

THE SUBSTITUTION OF SCIENCE FOR RELIGION

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THE first step towards the investigation of the extent to which science has in fact taken and may continue to take the place of religion is to decide the sense in which we are to understand the word science. First, we are to discuss not *scientia* but 'natural science', and this is not a sharply definable conception. Natural science is the knowledge and theories that are obtained by the scientific method. The scientific method starts from observations, verifiable by repetition or, where repetition is not possible, by the making of similar observations. These observations lead by the method of induction to statements about classes of observations, which statements we dignify with the name of laws. These laws may be used as material for the deduction of other laws which are only accepted if verified by their prediction of what experiment confirms.

The observations of science are never wholly accurate (except when they are enumerations), but their degree of error is usually known and so we can arrive at comparatively reliable statements about what has been observed. The inductions made from these observations are of a degree of reliability dependent on the number of observations used and the accuracy with which these are expressed by the generalisation. Some scientific laws, then, make statements which are very unlikely to be appreciably modified, while others are considerably less certain.

The scientific laws are not a disconnected set of rules; they are unified by the theories or suppositions concerning the nature of what science studies. Thus the atomic theory links together hundreds or thousands of laws in physics and chemistry, explains them, and suggests new lines of investigation. These theories are the more likely in proportion as they link together a wider range of laws (and so of observations) and as they are fruitful in leading to new knowledge. Some theories, such as the atomic theory, are practically accepted as fact; others, such as Wegener's theory of floating continents, as fruitful conjectures.

Finally on the fringe of science, so to speak, are conjectures which, though unsupported by evidence, suggest how something

might occur or might have occurred. The conjectures on the formation of the solar system, or on the origin of the universe from a single vast quantum, or by the continuous creation of atoms, are of this type.

We must then recognise that the scientific account of the world has a central core, so to speak, of great probability amounting almost to certainty, and that around this, as we approach the frontiers of science, there is an area of likely but tentative accounts and explanations. Finally beyond the area of experimental investigation there is a number of conjectures founded on extrapolations and analogies: acknowledged by the scientist as mere conjecture, as a means of bringing the (as yet) uninvestigated into his world-view. In this far-reaching power of conjecture resides the possibility of taking natural science as the foundation of a man's world-outlook.

Why should a man adopt science as the foundation of his world-outlook? Because, I think, science has certain remarkable properties that are found in other types of knowledge in a smaller degree. Firstly it is reliable: when it ventures a prediction, the predicted usually happens. It is possible, indeed necessary, to found practical concerns such as engineering, weather forecasting or medical treatment upon science, and the value of the method is proved by the results. Secondly it is constructive: for it has not merely explained the world about us, but it has in some sense made that world; and those who live in it and think with it are creatures of science. Thirdly it is cumulative, something that is being made greater and more fascinating and useful by the efforts, however petty, of every scientist: it is for mankind, not merely for the individual. Lastly it is pacific—not in the sense of tending to abolish warfare, but in the sense of composing differences. Nothing is more constant in philosophy than the warring schools of thought, nothing rarer in science where the test of truth is the *event*. Is it surprising then that men have tried to extend the scope of so remarkable a type of mental operation?

Extending the scope of science means the attempt to apply scientific method where the scientific data of verifiable and universally accepted observations are inadequate or lacking, while neglecting the evidence that exists but is not of the scientific type and refusing to make any assumptions that cannot be expressed in scientific terms.

That science has been *partly* substituted for religion by a majority of Europeans and Americans, and wholly by some, is not open to doubt. Let us turn back to the thirteenth century, the time of Christian philosophy. The status of experience as the foundation of our knowledge and practice was clearly enough recognised, and so was that of revelation. There were two sources of truth, our reason exercised on the data of sense and our reason exercised upon the content of Holy Scripture, guaranteed through faith. Revelation thus provided a framework, which was in part confirmed by philosophy, in its widest sense, and in part accepted by it.

