible of proof. He asserts that no one has found evidence of the supernatural and that the order of the world is not in fact such as to suggest the existence of anything more than matter and energy. Since his case rests on negative evidence, it cannot be proved, for new evidence which would convince even him that God or the soul exists, might at any time be found. On the other hand, it is exceedingly difficult to disprove by scientific methods, because nothing short of a miracle performed to order in his presence, and under conditions of stringent scientific control, could convince the hardy materialist.

Religion, on the other hand, claims that some part of its assertions can be proved, though not by the methods of proof employed by science. It claims that from the nature of existence metaphysical proofs of the

existence of God can be obtained ; secondly, that from the order of the universe, as we perceive it, we can infer God ; thirdly, it offers a proof of truly scientific character, namely that if you follow the path laid down by its masters, you will have direct experience of its truth.

No proofs of anything outside the realm of mathematics or formal deduction are wholly compelling ; but to put it at the lowest, religious belief is supported by evidence of the type which we are accustomed to consider adequate in the affairs of daily life : such evidence, in so far as it flows from the study of nature, will be the subject of the next chapter.

9. RELIGION NOT ONLY A BELIEF

We have contrasted science, materialism, religion, as systems of belief, that is, as pictures of the workings of the universe. This is however a very one-sided view of religion. No one will doubt, I conjecture, that St. John the Evangelist, St. Francis of Assisi, and St. John Mary Vianney—the Curé d'Ars—to take three examples sundered by many centuries, were all men of extreme holiness, men who had accomplished almost all that man can accomplish in the sphere of religion, and had gained from it a quality which has made the deepest impression on their fellows, and were raised to heights of joy and experienced depths of feeling that we can but begin to imagine. None the less these men clearly possessed a world-view which from the scientific point of view was positively childish in its incompleteness. Religion offers quite a different kind of truth from that of science, though the latter's findings are not excluded from it. It is not primarily a factual description, nor even simply a philosophy, but it is a *way of life* : and not

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only is it a way of life, in the sense of a path along which a fixed and stable *you* proceed ; but it is a *new creation*, by which not only do you see things in the light of God, do things with respect to God, but actually become yourself more like to God.

CHAPTER IV

SCIENCE IN SUPPORT OF RELIGIOUS BELIEF

I. SCIENTIFIC PROOF OR DISPROOF

The method of modern science has been discussed in detail in Chapters I and II. Its data are measurements or enumerations of material objects. Its reasoning is mathematical, and a well-known mathematical method is founded on the fact that you do not get out of a piece of mathematical reasoning any entities other than those you put in.

Consequently, so long as science concerns itself with primary qualities which all derive from mass, length and time, its rigidly demonstrable conclusions will not be concerned with anything else than these. These *certainly demonstrable* conclusions will concern the observed world as it was when observed; thus it might be shown that two leaden balls on certain occasions attracted each other with a force which could be expressed by

$$\frac{mm'}{d^2} \times G$$

where m and m' are the masses of the two balls, d is the distance between them, and if these are expressed in C.G.S. units G will be the number equal to 6.664×10^{-8} . Science next assumes two principles, those of the simplicity and of the constancy of nature's operations, and *infers* that what applies to these leaden balls applies to all other heavy bodies everywhere in the universe.

Now, if we adopt these rules of the simplicity of nature

(that we are to assume no more causes than will serve to explain the effects) and of the constancy of her operation (that the same causes always produce the same effects), and if we exclude from consideration all but the primary qualities of things; then it follows that, no matter what evidence might be studied, there must *appear* to be a universal reign of scientific law in which the materialist view will be valid, for nothing else than matter and energy will be considered. The scientific view is arrived at by (1) selecting the data from our sense-perceptions so that it deals only with moving matter and fields of force, then (2) assuming by our first rule of simplicity nothing else operates in these phenomena, and by the second that laws correctly deduced from these phenomena will continue to apply everywhere in space or time. Science therefore assumes without proof and arbitrarily selects the kind of data and rules that will present to us a mechanistic universe. It does not of course assert that this aspect of the universe is identical with the totality of things, the All: that is the materialist's fallacy.

Now it is obvious that this science cannot operate to prove or disprove the existence of God, unless He chooses to manifest Himself in matter; for our idea of God is derived principally from a negation of those very things which, for the scientist, provide a complete and exhaustive description of all reality, namely mass, length and time. God must consequently fall outside any class of objects studied by science, and it is therefore evident that no scientific proof could begin with the abstractions that we term scientific data and end with any conclusion concerning God.

The existence of God might indeed be inferred from a study of the same events as are studied by science, for every object and event has a similitude to and

contains evidence of its Creator and First Cause; but the principal elements from which a knowledge of this similitude and evidence could be gained are removed by the abstraction that turns events into scientific data. The appreciation of beauty, harmony and purpose in the world arise from the action of the mind on these elements that are not studied by science, and are reached by a complex activity of mind very different from the austere and arbitrarily limited activity of strictly scientific thought. Beauty and harmony are not subjects of science, though they may be attributes of it. Reasoning or its conclusions may be beautiful, but the beauty is not apprehended by reason and cannot enter into a scientific proof.

2. IS GOD TO BE DISCOVERED BY SCIENCE?

Let it be supposed, *ex hypothesi*, that there is a God, and let us consider how he might be detected by scientific methods. As long as his operations were upon the minds of men, nothing that science could do would reveal them, for only the crudest and most uncertain laws of psychology have been attained, nor does improvement seem to be rapid. The only circumstances in which God could be discovered through science would arise if he were to modify in an arbitrary and frequent way the usual mode of operation of matter according to scientific 'laws.' If his alteration were not arbitrary it would pass for a higher law; if it were isolated, the divergence from the expected result would be ignored as presumably due to some human error, e.g. of incorrect observation or unreliable report. It is quite clear that the God we have assumed could demonstrate Himself to men of science by exerting direct influences, showing evidence of a quasi-human conscious intention, on the

matter they study; but the fact that no such influences have been noted is no demonstration of the non-existence of God. He may wish us to take the enormously profitable road of faith rather than to be compelled into belief—and if our hypothesis of a God is true there may be a thousand reasons why a Being all-wise and wholly transcending human modes of thought should not demonstrate himself to men of science.

3. IS THE NON-EXISTENCE OF GOD TO BE DISCOVERED BY SCIENCE?

The usual expression of the man of science who does not believe in God is "Nowhere in the universe have I found any evidence of Him," the best reply to which pretentious claim is the words "So what?" or to expand this laconic query—"Where have you looked for him, and what aspects of the universe have you studied? Have you looked at the scientific abstraction or have you looked at the purpose, design and harmony of things? Have you only looked at a part of what is perceived by your external senses, or have you looked into your own mind, which is said to be the dwelling-place of God by all who study Him and by Him who claimed to be God Himself? How foolish would you think the scientist who knew that all the books and the best zoologists agreed that wombats were to be found in Australia, and yet insisted on looking for them everywhere else, in Tibet and Madagascar and Yucatan, dredged for them in the black depths of ocean, and turned his telescope to seek them in the cold of the Moon? And even if he finally consented to make a cursory inspection of the docks at Sydney and the streets of Melbourne, would he have done enough? Are you not making the same error in your search for God?" To which

he may reply "But God is asserted to act miraculously in matter, as in the Holy Scriptures." To which the reply must be "The events recounted in the Holy Scripture are not observable by science in that exact manner which enables them to be characterised by science as true or not true, miraculous or natural. There are modern miracles asserted, e.g. at Lourdes: study those if you like and if you can. But as a man with work to do in the world, you may prefer to stay at home and take the advice of those who have acquainted themselves with God, namely to seek Him chiefly by the study of those aspects of His handiwork which are most like to Him, rather than to imitate that wicked generation that asketh a sign."

