

Science and Christian Faith Today

Donald MacKay - Physicist and brain scientist

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A century ago it looked to many people as if science and Christian faith were heading for a fight to the death. Today the echoes of the conflict have almost died away. Is this 'peace with honour', or is it a dishonourable truce? I believe the dispute deserved to die, because it was not really between science and Christianity at all but between mistaken views of each; and I would maintain that the true scientific spirit in fact expresses something which is a necessary ingredient of a truly Christian faith. Faith is not credulity; like scientific belief, it entails trust based on experience and on reliable testimony. It differs from scientific belief not in its standard of truth but in its mode of origin.

Both Christians and scientists have learned something since the debates of the last century. Christians have come to realise that true reverence for the Bible requires a positive effort to avoid misinterpreting it; and that scientific discoveries may sometimes be God's way of warning us off a too literal approach. Scientists have been taught by science itself to distinguish more carefully between fact and interpretation, and have recovered some of their professional humility.

It would be mistaken, however, to use any technical changes in science (eg, physical indeterminacy) as an argument for Christian faith. The Bible represents God as 'upholding' the whole going universe—not merely the physically puzzling bits. While, to our finite minds, the idea of 'upholding' or 'holding in being' can convey only a hint of the truth, it serves at least to guard us against the image of a mechanic tending a machine.

It would be equally fallacious to argue from the present regularities that miraculous events, such as the resurrection of Christ, were 'scientifically impossible'. Just as a scene on a television screen, however 'regular' it seems, could be unimaginably changed by merely turning a switch, so God's world is open to change at his will. The big difference is that no change in God's world could ever be capricious, God's actions may sometimes be astonishing to us; but they can never be inconsistent with his unchanging purposes. This is what distinguishes miracle (in the biblical sense) from mere magic. It is here, indeed, that I see the deepest harmony between Christian faith and the scientific attitude.

The best basis for our scientific expectations is the rationality and faithfulness of the God who holds our world in being.

The basic issue

Three centuries ago, the founders of the Royal Society saw nothing incongruous in dedicating their scientific work 'to the glory of God'.

Two centuries ago, the new discoveries of science were being eagerly harnessed to 'arguments from

design' intended to support the Christian faith.

A century later, the climate of thought had changed; theologians and scientists were eyeing one another with mutual distrust, and before long men were speaking and writing as though science and Christianity were in for a fight to the death.

Today, the echoes of the great nineteenth-century conflict have almost died away, and theologians and scientists once more pursue their callings side by side in peace.

The true scientific spirit expresses something which is not only a possible but a necessary ingredient of a fully Christian faith. Christian faith is not credulity; like scientific belief, in one respect at least, it is trust based on experience and on testimony judged reliable. (This is not of course meant as a complete definition of faith!)

As everyone knows, the ostensible cause of battle in the past century was the Darwinian theory of evolution; but I have no qualifications to discuss the technicalities then in dispute, and in any case I believe that the basic dispute concerned a much more general question, which evolutionary biology just happened to raise in an acute form.

The Christian God is declared throughout the Bible to be a God of action. He not only is; he does. Science, however, is concerned to account for everything that happens in terms of other happenings ('causes') in the physical world. The chain-mesh of cause-and-effect is far from complete; but missing links are continually being found, and most nineteenth-century scientists saw no obstacle to its eventual completion.

What then of the God of action? This was the real question underlying the great debate. Did science, in its ever-filling picture, leave any room for God to act? To many scientists the idea of God seemed obviously a mere stopgap for want of scientific knowledge of what they would call the 'real causes' of events. Some of the ablest theologians encouraged this belief by desperately searching for weakness in the scientific theories they regarded as competitive—performing in the process a valuable service to science, but fated to be squeezed from one untenable position to another under the pressure of accumulating fact. The very momentum of their retreat contributed to the general impression that the Christian faith was no longer credible for an honest and well-informed Victorian.