Thus the existence of God, the reality of matter, the existence of spiritual beings and a spiritual part of man, followed from the scriptures and were supported by philosophy. Thus, for example, religion provided the framework of a psychology and ruled out any materialistic or determinist theories thereof. Furthermore, some questions more obviously appropriate to natural science were answered. The world had a beginning in time and was to be consumed in the not very distant future. The first two chapters of Genesis were accepted in the simple factual sense, as were the cosmological views implied, though not taught, by scripture, such as that of the stability of the earth. Moreover some notions, such as that of a local heaven, as implied by the doctrine of the resurrection of the body, fitted admirably with the scientific scheme of nine or ten concentric 'heavens', the outermost of which was the habitation of God and the saints.

Furthermore, this foundation of natural science upon religion led to a religious interest in its subject. Thus the question that exercised men concerning natural phenomena was not generally their analysis into simple definable elements, which together led to a mechanical explanation, but an enquiry into the purpose that they fulfilled. The whole universe was held to have been created by God to subserve the earth which in turn, with its creatures, served man, who was to serve God and accomplish his own salvation and fill up the company of heaven.

The first serious difficulty came with the development of astronomy. Broadly speaking, the spatial insignificance of the earth has been demonstrated further with each advance. The earth is the stage of the world-drama as portrayed by religion, but is an insignificant and unremarkable speck in the irrefutable world-picture of science. The man of today, therefore, sees the religious

account of the world as primitive and ill-informed, and he substitutes for it what science can tell him. The same is true of the biblical account of creation: the man of today has adopted evolutionary theory as his account of the way in which the world we know came into being, and he considers the biblical account of creation, which omits all mention of this vast and wonderful process and of the forerunners of man, to be a primitive myth not to be distinguished from the many others known to the anthropologist. If the scriptures are misleading in matters such as these, which he feels to be the most important matters of cosmology—where, he thinks, are they to be trusted?

It is not surprising then that many attempt to make science their guide, and that those who attempt and fail are inclined to a complete scepticism on all matters concerning which science gives no answer. For the attempt does fail.

In the first place science cannot lead to metaphysics. Science is entirely derived from observations: it is in fact the building of groups or patterns of observations, but it cannot tell us whether these observations represent anything beyond themselves. All scientific men assume that they do—that there is 'real' sulphur which we observe—but they make this metaphysical assumption on no reasoned grounds. But they do make it, and so they should ask whether this supposedly real thing is wholly represented by their observations—and surely they cannot claim that it is or can be fully known by the five human senses aided by instruments. It must seem then that science can very inadequately represent the real world and that there may be an infinity of properties of things forever hidden from it. This is of no consequence to science, but it is a demonstration of the fact that science, however fully and deeply pursued, is not to be rated as the final account of an objectively existent world.

Furthermore science is very far from complete. The scientist's habit of mind is to proceed from the newly-known to that which can be directly inferred from it: he stands at the edge of the known, building his science into the unknown. He does not, as scientist, speculate about the matters of which he is totally ignorant and he is apt to forget that they exist. A well-known surgeon told me that he once set the examination question 'What don't we know of the kidney?'—but, he said, it was far too hard. So in fact science has not answered the greater part of the scientific questions which

man from the beginning has asked. I suggest to you that the questions concerning the universe which philosophic man has always desired and still desires to have answered are as follows:—

- (1) What can be said of the origin and ultimate end of the universe?
- (2) Is the universe a system wholly determined by impersonal and inexorable law?
- (3) Can the universe be fully described in terms of mass, length and time?
- (4) What is the relationship of human mental operations to the inorganic world in which they are apparently rooted?

To none of these in fact can science give a plain answer though it provides in every case considerations that have greatly influenced men in their outlook on these matters.