4. SOURCES OF EVIDENCE OF THE EXISTENCE OF GOD

Assuming, then, the tentative hypothesis of the existence of a Deity, and such a Deity as those of our fellows who have maintained this hypothesis assert to exist, wherein, according to them, are His operations to be sought? Chiefly we may think:—

- A. In the creation and preservation of the universe.
- B. In His deliberate manifestations to humanity.
- C. In the mind and heart of man.

A. We are to assume *ex hypothesi* that God created and preserves the universe, which therefore we may discover to bear traces of His design—always provided that we know enough of God to recognise His handiwork. It is very easy here to fail in humility and to expect a world created by God to resemble that which would have been created by a committee of philanthropists. In fact we may expect to have far less appreciation of God's plan of the universe than an ant crawling on a

cathedral floor might have of the mind and intention of its designer. But the method is legitimate, if we always remember that we are looking for the operation of eternal God, not of a rather more intelligent sort of man. For "Where wast thou when I laid the foundations of the earth? Tell me if thou hast understanding . . . Wilt thou make void my judgment? And condemn me, that thou mayest be justified?" (Job xxxviii. 4).

Developing this assumption we are supposing:—

(1) That all existence—being—derives from God and that therefore a study of *being* may lead to evidence of God.

(2) That although philosophers hold that it is not possible to demonstrate the impossibility of a universe depending on God's creative power exercised from all eternity, yet it is highly probable (quite apart from revelation) that the history of the universe is a finite history, and it is accordingly possible that a scientific study of the evidence might lead to a knowledge of the length of that history.

(3) That if the universe is viewed as religion views it, not as a structure solely made up of matter and energy, but as comprising also an eternal spiritual world, then its present operation and past history and future destiny, as far as we can know them by the natural reason, are compatible with and indeed point to a design which is consistent with creation by one who is infinitely good, beautiful and orderly.

B. An entirely different class of evidence is to be found in the sacred writings of Christianity. These relate what purports to be an account of the direct and personal intervention of God in the affairs of men. The non-Christian is not compelled to give these any greater evidential value than he would accord to other writings of the period, but he may find in them some-

thing that compels him to believe that they originate from some more than human source. Evidence of this type is less compelling, but perhaps more convincing than any scientific evidence. The latter weighs evidence; the former not only does this, but savours the goodness and beauty of the matter. Science is concerned in this type of proof only so far as its findings may confirm or confute the authenticity or veracity of these writings.

C. (1) A cogent and experimental proof of the existence of God can be derived from an experiment of a man upon himself. That which is directly apprehended needs no proof.* That grass is green, that sunrise is beautiful, a Greek vase harmonious, is not susceptible of proof because it is directly apprehended. So, in fact, in the religious life, the operations of God are not seen or known or understood, but felt with a certainty which does not permit of argument. And, indeed, there may be present to the mind of a Christian weighty difficulties about the existence of God, difficulties which his intellect is unable to resolve, while he retains complete inner certainty of it—just as he might intellectually argue that a murder was right, but know in his heart it was wrong. Such an apprehension of God is open to everybody who is willing to put himself in the way of attaining it.

*What has been said here is in no way intended to deny the fact that the existence of God can be demonstrated by human reason, arguing from the existence of contingent and mutable being. But a philosophical demonstration of this sort, while it by rights claims the assent of intellect, does not necessarily secure the assent of the *man*. Man is not turned to God by intellect alone, but when he does turn to God, there begins a new and complex vital reaction of the whole personality, which mere discursive reason can explore but ploddingly. This religious experience is not indeed unreasonable, but results from a new freedom and exhilaration as intellect and will strike out for the heights at a pace which defeats the pedestrian formulations of communicable thought. The religious man asserts that such an experience does take place in the man who turns to God. Here is a verifiable assertion. Let the scientist try it. *Fiat experimentum!*

(2) There is a much more direct and vehement apprehension of God that wholly banishes every possibility of doubt and makes God seem as near and positive an existence as that of a human friend: this is narrated by the mystics, but this mystical apprehension is not in fact attained by the majority of Christians and therefore it can constitute a proof only to those that have attained it.

(3) Neither of these modes of directly knowing God is immediately available to the inquirer for they require a cultivation of the mind that, presumably, he has not undertaken. None the less you do not need to be a mathematician to realise that Newton knew mathematics nor a musician to apprehend that Beethoven knew something of music. Nor, however destitute you were of the mathematical or musical faculty, would you doubt, after reading the biographies of these men, that they were studying something of real importance and had a genuine understanding of it: both men, moreover, had a quality of *greatness* that affords a guarantee that they were not spending their lives on idle nonsense. What is true of Newton or Beethoven, is true of St. Paul, St. Augustine of Hippo, or St. Ignatius Loyola. The conviction that "this man would not be concerned with other than reality" is valid argument for that reality, and though it is not compelling proof, yet it affords an immediate means of convincing yourself that the 'experiment' of C.(1) above deserves a trial.

5. THE POSSIBILITY OF PROOF OF GOD'S EXISTENCE

What do we mean by the proof of a statement? We mean a course of reasoning starting from accepted premises and unescapably leading to that statement, just as the acceptance of the definitions and axioms of

Euclidean geometry lead unescapably to the conclusion that the angle in a semicircle is a right angle. But the very possibility of proof rests upon the acceptance of the data from which the argument starts.

For that reason no proof of anything can be compelling unless it starts with agreed definitions or with reproducible observations. It follows then that, since the evidence for the existence of God can start from neither (pp. 66-68) but involves judgments of value, it can never be compelling to an individual adversary. But if you accept your own and other men's judgments of value as having the same status as data for argument as physical facts or agreed definitions, then an acceptable argument for God's existence may be reached. Judgments of value are in fact the data employed in most of the decisions of human life, and there is no reason to exclude them from this most important of investigations.

The Christian does not, of course, hold his specific Christian beliefs as a consequence of any particular proof or proofs. He holds them in consequence of a reasonable assent confirmed by a real gift of faith, which is not obtained of his own free will, but is given by God to those who make themselves fit to receive it. Assent to the arguments of the kind which are discussed in this and subsequent chapters is not necessary to the Christian, but is merely a valuable preparation for this gift. We should rate our faith very low, if we held it simply on grounds that might be disproved by a capable advocate; or which were first thought of at some date long after the beginning of Christianity; or which, by reason of their learned character or subtlety, were not to be apprehended by the simple, childish or unlearned.