Changes—relevant and otherwise

What has happened between then and now to account for the different outlook today? Changes there have been in plenty. First, and most spectacular, has come the complete revision of our scientific notion of the physical world, culminating in Heisenberg's famous Principle of Uncertainty. According to this, the 'elementary particles' of the universe (electrons and the like) are fundamentally unpredictable in their motions. Either the speed or the position of an electron may be determined as exactly as we please—but not both exactly at the same time. At any one time we have to make a compromise, accepting less precision in the one specification if we demand more in the other. The average behaviour of large enough numbers of particles, like the average numbers of births or deaths in a large community, can, of course, be predicted more accurately, so that the dynamics of objects as large as billiard balls or planets are unaffected; but the Victorian dream of a 'clockwork universe' of fully-predictable processes has been shattered.

I have begun with this particular change, not because I think it is crucial to the Christian position, but because I think it is not; and I fear that some—though by no means all—apologists have been tempted to make more of it than they should. Heisenberg's principle does establish a certain kind of incompleteness in the scientific picture which we are far from understanding; but the 'gaps' it indicates are not at all of the kind for which nineteenth-century theologians were looking; and in any case I hope to show

that a fully biblical doctrine of God's activity is made logically neither more nor less credible by such developments.

The second big change—in part a consequence of the first—is in the mood of scientists. By contrast with the jaunty confidence of last century, it could, I think, be fairly described as 'chastened'. Particularly in the physical sciences, cocksure dogmatism has given place to a much more cautious and tentative way of presenting conclusions. Arrogant postures may occasionally be struck by a few exponents of the newer sciences, such as molecular biology and anthropology; but these attitudes are widely deplored by fellow scientists as atypical. It is sometimes said that the bankruptcy of classical physics, revealed by the discoveries of atomic phenomena, discredited Victorian materialism. For its logical implications I believe this makes too strong a claim; but at the psychological level I think it is profoundly true. These discoveries, from within science itself, have done much to recall us in science to a proper professional humility.

There have been changes, too, on the other side. I am not thinking now of the various attempts to compromise, in the name of 'modernism', by abandoning unpalatable biblical doctrines and biblical authority. I believe such a compromise to be neither necessary, nor, in the long run, self-consistent. The lesson that all Christians have learned, however, is that what may seem the 'obvious' way to interpret biblical material is not always the most reverent; that true reverence for the Bible requires a positive effort to avoid misinterpreting it. Sometimes it may even be scientific observations that God uses to warn us when we are pressing a literal scientific interpretation on a non-scientific idiom (as when Copernican astronomy came up against the official geocentric interpretation of passages such as Psalm 104:5). It has never been doubted by orthodox Christians that the same God was the Author of true discoveries in the book of nature as well as in the book of Scripture. But instead of arguing, as some did a hundred years ago, that this rendered scientific enquiry superfluous on matters dealt with in Scripture, Christians today are more alive both to the dangers of trying to use Scripture for purposes which it is not intended to serve, and to their responsibility, in God's sight, for following up the full implications of the knowledge he gives in these other ways.

The second big change—or rather, reformation—on the Christian side, has been in the understanding of what is meant by God's activity in relation to our world. Like all true religious reformations, this has been marked by a revival of emphasis on what the Bible actually has to say, as opposed to what it was thought to say or expected to say. In forcing this re-examination of thought-models, the nineteenth-century conflict has been an undoubted blessing. The trouble was that both Christians and non-Christians at that time had slipped into thinking of God as a kind of machine-tender. Partly under the influence of deistic notions, and of such stock works of apologetic as Paley's *Evidences*, they were tacitly agreed in adopting a mental picture of the world as a great machine, with God (if he existed) supervising its workings from outside. Divine activity in the world (if any) would then be possible only if parts of the machine were open to non-mechanical influence. Hence the importance attached to 'gaps' in the chain-mesh of physical cause-and-effect, to enable God to intervene without wrenching a part of the (presumably perfect) machinery.

Undoubtedly, there are various biblical idioms which could be taken in isolation to justify this mental picture (eg, Gen 2:2; Ps 102:25); and indeed, for practical purposes, it embodies an important truth, that God's normal pattern for his world is regular and reliable as clockwork. No single image need be expected to do justice to all aspects of his relationship to the universe, and it may well be asked why such a time-honoured (if relatively recent) thought-model should be set aside. An image has had its day, however, when its power to illuminate is exceeded by its power to mislead; and in our time this would seem to be abundantly true of the picture of God as a machine-tender. It is not that it cannot be stretched ad hoc to fit the biblical data it purports to embody, but rather that the expectations it evokes are radically out of key with much of what the Bible has to say about God's activity. Instead of finding a ready place within its framework, concepts such as creation or miracle appear as disconcerting 'difficulties', felt by non-Christians at least to be vaguely incoherent with the rest of the picture they are offered. Worst of all, the whole facet of biblical teaching that deals with God as immanent in the events of nature is made to

seem quite unintelligible.