First as to the origin and last end of all things. Here science provides conflicting data. All our observations confirm the conservation of mass and energy, according to which nothing is wholly lost and nothing comes to nothing. It therefore argues an infinite past and future. On the other hand the equally well-confirmed second law of thermodynamics indicates a progressive and, in the long view, irreversible degradation of energy to a dead level; since that process is not completed, a beginning must be postulated, an idea confirmed by astronomical data which point to a time-scale of the order of a thousand million to ten thousand years. Escape from this dilemma is only by an *ad hoc* assumption that one of these laws is not universally true.

Yet again there are those who argue that we have no reason to suppose that our scientific laws checked over a period of the order of a century are so accurate that they can be extrapolated to indicate what happened ten thousand million years ago: furthermore we do not know of any absolute standard of time, and Milne and his followers have well shown that a consistent theory capable of explaining physical facts can be constructed on the basis of two time-scales, one constant and applicable to statistical clocks, one accelerating and appropriate to atomic clocks. The truth is that the scientific evidence as to the origin of the world is scanty and conflicting and we should do very ill to base on it any philosophical ideas that might in any way influence our present conduct.

Yet we must not suppose that science has told us nothing of

importance. The evidence for the existence of this planet for a period of some thousands of millions of years is strong and contrasts with the life of six thousand years generally supposed a couple of centuries ago. But it does not give us the faintest idea of how the universe came to exist and still continues. Of the future again science gives some stronger indications: we may not know much of the laws that governed the youth of the world when energy was but little degraded, but it seems that the old age of each individual body must be destruction or a static 'heat-death', a future of little change without an end: yet here again we must confess our experience to have been too short and not accurately enough known to enable us to predict what will happen a thousand million years, let alone ten thousand million years hence.

We see indeed that the religious doctrine of a creation by God *ex nihilo* is untouched by science which can neither affirm nor deny such a view. Indeed we may think that *Fiat lux* may well be read as the creation of a flash of radiation of such frequency and energy as by its degradation gave rise to all the matter and energy of the universe still expanding outward from that beginning; or perhaps the continuous creation of atoms supposed by F. Hoyle.

Let us turn to our second question: Is the universe a system fully determined by impersonal and inexorable laws? What science can adduce as evidence is that, where it has been able to check the facts, it finds that constancy of behaviour that we express by the formulation of those generalisations that we call laws. There are, on the other hand, regions of our experience which cannot be so checked. Thus the indeterminacy principle expressed the fact that the position and motion of the smallest particles cannot simultaneously be measured with the accuracy that would allow us to assert them to be determined by such laws. Again in the very region where our observation of our behaviour leads us to assert the making of choices, namely in our own actions, we find it impossible to formulate laws against which this supposed determinism could be checked. Once more science gives no certain answer. Very large classes of phenomena seem to be determined: are we to extrapolate this to all phenomena? As a hypothesis we may do so: but only as a hypothesis too ill-supported to be applied to any practical considerations. Those who fix their eyes upon the mechanical processes of physics find it very hard to think of a process not determined: while those who are concerned with

ethics find it very hard to suppose that living and conscious beings are determined.

The third question—Can the universe be described in terms of mass, length and time?—has already been touched upon. Is psychology expressible in terms of physiology, physiology in terms of chemistry, chemistry in terms of physics, all of whose concepts are expressible in the dimensions of mass, length and time? I think we may say that the majority of men of science have adopted this hypothesis. Yet until we have an account of the structure or dynamics of living matter in terms of the entities known to chemistry and physics we have not the evidence that could convert this hypothesis into a reasonably attractive theory. The scientist tells himself, 'I know of nothing else that could operate': the philosopher may well reply, 'I know of nothing in chemistry or physics that could give rise to consciousness'.

The same questions arise more powerfully in the transition from physiology to psychology. Can an abstract idea, such as goodness, arise from a system of nerve-fibres? Once more we may adopt hypotheses as to the manner in which this could occur, but science gives no real evidence to support them.