The function of these proofs is to prepare for the gift of faith those who, by reason of their adhesion to a

materialistic or other false philosophy, are intellectually hindered from believing the fundamental truths of Christianity. Those who are or have been materialists must discard the assumption that the only admissible data are scientific abstractions and definitions: this assumption is simply a part of scientific method, and the question of the existence of God is not a part of natural science.· Indeed the method of science totally obstructs many of these arguments, because science concerns itself wholly with the parts of knowledge already in process of elucidation and is content to ignore the defects of and gaps in knowledge, which none the less have a profound significance. The arguments here given are, furthermore, not the total of those that may be presented, but only those which in data or method have some relation to natural science.

CHAPTER V

ARGUMENTS FOR THE EXISTENCE OF GOD DRAWN FROM THE EXISTENCE OF THE UNIVERSE

I. ARGUMENT FROM THE MERE EXISTENCE OF MATTER

- (a) *All science indicates that every event has a cause—something without which it would not be.*

Almost the whole of science is concerned with working out by the methods described in Chapter I the laws which express the manner in which event A depends on event B. Thus we explain rust by (1) the *previous* contact of iron, air and water: this gives an explanation in sequence of time; (2) we may explain it as atoms of iron, oxygen and hydrogen disposed in such and such a pattern. Everything is explained as being the result of something else, both in time and in constitution.

It is so repugnant to the understanding as to be incredible that an object should have no cause, e.g. that a piece of iron or a drop of oil should be made of nothing, so that we could not explain it as being derived from anything else. Not only is this repugnant to the understanding, but is also contrary to all experience: all science is founded on the contrary, which is therefore at least the most certain of scientific conclusions and, as such, worthy of great respect by the man of science.

- (b) *Every finite cause we can allege for phenomena has itself a cause.*

If we investigate a fragment of rust we can prove it to be constituted of iron atoms and oxygen atoms associated in a particular pattern characteristic of rust.

If we investigate the iron atoms we find that we can call them the result of certain entities called electrons, protons and neutrons which have mass, size, position and velocity; and exert electrical, magnetic and presumably gravitational forces. We are now entitled to ask what are electrons, protons, neutrons, etc. At present no one can answer that question, as half a century ago no one could answer a similar question about atoms. But since they produce exceedingly marked effects they must be something, and something that can be explained in other terms than themselves, since they are apparently mutually transformable with the loss or gain of energy. Let this 'something' of which electrons, protons, etc., are composed be called A. Then of what is A composed? Either it has a cause or it has not. If it has, that cause had another cause or has not. That it has not is contrary both to reason and our deductions from experience: if it has, let its cause be called B. But B in its turn must have a cause, and our series of causes seems at first to have no limit.

(c) *An infinite series of causes can give no better explanation than a single cause.*

- We cannot conceive of a stone or a flower being present without any reason or scientific cause. Let there be a million, ten million causes preceding and leading to that flower or stone. Then consider cause No. 1,000,000 or 10,000,000: it is just as hard to believe that this exists without a cause, as that the original stone or flower exists without cause. No series of such causes, however long, suffices to make the existence of anything scientifically or rationally explicable. If we cannot think of an electron without supposing there is *something there* of which it is made up, there is no better explanation of it by supposing an infinite number of

different kinds of being each underlying the other and constituting it.*

(d) *The only escape from this infinite series of causes which serve to explain nothing is that of a Causeless Cause.*

Clearly if there were something that required no cause, but could cause, i.e. originate, the whole universe, the world would thereby be made rational and its existence would be explained; and so if, as scientific men, we require a rational explanation of the existence of anything we must consider that there exists a causeless cause of that thing.

(e) *A causeless cause must have many of the attributes of God as revealed in the Christian religion and may therefore reasonably be identified with Him.*

We suppose then that a causeless cause is the beginning of every chain of action and underlies every portion of matter as the principle of existence. Since it is a principle, alike of science and all reasoning, to assume no more causes than are necessary to explain the effects, we shall not posit a separate first cause for every piece of matter and every action, but suppose that all have one single First Cause.

(f) *The First Cause must contain potentially all the perfections of that of which it is the cause.*

If the First Cause is the origin of man and nature, then it is the source of all harmony, beauty, power, personality, knowledge and love that there is in the universe. It is the source of every perfection; and, as the world has evolved, perfections (as of wisdom) have increased. We must therefore suppose that this First

*Modern mathematical logicians have discovered certain subtleties about infinite regressions which were not known to the older philosophers; none the less, this argument is compelling to the normal understanding.

Cause is always able to produce far more than the total of its present effects at any moment, and that it contains within itself at least as much of reality and perfection as the universe may at any moment in the future contain. The arguments by which we attribute perfections to the First Cause could equally be applied to positive evils, if such existed, but not to a mere absence of good in a given subject. That the First Cause is not a cause of present goodness in me who am not good does not argue a lack of goodness in the First Cause. The difficulty as to positive evil is of course a real one, and it is generally taken that the only evil is that of man's wickedness and that he is able to do evil only because he has been given the power of free will which nothing else possesses. Pain and suffering viewed in the light of eternity are simply incidents whose significance for good will appear when the whole world-process is seen in the aspect of eternity.

The First Cause must then be of a perfection and immensity that must lead us to identify it with the Divine.

2. THE VALIDITY OF THE ARGUMENT FROM THE EXISTENCE OF MATTER

The controversy produced by this argument has continued for half-a-dozen centuries and would fill a good sized library. It is easy to travesty it and confute the travesty, but on the whole its opponents have not been successful in suggesting any escape from the necessity of a First Cause nor from the endowment of this First Cause with attributes which identify it with God. It is not for this book to discuss the controversy, but simply to suggest that any fault which the reader may find with the argument is very likely to be derived from its

brief presentation or from his failure to appreciate it. His appropriate course is to make further investigation by consulting the works of writers of sound natural theology* on the one hand and the opponents of the arguments, e.g. Immanuel Kant, on the other.

But it at least affords a serious cause for meditation. Science concerns itself with matter and chronicles its changes and their regularity. It never asks how matter comes to be here or to remain in being, nor what is the cause of the constancy and simplicity of nature that is always assumed. Such problems are not fit matter for physical science, and are segregated under the forbidding title of metaphysics; but the problems remain and are not made less by a refusal to study them. To meditate on the ever-present eternal principle of existence in virtue of which the world exists is an exercise that leads some of the way towards the knowledge of God.

3. ARGUMENTS FROM SCIENTIFIC EVIDENCE TO SHOW THAT THE UNIVERSE BEGAN A FINITE NUMBER OF YEARS AGO

Christianity and indeed most religions indicate a creation of this universe by God. This creation, if true, is a physical fact from which all others have resulted by a train of causes; it is generally considered to have occurred at a point in time, and it is at least possible that we may find scientific evidence of a beginning of things in time. Such evidence would not be a proof of the existence of God, but it would be a confirmation of the usual interpretation of the history of the universe as revealed in the Scriptures, the stronger as it may prove more difficult to discover any natural cause that

*E.g. "Principles of Natural Theology," by J. H. Joyce.

should bring about the state of events which characterised this beginning.