For when we look at it more closely, the Bible as a whole represents God in far too intimate and active a relationship to daily events to be represented in these mechanical terms. He does not come in only at the beginning of time to 'wind up the works'; he continually 'upholds all things by the word of his power' (Heb 1:3). 'In him [ie, Christ] all things hold together' (Col 1:17). Here is an idea radically different from that of tending or interfering with a machine. It is not only the physically inexplicable happenings (if any), but the whole going concern that the Bible associates with the constant activity of God. God is the primary agent in feeding the ravens, or clothing the lilies (Lk 12:22-28); it is he who is active in the 'natural' processes of rainfall and of growth; and even wicked men depend on him for their existence (Mt 5:45) and serve his purposes (Acts 2:23). The whole multi-patterned drama of our universe is declared to be continually 'held in being' and governed by him.

Divine upholding

What sense can we make of this unfamiliar idea of 'holding in being'? Obviously it describes a mystery that we need not expect to understand at all fully; yet unless we can make something of it we cannot come to grips with its relation to our scientific and everyday ways of thinking about the world, which is our present concern.

To start with a negative, it is clearly meant to warn us against precisely the error we have been discussing, of reducing God to the status of a machine-tender. While insisting on the genuine distinction between God and his creation, the Bible throughout regards his activity as essential to, and visible in, all its continuing processes. Can we find a mental image that will do more justice to this relationship? We need not expect to invent a perfect analogy; and if I venture to suggest a possible thought-model it is only because I have found that it helps to tie together a range of biblical and scientific ideas somewhat wider than those covered by the earlier image, though still inevitably limited.

An imaginative artist brings into being a world of his own invention. He does it normally by laying down patches of paint on canvas, in a certain spatial order (or disorder!). The order which he gives the paint determines the form of the world he invents. Imagine now an artist able to bring his world into being, not by laying down paint on canvas, but by producing an extremely rapid succession of sparks of light on the screen of a television tube. (This is in fact the way in which a normal television picture is held in being.) The world he invents is now not static but dynamic, able to change and evolve at his will. Both its form and its laws of change (if any) depend on the way in which he orders the sparks of light in space and time. With one sequence he produces a calm landscape with quietly rolling clouds; with another, we are looking at a vigorous cricket match on a village green. The scene is steady and unchanging just for as long as he wills it so; but if he were to cease his activity, his invented world would not become chaotic; it would simply cease to be.

I do not in fact know anyone with sufficient dexterity to perform such feats at the required speed; but that is beside the point. I have sketched our hypothetical artist at work because I find this process quite a helpful illustration of some of the ways in which the Bible talks about God's activity in physical events.

Suppose, for example, that we are watching a cricket match 'brought into being' and 'held in being' by such an artist. We see the ball hit the wicket and the stumps go flying. The 'cause' of the motion of the stumps, in the ordinary sense, is the impact of the ball. Indeed, for any happening in and of the invented scene, we would normally look for—and expect to find—the 'cause' in some other happenings in and of that scene. Given a sufficiently long and self-consistent sample, we might in fact imagine ourselves developing a complete predictive science of the cricket world displayed before us, abstracting 'laws of motion' sufficient to explain satisfactorily (in a scientific sense) every happening we witness—so long as the artist keeps to the same regular principles in maintaining the cricket scene in being.

Suppose, however, that someone suggests that our scientific explanation of these happenings is 'not the only one', and that all our experience of them owes its existence to the continuing stability of the will of the artist who shapes and 'holds in being' the whole going concern. However odd this may sound at first, it is obvious that in fact he is not advancing a rival explanation to the one we have discovered in our 'science' of the cricket field; he has no need to cast doubt on ours in order to make room for his own, since the two are not explanations in the same sense. They are answers to different questions, and both may, in fact, be entirely valid.