Our final question—What is the relation of human mental operations to the inorganic world in which they are apparently rooted?—is a development of what we have already considered and is of the utmost importance for the department of philosophy we call moral philosophy. On the one hand science knows of nothing except the entities of the inorganic world as the ultimate analysis of man: on the other hand, it can give no account of his higher behaviour in such terms nor can it predict his actions, except by previous observations of these actions—and then only with uncertainty. The 'psychic' hypothesis of some being, not expressible in terms of mass, length and time, but free, conscious and separable from matter, is an assertion of the existence of a being which science could not know or discuss except in so far as there were modifications of normal scientific laws which could not be otherwise accounted for. If man in mental activity can transcend mass, space and time, that could be taken as evidence of an element in him that transcended them. If telepathy is independent of distance, prophecy of time, and psycho-kinesis of mass—then we can scarcely expect them to arise from what is expressible in those terms. In this respect I would remind you of

Prof. J. B. Rhine's work in the U.S.A. as a truly scientific attempt to investigate these phenomena. His experiments are based on the prediction of the order of a pack of cards, marked with five different symbols and mechanically shuffled. The subject predicts each card before it is exposed and it will be obvious to you that the results of his or her predictions can be compared with the mathematically assessed probability. In fact subjects are found to vary: the whole run is almost always significantly above the expectation. Where the subject is keen and interested his successes are correspondingly greater. Rhine has organised another series in which the attempt is made to influence mentally the fall of mechanically thrown dice—again with positive results.

We have no idea of the way in which these results came about, so it is not surprising that success is fitful. Indeed we cannot infer from them in any compelling way the existence of a 'psyche' but we must be brought to suppose an influence in the human thinking subject extending beyond itself controlling and perceiving external matter in a way analogous to that in which, on the psychic theory, the psyche controls the functioning of the brain. This notion of the mind as a controller is of the first importance. Do we guide or are we moved?

Science cannot in fact answer this question, but the practical answer is surely that the world is organised on the basis that human beings do in fact make choices, and that the problem 'What am I to do?' is a real one. Even the writers who have attempted the final substitution of science for religion by proposing a scientific system of ethics, do in fact propose to us a way of behaviour which we can adopt or reject. These systems have not, in fact, made much impression on the Western World, but they are worth discussing. Thus the systems proposed by Waddington and Bernal are in essence based on the view of the human race as having evolved from the mindless and risen through small primitive associations, with narrow and unreliable views of the world, to complex associations with more extensive, satisfactory and reliable relations with their environment. This change, they would say, indicates the direction man should pursue. This system depends on science in so far as science reveals the course of evolution of man and his societies and in so far as the increase of science is taken to be the characteristic of the present changes in man's society. Yet these systems involve many difficulties. In the first

place they involve knowledge of the evolution of man and primitive societies which we do not possess. We have found a number of skulls and bones: and we piece them together to make the best story we can, but we really know almost nothing about the circumstances of the origin of *homo sapiens* and even less about his history for the thousands of years between his emergence and the beginning of civilisation. When we reach our own time we have to judge what we are to do in order to co-operate in man's progress—and we don't know where he is going. Is the increase of science a part of this progress? Is the decrease of religion part of it? Really these systems of so-called scientific ethics come to little more than the advice to co-operate in what our section of society is doing at the moment.

In fact, of course, science is entirely in the indicative and knows no imperative. It has no bearing on morality except to provide information concerning the probable causes of our desires and the consequences of our actions. There is a wide-spread illusion that psychology is able to provide a morality. Psychology is a science. It can talk about causes and effects in our mental life and behaviour, but it cannot tell us how we ought to behave, unless we decide on the kind of life we want. Thus it could give us advice as to how to attain mental health or a happy family, but it cannot tell us in an absolute way what we are to live for.