This argument amounts only to confirmation and cannot approach proof, because it involves the supposition that the fundamental scientific laws, as deduced by us from the conditions obtaining to-day, have applied through remote ages and under conditions of which we have no experimental knowledge. None the less it is a necessary part of science to assume, until the contrary is proved, that the absolutely fundamental laws such as the conservation of mass and energy, the laws of mechanics, etc., apply wherever there is matter and energy, in any state whatever.

Now there are certain apparently *irreversible* processes. Thus a machine wears out by friction and does not restore itself and if we were told that a certain machine had been at work from eternity we should not believe it, because it would have undergone an infinite amount of wear and so have been destroyed an infinite time ago. There is, of course, no wear of this kind in the universe, but there are, in fact, irreversible processes which have not completed themselves. No process that is taking place in this earth, or in any individual part of the universe, can be a witness to a general creation, for any part of the universe might have originated from another, as the earth is supposed to have been ejected from the sun; but if there were indications that all bodies whatever are undergoing the same irreversible process, then their state at the beginning could only be accounted for by supposing a creation, or by supposing that there is some wholly unknown source of that which they are dissipating. These arguments require to be handled with great care because they involve an exact knowledge of the observations and assumptions of the astronomer and the mathema-

tician. The reader may be referred to the writings of Professor Whittaker for a further discussion of them, and especially to his work "The Beginning and End of the World."* For the reasons alleged in Chapter IV, par. 1 no argument starting from scientific data and operating by mathematical reasoning can prove the existence of God, but these arguments can afford grounds from which the reasonable man may deduce as a judgment the operation of God in the universe.

4. ARGUMENTS FROM THE STATE OF THE WORLD AS IT IS

Modern man is apt to be depressed by the smallness of his abode. His earth in size bears a smaller ratio to investigated space than does a mote seen in a sunbeam to the whole solar system. What, he thinks, can I matter who am so small? How could it be that God, being so great, should pay attention to this dust? This is, of course, a mere piece of anthropomorphism, a thinking of God as being an extremely large and intelligent man existing in space and time, and capable of turning his attention to only one thing at once. There is not the slightest reason to suppose that man's physical dimensions are of the least importance in determining God's attitude to him. Nor need a possible though unproven plurality of inhabited worlds give us pause, for if God is free from the human limitations of sense, He can simultaneously be in touch with and aware of not only you and me and the Greek peasant and the Indian fakir and all the employees of the Southern Railway, but also with the intelligent animals on the planets of 61 Cygni and all the spiritual beings of the universe. The inability to attend to more than one thing at a time cannot be laid down as a universal property

*Riddell Memorial Lecture: Oxford University Press, 1942.

of intelligent beings, but it is quite as reasonably thought of as a human limitation. So be the universe never so large and never so thickly populated, we are right to think of God as paying the same attention to and taking the same care of us as he would if there were nothing else in the universe except the earth and a few luminaries designed to give light to man and decorate the heavens. To suppose that God is somehow divided between the parts of his creation is to suppose a limitation and to depart from our hypothesis of the existence of a God with the attributes assigned to Him by the Christian religion.

We shall expect to find, then, in this earth and in ourselves such properties that God might have been expected to give had his work of creation been concentrated only upon this terrene globe; and if we find these properties we may regard them as evidence of God's existence. But how are we to look for these properties? We have already seen that science excludes from its consideration the ideas of purpose and all those secondary qualities which proceed from the interaction of our senses and minds with the supposed external universe, and it must therefore be regarded, not as a study of nature, but of an abstraction from nature (p. 67). If we are to seek God in His handiwork, then we must seek Him in all that we can perceive concerning the whole of His handiwork to which we have access, and even this is likely to be but a poor shadow of a fragment of that *Whole*.

CHAPTER VI

NATURAL SCIENCE AND NATURAL WISDOM

I. SCIENCE AS A PART OF KNOWLEDGE

Thus far we have had the negative and thankless task of insisting upon the limitations of natural science and its inadequacy as a way of knowing all that is. But it would be a poor philosophy which rejected that towering structure of human care and ingenuity as useless to the man who wishes to understand; nor can any discussion of the relationship of religion and science claim attention which does not indicate the positive part which science must take in the philosophy of the whole man. The knowledge and understanding that man must seek is of the internal and external objects of perception of the spiritual and natural worlds. The former are not accessible to natural science: to our knowledge of the latter it can make a great contribution. But we have seen that science concerns itself with only a part of that we can perceive, and so the knowledge of the natural world that could be gained by the use of all our faculties that can bring us in relation with it greatly exceeds and transcends that which can be acquired by the use of the scientific method. We must set up the ideal of a *sapientia naturalis*, a wisdom concerning nature to which our present *scientia* or knowledge is a valid contribution.

The relation of parts of knowledge to the whole wisdom is put with much precision by St. Thomas Aquinas, who derives his idea from Aristotle's 'Nico-

machean Ethics'; and it is from this passage that the notion of a natural wisdom can be derived.

. . . they are to be called 'wise' who put things in their right order and control them well. Now, in all things to be controlled and put in order to an end, the measure of control and order must be taken from the end in view; and the proper end of everything is something good. Hence we see in the arts that art A governs and, as it were, lords it over art B, when the proper end of art B belongs to A. Thus the art of medicine lords it over the art of the apothecary, because health, the object of medicine, is the end of all drugs that the apothecary's art compounds. These arts that lord it over others are called '*master-building*' or '*masterful arts*,' and the master-builders who practise them arrogate to themselves the name of '*wise men*.' But because these persons deal with the ends-in-view of certain particular things, without attaining to the general end of all things, they are called *wise in this or that particular thing*; . . . while the name of 'wise' without qualification is reserved for him alone who deals with the last end of the universe which is also the first beginning of the order of the universe.³

To the Christian, God is the last end, i.e. purpose and first beginning, i.e. cause of the universe, and consequently all knowledge must conduce to and be subservient to the knowledge of God.

The Christian view of natural science, then, is that it is one of the lesser arts that contribute to the whole knowledge of the material world. Who possessed that whole knowledge could be called wise in the things of nature: this wisdom of nature would combine with a wisdom concerning the things of the spirit to make a wisdom, absolute and unqualified. The man of science then who wishes to make his expert knowledge contributory to an absolute wisdom must first complete it by making it a full knowledge of nature, not in all her details, but in all her aspects. It is very certain that the completest view of nature that we can reach is

immeasurably poorer than that which a higher being than a man could compass, yet if we are to attempt the task of seeking God in the universe which he is supposed to have created, we must attempt to view that universe more nearly as He does. We must not only seek to apprehend it by knowledge, but likewise we must love it, and strive with and in it to its end. And as in God, knowledge and love and will are made one in a single essence, so must we endeavour to apprehend the universe simultaneously in all these ways. To accomplish this is the way to wisdom, and the way to be followed by us in seeking the highest wisdom which is the knowledge of God.

The first step in this enormous quest is the examination of the various ways in which the external world may be perceived and interpreted. Our knowledge of that external world is entirely derived from our sense-perceptions: these we then select and order so as to reveal relationships which make it a part of ourselves.

2. MODES OF APPREHENDING THE WORLD

(i) *Mere perception.*

The simplest way of seeing the world is by mere sense-perception without any other than personal or practical significance being given to the thing seen.