The parallel I think is clear as far as it goes. The God in whom the Bible invites belief is no 'cosmic mechanic'. Rather is he the Cosmic Artist, the creative Upholder, without whose continual activity there would be not even chaos, but just nothing. What we call physical laws are expressions of the regularity that we find in the pattern of created events that we study as the physical world. Physically, they express the nature of the entities 'held in being' in the pattern. Theologically, they express the stability of the great Artist's creative will. Explanations in terms of scientific laws and in terms of divine activity are thus not rival answers to the same question; yet they are not talking about different things. They are (or at any rate purport to be) complementary accounts of different aspects of the same happening, which in its full nature cannot be adequately described by either alone.

Before we turn to work out some of these implications in more detail, it may be well to make clear what is not implied by our illustration in this inadequate form. The human artist's invented world is unreal; but what God does is the only ultimate reality there is. The human artist's world is presented to us on a screen, of which we are merely powerless spectators. In God's world, however, we are part of the scene, brought into being as active participants as well as observers. Nor are we mere puppets. We contribute by our own decisions and actions to the total drama, and God holds us responsible for the part we play, even while our existence in it is wholly dependent upon him.

In these and doubtless other respects, then, the illustration is deficient and could be misleading in its turn; but while some of the deficiencies can, I think, be remedied, there is no need for our present purpose to complicate the thought-model. Its function is not (heaven forbid!) to explain the mystery of God's activity, but only to bring out some of the features of the biblical idea of it which seem to have been neglected in disputes where God was presumed to be a 'machine-tender'.

Prior to an enquiry into the truth or falsehood of the Bible's claim, there is a real need in our day to get clearer in mind what is, and what is not, being claimed. If the biblical notion of 'holding in being' is at all akin to that which we have been considering, then the whole relationship between scientific and biblical analysis of 'causation' has to be reappraised. To argue hotly, for example, as some of our fathers did, whether something 'came about by natural causes or required an act of God', is simply not to take seriously the depth and range of the doctrine the Bible is asking us to consider. To invoke 'blind chance' as if it were an alternative to the action of God in creating us, as Professor Jacques Monod does in his book *Chance and Necessity*, similarly misconceives the Christian doctrine of creation and providence. For what in science we term 'chance events' are recognised in biblical theism as no more and no less dependent upon the sovereign creative power of God than the most law-abiding and predictable of happenings (Prov 16:33). It may be fair enough to express personal hostility to this doctrine; but it is theologically inept to pretend that science as such has any quarrel with it. The trouble here (to quote J.B. Phillips) is that our ideas of God have not been too big, but too small. Admittedly, the revision of our conception of 'reality' which the Bible calls for is far-reaching; but it is half-measures here that in the recent past have proved theologically disastrous. In the remainder of this paper I hope to bring out, with the help of a few key illustrations, the remarkable harmony of scientific and Christian belief which reappears when the nineteenth-century misunderstanding is replaced by a more thoroughgoing biblical emphasis.

Origins

Our first example may appropriately be the classical question of origins. As soon as we absorb the force of the biblical doctrine of God, it becomes clear that there is not just one question of origins, but two.

To enquire into the 'origin' of the cricket match on our artist's screen, for example, may be to ask either about the earlier pattern of happenings in the world of the cricket field that must presumably have led up to the scene we are now witnessing, or about the artist's originaive activity, without which there would be no happenings at all. The first kind of 'origin' we could infer in principle from scientific or commonsense observation of the happenings in the scene, the state of the scoreboard, and so forth, extrapolating backwards from as many clues as we could pick up. The second, however, we should never expect to determine in this way. It is, of course, concerned in a sense with the past; but it is concerned to account for the past (and the present) of the picture as a whole—as a phenomenon so to speak—rather than with a unique moment in it. Only if the created scene contained some clues relating to the artist who is shaping and holding it in being could his existence, and the origin of the scene in this sense, even be discussed within its own framework. If it were so discussed, the appropriate term for it would certainly be the biblical 'ex nihilo'.

In relation to our own world as God's creation, much debate in the past seems to have arisen from a confusion of these two questions of origin. Cosmology, on the one hand, is concerned to extrapolate backwards in time on the presumption of continuity, and to picture the initial situation (if any) to which the present state of affairs would form a 'natural' sequel. The Bible, on the other hand, claims to be the clue to the origin of the world in our second, quite different, sense; not to its origin in time, but to its origin in eternity. Its basic concern is to reveal the nature and purposes of the Giver of the pattern we encounter as the Physical world.