Returning, then, to the point of view of the man who has tried to make science do what religion and philosophy did for his remote ancestors, we find that he has a far more accurate and definite picture of the sort of world he lives in today, but lacks any answer to the great ultimate questions that men wish to know, or any 'real' knowledge or clear belief as to his origin and that of the world, of his purpose or of his nature. He finds no adequate principle of conduct and falls into that *Praktizismus* of which our recent allies accuse the Germans—getting on with the job in hand without due attention to ideologies; like Candide cultivating his garden.

What can the Church do for such people? It can give them all that it gives to us and has given to the saints, understanding of man's nature and destiny, a purpose, the power to fulfil it and attain eternal blessedness: but it does not make it easy for them to enter. They must necessarily make an enormous readjustment of their ideas. They must accept the idea of spiritual beings, must

come to regard the inner life of man as the workings of such a being, must learn to set spiritual values above physical, to believe that the spiritual being has primacy over the physical and can bring about changes therein, to believe in God and the efficacy of prayer, and, indeed, to accept a whole apparatus of thought, doctrine, and practice, today extremely foreign to them. This is unavoidable and only God's grace enables it to be done.

But Catholics as well as non-Catholics should realise that the Church has lightened certain other burdens. The man of today believes in evolution as the key to the understanding of the past. He can easily credit a single act of creation resulting in something in which was contained the potency of every being, but he thinks the notion of successive acts of creation as apparently indicated in Genesis to be an archaic survival. We are not called upon to accept the literal view, nor to suppose that Genesis, in the mind of the Church, inculcates any particular cosmogony or 'scientific' truths. We are to believe in the separate creation of man and of woman, and of the human soul by God, as being revealed truths, but we may suppose much of the account of the way the world came into being to be metaphorical and symbolic. It is even possible to hold that there may have been several heads of the human race and to interpret 'Adam' and 'Eve' as general terms. Such a scheme does not conflict with science, though it could not have emerged from the data of science alone. Those views are certainly tenable, but unfortunately they are not openly adopted by those who preach and teach. The whole idea of Evolution is, indeed, treated with disfavour by some Catholics, and the Catholic population as a whole is certainly in doubt concerning what is to be believed on these matters. We badly need a new commentary on Genesis, and a frank approach to the question of Evolution, an acknowledgement that it is the most probable, though not proven, account of the origin of living organisms, and a clear statement of its relation to the Catholic faith.

I believe that this would remove some obstacles that hinder twentieth-century men from entering the Catholic Church, and I do not think it need lead to the process of minimising which has proved so destructive to Christian doctrine in some other churches. Its effect, I would hope, would be to allow the scientific world-view to be more fully taken up into the Catholic. Such an attitude would also make science a much more attractive pursuit for

Catholics, and lead to a much-needed increase in the number of Catholic scientists.

These are today lamentably few and regrettably inarticulate. I am sure that one of the best arguments for the faith that can be presented to the perplexed believer in science is a good scientist who holds that faith: so that to the query, 'How can people believe all this?', we may make the reply, 'Well, Sir So-and-so So-and-so understands all your difficulties and still believes'. We shall not, however, much increase our Catholic scientists till we alter our attitude to science, especially in the school and the seminary.

The progress of science does not slacken for an instant. Biology, in particular, is coming far nearer to a demonstration of the essential mechanisms of life, and physiology to the formulation of theories as to the action of the human brain. There will undoubtedly be new difficulties arising from these questions and we need to be equipped to meet them. Let us hope we shall be able to say to new theories, 'If this is true, it fits into Catholic doctrine in such and such a way', and not merely to say, 'This is only a theory and I don't believe it'.

We see, then, that there has been a real substitution of science for religion in the realm of cosmology in the sense that the scientific view has been accepted and the religious account taken to be figurative. On the other hand, science has done nothing useful in the field of metaphysics and ethics. Science has been proved irrelevant, philosophy speaks with an uncertain voice, and religion alone can tell us certainly what we are and what we are to do and enable us to do it. That is, I believe, what the man of today wants of religion and what he ought to want, and it is for us to see how far we can relieve his difficulties in accepting the whole, or part of, that which he knows himself to be in need.