But nature ne'er could find the way
Into the heart of Peter Bell.

In vain through every changeful year
Did nature lead him as before.
A primrose by a river's brim
A yellow primrose was to him,
And it was nothing more.⁴

Peter Bell is the extreme case, of which the very existence is doubtful. Simple folk are inarticulate

about nature, but there is scarcely anyone who will not walk into the country on a fine day and look at the woods and the passing clouds. The act speaks an affection, a relating of the mind to the whole living world. If there is one who is not glad to see the earliest primrose, him alone will I admit to be a Peter Bell: less than brutish would he be, for even the brutes rejoice in Spring, and 'with the heart of May, doth every beast keep holiday.'

(ii) *The scientific view. Integration by knowledge.*

The view of the scientist is a great advance on that of Peter Bell, because it is an *integration*. The material universe is a multiplicity, and the human brain can grasp only a single not over-complex notion at any moment: so if man is to grasp or understand the material universe he must first integrate it into a single idea or concept which he can hold in his mind. The scientist in so far as he seeks to *know*, and not merely to *do*, aims at this integration. He observes, records, measures, classifies, calculates; and what he studies is, of course, limited to that susceptible of record, measurement, classification, calculation. If he aims at a vision of the world, it is that of Pythagoras, to discover and grasp the *harmonia* of things—their ratio, order, law, interdependence; and in doing this he has attained one and a great part of the knowledge of natural things, apprehending them in spatial and temporal relation though divested of their aspects of purpose and human significance.

Looking at the world with the eye of science, what do we see? *Unity in diversity*. Forms and motions, birth, growth, death, change and decay, all the pageant of heaven and earth are resolved or in the process of being resolved by science into interactions of three different

kinds of particles and quanta of radiation. All the objects in this world of science are characterised by classes, numbers, measurements; and rules of high reliability tell us how these objects are numerically or spatially related to one another, and what changes in each of them a change in the others will bring about. The world described is that of extension and local motion, without colour, sound, light, warmth, love or joy; ultimately there are no objects in it at all, for every object you pursue, as you draw near to it, ceases to be a *thing*, as we understand it, and changes into a mathematical formula—useful, but not imaginable.

That is the cold, clear and pure form of legitimate scientific knowledge, but the scientific man, because he is a man, must make his pictures, importing into them the elements of colour, sense, emotion, that he formerly discarded. And what pictures they are! The majestic progress of the star from an ocean of cosmic dust through evolving flame and fury to its dark and mysterious end as a dead dwarf. The insurgence of life on earth from some unknown germ through ever more intricate organisation and co-ordination to man: the swarming invisible life in a drop of pond-water or a crumb of earth: the gigantic ordered complexity of a living animal—to see and know these with the eye of science and imagination is an experience as high as any that man has found by his unaided powers.

Such is the noble task of the scientist as knower, but the mere doer in science, so much extolled to-day, though he may benefit man by his work, has not, as doer, even the enlightenment of this vision. He is only a most skilful craftsman and as such has no goal of wisdom.

How can he get wisdom that holdeth the plough, and that glorieth in the goad, that driveth oxen and is occupied

in their labours, and whose talk is of bullocks? . . . All these trust to their hands and everyone is wise in his work. Without these cannot a city be inhabited. . . . They shall not be sought for in publick council nor sit high in the congregation.⁵

(iii) *Comprehension of the artist.*

The artist, using the word in the modern sense, has an entirely different but not less valid way of understanding and recording the external universe. His perception and record is in terms of an experience, common to all, that of beauty.

Compare, for example, a painting of flowers and a scientific description or figured dissection of a flower. Their object is entirely different. The artists' and scientists' comprehension of a peony are both integrations of certain aspects of those things concerning real peonies that are perceptible by man. They are both true and in no way contradictory; nor am I aware of any grounds on which the artist's view can be said to be less real than that of the scientist. It can be a less universal subject of agreement, because the scientist's method is to select only the aspects of reality concerning which all men are in agreement; but that which only the rarer or finer spirits can see is not less true than that which is apparent to all. Contrast the following. Here is Science :—

The pied wagtail is almost confined as a breeding species to the British Isles. It constitutes a good example of a species owing its origin to isolation. It is represented on the Continent by the white wagtail (*Motacillina alba*) of which it is a subspecies. Three other species occur in England, but the sub-family with several genera and many species ranges over the Old World, except Australia and Polynesia, whilst Asiatic species reach North-West America.

Wagtails are long-tailed, generally particoloured birds, frequenting streams and stagnant water, and feeding on

seeds, insects, worms, small molluscs and crustaceans. The nests are made of moss, grass and roots, with a lining of hair and feathers; four to six eggs are laid, bluish-white or brown with yellow marks.⁶

And here is Art:—

Little trotty wagtail he went in the rain,
And tittering, tottering sideways he ne'er got straight again,
He stooped to get a worm, and looked up to get a fly,
And then he flew away ere his feathers they were dry.

Little trotty wagtail, he waddled in the mud,
And left his little footmarks, trample where he would;
He waddled in the water-pudge, and waggle went his tail,
And chirrup up his wings to dry upon the garden rail.

Little trotty wagtail, you nimble all about,
And in the dimpling water-pudge you waddle in and out;
Your home is nigh at hand, and in the warm pig-stye,
So little Master Wagtail, I'll bid you a goodbye.⁷

The scientist, if he chooses to go further than his science, sees harmony or order in nature; while the artist sees grace and beauty, and all these qualities are attributes of God; but it does not follow that these qualities in nature are perceived by artist or scientist as having any origin from or connection with God. To see this connection requires a further step, which may be rational or may be intuitive, like all that leads to God, for the knowledge of Himself he denies neither to the philosopher nor the poet, nor the peasant-woman.

(iv) *The intuition of God in Nature.*

There is then a fourth view of nature which is essentially religious, though not essentially Christian. It may be arrived at by theological reasoning or by direct intuitive

perception, and its essence is the vision of the whole universe, down to the moss and the stone, as the consequence of God's will and as actively fulfilling his purpose. Some have the gift or grace of perceiving the relation of nature to God as directly and inescapably as the artist perceives beauty, while others not thus gifted may acquire the habit of rationally contemplating nature under this guise.

The first-named gift or sense is not so common, or at least so well-recognised as to come into everyone's cognizance, and, as it may be held to be the complement of natural science and the crown of natural wisdom, it may be well to seek unmistakable instances.

3. A FURTHER EXAMINATION OF THE INTUITION OF GOD IN NATURE

Before the separation of science and the acceptance of it as the sole valid way of apprehending nature, the vision of God in nature seems to have been the normal way of viewing the world, nor could it have been remarked as an exceptional experience. In such magnificent visions as those of the Book of Job or of the 104th Psalm,* the world is seen simply and naturally as flowing from its Creator,—whether by reason, faith, or intuition, we cannot tell.

The young lions roar after their prey, and seek their meat from God.

The sun ariseth, they gather themselves together, and lay them down in their dens.

Man goeth forth unto his work and to his labour until the evening.

O Lord, how manifold are thy works! in wisdom hast thou made them all: the earth is full of thy riches.

So is this great and wide sea, wherein are things creeping innumerable, both small and great beasts.

* A.V. here quoted : 103rd Psalm in Vulgate and Douay version.

There go the ships: there is that leviathan, whom thou hast made to play therein.

These wait all upon thee; that thou mayest give them their meat in due season.

That thou givest them they gather : thou openest thine hand, they are filled with good.

Thou hidest thy face, they are troubled: thou takest away their breath, they die, and return to their dust.

Thou sendest forth thy spirit, they are created: and thou renewest the face of the earth.

The glory of the Lord shall endure for ever: the Lord shall rejoice in his works.

Nor was this sense denied to the pagan and from its interpretation we may suppose all nature-worships to have arisen. Very early it was interpreted as evidence of the existence of a universal spirit in nature—an idea that goes at least back to the Pythagoreans; it is familiar in the *Timæus*; Aristotle regards the world as animated. The doctrine of emanations and the tenets of astrology both postulate a network of influences extending over all nature, and *via* the celestial bodies, envisaged as lofty intelligences, finally reaching back to God who is over all. To the neo-Platonists and neo-Pythagoreans this was a central doctrine, and few would have dissented from it during the middle ages. Without, of course, advocating any such views, it is clear that a direct vision of an animate personal interconnection of natural objects and phenomena may be arrived at by the unaided human faculty, though it may be interpreted in very different fashions and under very different symbols.

The experience seems first to be claimed as something remarkable at about the period when science began to separate itself, and the first example to be quoted may be that of the twin brothers Thomas and Henry Vaughan, the former the exponent of alchemy, magic and the Rosy Cross, the latter perhaps England's greatest religious

poet. Thomas Vaughan wrote numerous works on the subject of a universal light or spirit in nature. His works are very obscure, conceited and verbose, but he is quite clearly talking of something he has experienced. He is hard to quote, because so diffuse, but here are two passages :—

“I speak not in this place of the Divine Spirit, but I speak of a certain Art by which a particular Spirit may be united to the universall, and Nature by consequence may be strangely exalted and multiplied . . .”

“In the summer translate thyself to the Fields, where all are green with the Breath of God and fresh with the powers of Heaven. Learn to refer all Naturals to their Spirituals *per viam Secretioris Analogiae*, for this is the way the Magicians* went and found out Miracles. Many there are who bestow not their thoughts on God, till the World fails them. . . . Do thou think on Him first and he will speak to thy Thoughts at last.”⁸

The same spirit, less vividly but more beautifully manifest, shines through the poems of his brother Henry Vaughan the Silurist. Thus in “The Retreate”—

Happy those early days! when I
Shin'd in my Angell-infancy
Before I understood this place
Appointed for my second race,
Or taught my soul to fancy ought
But a white, Celestial thought,
When yet I had not walked above
A mile or two from my first love,
And looking back (at that short space,)
Could see a glimpse of his bright-face;
When on some *gilded Cloud*, or flowre
My gazing soul would dwell an houre
And in those weaker glories spy
Some shadows of eternity;⁹

*Magician at this date meant a practiser of natural magic, the use of nature's less obvious laws and relations.

Even more is it found in "The Morning Watch" and in "The Bird" quoted below.

So hills and valleys into singing break ;
And though poor stones have neither speech nor tongue
While active winds and streams both run and speak.
Yet stones are deep in admiration.
Thus Praise and Prayer here beneath the Sun
Make lesser movings when the Great are done.¹⁰

I pass unwillingly over much of the work of Thomas Traherne, in whose work is the same sense of the wonder and transparency of Nature, and its kinship to his own soul.

'Tis Art that hath the late invention found
Of Shutting up in little Room
Ones Endless Expectations : Men
Have in a narrow Penn
Confin'd themselves : Free souls can know no Bound
But still presume
That Treasures everywhere
From Everlasting Hills must still appear
And be to them
Joys in the New *Jerusalem*.

We first by Nature all things boundless see ;
Feel all illimited : and know
No terms or Periods : But go on
Throughout the endless Throne
Of God to view His wide Eternity ;
Ev'n here below
His Omnipresence we
Do pry into, *that* copious Treasury
Though men have taught
To limit and to bound our thought."¹¹

In the next century comes Christopher Smart. I will not quote the "Song of David," save the lines—

At once, above, beneath, around,
All Nature, without voice or sound,
Replied, O LORD, THOU ART.

I would rather quote one line from his extraordinary work "Rejoice in the Lamb"¹² wherein he says of his cat Jeoffry—

For the divine spirit comes about his body to sustain it in compleat cat.

In the work of John Clare, who lived in the nineteenth century but belonged to an earlier age, we find the same sense of the presence of a super-human life in nature.

THE PEASANT POET.

He loved the brook's soft sound,
 The swallow swimming by.
 He loved the daisy-covered ground,
 The cloud-bedappled sky.
 To him the dismal storm appeared
 The very voice of God ;
 And when the evening rack was reared
 Stood Moses with his rod.
 And everything his eyes surveyed,
 The insects in the brake,
 Were creatures God Almighty made,
 He loved them for His sake—
 A silent man in life's affairs,
 A thinker from a boy,
 A peasant in his daily cares,
 A poet in his joy.¹³

Examples could no doubt be cited from Goethe and the Natur-philosophie, but I pass on to the most concise expression of this vision, which is to be found in the poems of William Blake, who seems to have contemplated nature under no other than a spiritual aspect. We shall remember,

To see a World in a Grain of Sand,
 And a Heaven in a Wild Flower,
 Hold Infinity in the palm of your hand
 And Eternity in an hour.¹⁴

The same such experience seems to be narrated in a letter to Thomas Butts.

Now I a fourfold vision see
And a fourfold vision is given to me.
'Tis fourfold in my supreme delight
And threefold in soft Beulah's night,
And twofold always. May God us keep
From single vision and Newton's sleep.¹⁴

Of this more hereafter, but note that the fourfold vision combining the four modes of seeing the universe is *supreme delight* and is *given* to him, i.e. is a mystical experience, not attainable at will.

To return to the better known, a classic case is that of Wordsworth, one passage of whose work ("Tintern Abbey") may here be cited.

. . . That serene and blessed mood,
In which the affections gently lead us on,—
Until, the breath of this corporeal flame
And even the motion of our human blood
Almost suspended, we are laid asleep
In body, and become a living soul :
While with an eye made quiet by the power
Of harmony, and the deep power of joy,
We see into the life of things . . .¹⁵

. . . And I have felt
A presence that disturbs me with the joy
Of elevated thoughts ; a sense sublime
Of something far more deeply interfused,
Whose dwelling is the light of setting suns,
And the round ocean and the living air,
And the blue sky, and in the mind of man :
A motion and a spirit that impels
All thinking things, all objects of all thought
And rolls through all things. . .¹⁵

To come yet nearer to the present time, Richard Jefferies in 1883 is a remarkable case, because, while the problem of evil made him an atheist, yet in experiencing this sight of nature's privities he had to confess a "super-deity."

I felt the presence of the immense powers of the universe ; I felt out into the depths of the ether. So intensely conscious of the sun, the sky, the limitless space, I felt too in the midst of eternity then, in the midst of the supernatural among the immortal, and the greatness of the material realised the spirit. By these I saw my soul : by these I knew the supernatural to be more intensely real than the sun.¹⁶

These experiences are evidently not susceptible of exact description ; the terms in which they appear must depend on the symbolism felt appropriate by the writer, and this must vary extremely. Indeed, I might have given little attention to these passages had I not for a few brief minutes realised something of the same kind.

Two years ago, in a clear, sunny, autumn morning, I had walked into the gardens of St. John's College, Oxford ; the dahlias were still in bloom and the Michaelmas daisies were covered with great butterflies—tortoise-shells, fritillaries and red admirals. Suddenly I saw the whole scene take on a new figure. Every plant assumed a different and *intelligible* pattern, an individuality with a meaning that was the plant itself, which, by existing in that pattern, was turned towards God and praising him. So with the butterflies ; they were not merely lowly organisms, but intensely alive, clad in the livery of God, and in a fashion more personal than the plants were praising Him too. The world was a prayer and I, fallen man, was the only being whose prayer was weak and broken. For there was nothing in my heart but love and tears and the avowal "Lord, I am not worthy." Then I knew what was meant

by "O ye works of the Lord, bless ye the Lord: praise him and magnify Him for ever," for I saw that praise. So I understood what Blake meant by,

How do you know but ev'ry Bird that cuts the airy way
Is an immense world of delight clos'd by your senses five?"

And I saw what was meant by his saying: "If the doors of perception were cleansed everything would appear to man as it is, infinite."

At the same time everything revealed itself as interconnected. There was no visible link, yet round each centre of life there was an influence, as if each living thing were a centre in a spiritual medium. The vision faded after about half-an-hour, and though it has never fully returned, yet when my mind is recollected and my heart at rest, I can see the world of living things differently, and as partaking of that hidden life. Then I know that the scientific description of nature is as jejune as the chemical analysis of the painting of an old master. And, if the power of seeing nature thus is, as one may suppose, nothing to do with the power to write of it, how many millions must have lived and died in its consolation, unknown to the world? We have no right to dismiss this faculty as a rare one. It may be expressed by few, known by many, innate in all.

It is unwise to theorise about the causes, internal and external, of this phenomenon, and it is best simply to accept it as a thing universally acclaimed as good. Blake regarded his experience as a vision of reality, a penetrating of the illusion of the five senses: revealing that everything that lives is holy. Others, as Wordsworth or Jefferies, have gained from it a powerful if obscure impression of a higher life than ours, subsisting in or, as it were, behind nature; but what that life is they cannot say.

These conceptions are strange to us, who have decided in accordance with an atheistic biology that mind is never found apart from brain ; but those who hold the belief in God as First Cause cannot dissent from the view that He is immanent in all that he preserves and sustains as well as being transcendent, outside and beyond them. If then we regard the whole material universe as not only created but continually conserved by God, and all natural causes as the last links of a chain originating from Him, God is therefore by unknown intermediaries the animating power of nature. This being so, it is clear that in some way the Divine Intelligence does perfuse and inform and operate in nature, and there is no objection to a tentative and unproven belief that in some measure the Divine Intelligence in nature becomes perceptible to those who receive the required grace, or whose natural faculties are developed to receive it. This view must be quite clearly distinguished from pantheism. No Christian identifies the universe with God but regards Him as the Creator, preserver, sustainer and activator of it.

From this view we may draw a valuable converse. If we accept the Christian view of nature as involving God's immanence as well as his transcendence, and if, in fact, some of us can directly perceive an animate interconnection in nature, of such a kind that we cannot speak of it save as divine, this perception is at least a strong confirmation of the former view.

Let us now consider what value is to be attached to this mode of vision, and whether we may think of it as a fourth mode of knowing the external world. Nature seen under this guise appears to him who sees as of an intense and naked reality : so that, if either of the two is to be thought illusory, it is the common perception of the world that must be thought so. The vision gives

intense joy, so much so that to live a year in that state one would give twenty ordinary years: it appears to reveal something about nature that cannot be perceived otherwise. Is not this as valid a mode of perception as the scientific or artistic?

4. THE FOURFOLD VIEW OF THE UNIVERSE

To sum up, man can achieve four modes of apprehension of nature, of which the scientific is but one. First is a mere perception of her surface; diversity without unity. From these man rises through successive stages of integration, first, to the perception of the beautiful in nature and its integration in art: next to the apprehension of the order of nature through science and philosophy, and the discovery therein of harmony: and lastly the apprehension of the world as made one in its orientation to God.

Now we can see what Blake meant by

. . . God us keep
From single vision and Newton's sleep.¹⁸

For Blake, Newton is the symbol of the mechanical philosophy in which everything is to be explained as *necessarily* occurring as the result of forces operating upon dead matter. Newton, it is true, believed in God and in the soul, but this belief took only a nominal or at least ineffective part in the world-view that constitutes the philosophy called Newtonian. He conceived his absolute time and space as being constituted by God, all-pervading and eternal: yet if the idea of God be taken away, the Newtonian philosophy still remains; for the idea of God is not necessary to it and did not survive in it. It is, as Blake says, a *single* vision. Sense is excluded, for the perceptions of man are not regarded

as giving a true picture of what they portray. There is in it no artistic or spiritual vision of the universe: but simply the intellectual presentation of science. Newton—by the word we must understand not the man but the type of which to Blake he is the symbol—is asleep, because the avenues of spiritual and artistic perception are closed and that which he sees is but a dream.

To-day the creed of a great part of educated humanity is the mechanical philosophy. They see all events, all perceptions, light, colour, music—even thought itself as being the direct result of the local motions and physical forces associated with non-living atoms and molecules. Beauty is seen, but is excluded from that world, left out of the philosophy of to-day, while the spiritual vision of nature is not even sought.

Science presents itself to the majority as the sole way of looking at the world, and we try to make our other functions a part of it. We turn *beauty* into a sense of adaptation to function,—i.e. similitude to the intellectually apprehended perfect machine. We try to consider love as an intellectually apprehended biochemistry of hormones and nerve-impulses: while the mystical vision of nature is excluded, not only by the refusal to consider the existence of God, but also by the refusal to look teleologically upon nature.

So we obtain a mechanical philosophy capable of doing mechanical good to us. It is satisfying, delightful to our intellects—and we forget our other faculties. But suppose we had that fourfold vision; suppose that in apprehending a tree we perceived it, first in the sensuous appreciation of colour, the smell of lime-blossom, cool caress of leaves and delicate sculpture of branches: then, advancing, we saw and loved it in the beauty of such trees as artists paint—a tree apprehended

as one single beauty. But then, not content therewith, suppose we knew it in its ordered mechanism of cells and channels, of rising sap, of complex means of snaring light and air and water, transmuting them to sugar, starch and fibre and the millions of geometrically ordered and different molecules that make a tree,—finally comprehending the harmony of it, its rhythm in time, and the symmetry of its myriad relations of space. Then lastly, if we could attain to that which the pen cannot write, and saw the very substantial form and idea of the tree, being the very life of the tree, linked to every life and one in the great Life that is the source of all that lives—if we could hold that fourfold vision in our senses, and love, and intellect, and spirit,—were not that a science worthy of the name of wisdom?

You will say that is impossible—and it is, as is everything else that is worth doing. Who can paint a picture, write a poem, love a woman, as it should be done? But an ideal of beauty or love, by which we judge our demerits, is an attracting orb to draw us up into love and beauty. So, had we an idea of Natural Wisdom, unattainable by man in his earthly life, save perhaps for a moment, as he trembles in the sweet pain of vision, we should be drawn from our absorption in the partial knowledge of natural science to the attempt to know the whole as it truly is, which, though it were a noble failure, would far exceed our present tame success.

5. THE AMENDMENT OF SCIENCE

Can we now suggest a practical amendment of our modern science that gives so partial and unsatisfactory a view of the universe? I would suggest that what is required is not any change in natural science itself, which operates in its own sphere with great perfection,

but rather the supplementing of it in such a manner as to aim at a fourfold vision of external nature. We cannot all be scientists, artists, nature-mystics, but we can all use our faculties in these directions. We can all know something of the external and internal mechanism of nature, we can all pause to join ourselves to pure beauty and reject its contrary. We can all regard nature not as a machine operated by necessity, but as upheld, infused, informed by God: and so we may grow to a comprehension of the spiritual view, even though no direct mystical perception of it may come our way. We can attempt to realise in ourselves the ideal of natural wisdom, and to combat those who set up science as an image of it. We cannot attain, still less abide in, the perfect fourfold vision, but we need not remain in its extreme contrary, single vision.

Science is generally analytic, regarding an object as an assemblage of parts: co-operative no doubt, but still parts: and this is a mere abstraction from the true object. A tree is very much more than a concatenation of molecules, more than a parcel of leaves, roots and branches: it must be looked at integrally as a tree in total action to an end, and loved as a fellow creature possessing in common with us life and beauty that makes us one. And if a tree, how much more a mind? The psychology that dissects a mind into items in interaction is far more at fault.

The Infant Joy is beautiful, but its anatomy
Horrible, ghast and deadly!¹⁹

To have natural wisdom and not merely natural knowledge, we need to contemplate the things we study, in themselves, in relation to us, to the external world, and to God. So only shall we see how great a

world and how worthy of our faculties is that in which we are set.

The outcome of the fourfold vision.

What, then, can be seen in nature by this fourfold vision? Unity, design, purpose, beauty, grace, harmony, life, goodness . . . and, in fact, God. But if it is asked how these are to be seen, then all that can be said is that, if it were expressible in words, it would have been expressed long ago. No one can do your seeing for you, but the process of seeing nature truly will begin as soon as you start to think of her, yourself, and all mankind as a unity, to regard the all as the one, to think synthetically instead of analytically,—an easy beginning. When you begin to think of and to contemplate the things of nature thus, there will appear in them beauty, and the love of them, and of that which will seem to you to be the cause of that beauty. And in loving that beauty you will be aware of a universal love, which in its gift of being and life and beauty, is demonstrated as goodness. And in seeing the goodness of all things, at once there becomes apparent the design wherein all things work together for good, and the wonder and depth of that design reveals the whole course of nature with its generation and corruption, its glory and its pain, as one process or act, not prolonged as in time, but complete—a perfect crystal in timelessness, an act of God, of which you are part. “For we shall say much and yet shall want words: but the sum of our words is, He is all.”

The master-art.

But even this master-art, to know the outer world, is not the end, or the final purpose of man. The outer world, rightly known, shows us an aspect of the glory

of God: which, if apprehended, might take us to the further end of seeking to apprehend God himself, as far as it appertains to a creature in this life to do so. And here the external world is left; for, although God's attributes may be ascertained by reason and revelation and the knowledge of His works, He is apprehended only in the innermost or highest part of the soul, where without images or words or any symbol, He is known darkly and obscurely by those to whom He may choose to impart such knowledge.

To quote Blake for the last time—

Nature is a Vision of the Science of Elohim.²⁰

This once understood, we know that the attainment of the vision of God, face to face hereafter or obscurely here, will display the whole of terrestrial science as a part or implication of that ineffable experience.

*Qui scientem cuncta sciunt, quid nescire nequeunt?*²¹

Who know the Knower of all things
What can they choose but Know?²²

And, once aware that this is so, we comprehend the folly of those who seek to draw strength and guidance for their lives from the results of that analysis of a few of the simpler modes of the external behaviour of matter and the lower forms of life, which is the sum-total of our Natural Science.

CONCLUSION

The intention of this book has been to show that the materialistic creed and the apparent conflicts between science and religion have arisen from a misapprehension of the functions and methods of those two activities; that science, or judgments founded upon it, can in fact support the beliefs of religion, and that science, art and religion can be altered and fused into one wisdom ranging from the darkness of matter to the light of God. Nothing is more necessary to the present age than this alliance, for the world is threatened by the power of man, and that power is the product of science. Scientists do not control that power, because the most part of them care nothing for power and little for man's good, living for the advancement of their department of knowledge. None the less they are the authors of that power, they can increase, divert, abolish it, if only they add will to their intellect. That power is rapidly to increase; its present benefits and injuries are obvious enough; so what of the future? Man is entering on a period of biological discovery and control, soon to equal and surpass his mechanical invention. He may well soon know how to modify plants and animals profoundly, how to control and regularise human births, and not improbably in the course of some fifty years efficiently to modify himself and others through psychological operations, control of endocrine glands, and possibly even by manipulating the chromosomes that are the medium of human heredity. We may guess what we will, but we know with the greatest certainty that unless man is crippled by war, the world in 1990 will differ

far more from the present world than that differs from the world of 1890: and that every access of power requires an access of responsibility, judgment, guidance, choice.

Science itself can give none of these things: it cannot tell man what he wants or needs. The Cæsars, entrusted with absolute power, grew to prodigies of lust and cruelty: mankind is beginning to enter on this most fearful trial, the test of wealth and power, and it has not begun well. Man cannot avoid ever more horrible perversions and maltreatment, more degrading and unescapable slavery to tyrants, unless he has in him an absolute purpose in life, not changing from generation to generation, but in its active manifestation wholly fixed on the good of others. And this good must not be what Man fancies or believes to be his neighbour's good, but a perfect, fixed and definable good. Such a good can only be found in God.

Let the man of science be a Christian philosopher: let him discard the shallow mechanistic view of himself and the world and try to see that world whole, living, lovely and loving. Let him learn what is his purpose, and then, fortified against any tyrant (for those that despise the world may laugh at such), turn to his science, and use it for that purpose. Let him refuse to have it prostituted to luxury, fraud, cruelty: let the profession organise itself and adopt an ethic higher even than that of the physician. Let it cast out the man who sells its power to the pimps of the rich and the war-makers' assassins. Let the natural philosopher lead the world as of old, instead of dragging it into the mire as have the materialist philosophers of the last two centuries.

But those who lead must know their goal and the way to it. There is only one guiding-star, that which came and stood over the house at Bethlehem. Thither

THE FOURFOLD VISION

go the wise men and enter in and find the Child with Mary His mother: falling down they adore Him, and, opening their treasures, offer Him gifts: gold, frankincense, and myrrh.

THE END

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