Even the first chapter of Genesis, despite its narrative form, makes clear, I think, that scientific 'history' is not what it means to convey. Its pictures—especially if their details are studied in contrast to pagan myths of the time—teach something quite other, and deeper, than cosmology. They tell us 'who' and 'why', and the metaphysical order of priorities, rather than 'how' in the physicist's sense. It may be worth while to substantiate this point in some detail, for too many people, including some 'modernist' Christians, have been apt to speak of Genesis 1 as a 'primitive attempt' by its writer to guess at what science has now revealed. In point of fact, the very structure of the Genesis narrative should have precluded this interpretation, since the story ends its creative period of six 'days' with a complete, going universe, in which the writer clearly intended us to picture trees and animals, for example, more than six days old. Logically, then, the Genesis narrative resembles an account of the way in which an artist brings his scene into being; it leaves entirely open the field of investigation we call 'cosmological origins', which must be determined by empirical examination of the scene—God's universe as created. Nor is there any suggestion that the past so determined—still less the present—is only 'apparent' or 'illusory': it is the only past there is, in the sense that science gives to the term. As Augustine put it long ago. God's creation is not in tempore but cum tempore: our scientific scale of time, extending backwards into the inferable past, is one of the intrinsic properties of the created order, and the biblical notion of creation as imaged in Genesis 1 is grossly distorted and diminished if it is restricted to a happening locatable at a point on that timescale, as if this were the point behind which scientific extrapolation must be impossible. The relationship of the divine Creator to our world is still more comprehensive, and the Bible's claim is in fact a bolder one. To draw a crude metaphor from our earlier illustration, Genesis 1, read at its face value, appears to narrate not just the inferable past of the 'cricket match', but rather the artist's decisions as to the kind of match it should be. I do not pretend that this is at all a clear notion, except insofar as our own experience of 'creative activity', eg, in writing, may afford some dim analogy.¹ But I see no reason to make any more complicated claim for the narrative such as (by reading the 'days' as aeons of geological time) that it represents a disguised version of the past that the scientist can discover. The intention of such speculations is often the excellent one of harmonising scientific discovery and inspired Scripture; our suggestion is only that the Scripture here is not answering the same question, so that to try to make

it do so is to do it violence. It needs to be defended not against 'science' but against well-meaning (or any other) attempts to make it into 'science'.

By the same token, it would seem that any attempt to find support for the Christian doctrine of creation in 'explosive' theories of cosmology (which trace things back to a 'primeval atom') and to oppose the 'steady state' theories of Hoyle and others on religious grounds, would be misguided. The cosmological past of God's world is presumably 'written into' its present structure by him, and he will expect us to look for it there with unprejudiced eyes, since we cannot specify in advance which kind he should have 'written'. The most we can say a priori is that nothing can happen or have happened in our world that is inconsistent with the character of its Author.² Steady-state cosmologies may have some objections to face on scientific grounds, but they would seem to have none a priori in the Christian doctrine of creation.³

My contention then is not that the narrative here should be read literally (since I do not know what it could mean if one tried to), but that it should be read for what it is—a revelation of the metaphysical origins of our world—and not as either a 'primitive guess' or an inspired cryptogram on the scientific question of the cosmological past. Only in this way can we clear our minds for the depths of meaning that in faith we believe it to hold, for us just as much as for our less 'scientific' forebears.

Obviously this leaves a problem of identifying the transition in the biblical record from the 'divine history' of origins, to the 'natural history' of our created order. I have no intention of suggesting a clear-cut solution, for I do not believe that the transition itself is clear-cut. I want only to contend for the reality and necessity of the distinction.

What has been said about physical origins would seem to apply equally to questions of the origin of man's sense of moral values. Conflict can surely arise here only if our two questions of origin are confused. On the one hand there is the technical scientific question of the inferable past history of man's moral ideas; on the other, the theological question of their divine givenness or otherwise. Data are so sparse that present 'evolutionary' answers to the first question may be far wrong; but if they are wrong, there would seem to be no biblical reason to doubt that there is some answer to it in terms of mechanism which is right. I have already suggested that on closer examination the narrative in Genesis is not logically framed to supply us with an answer of this sort; its concern is within the second question. From the biblical viewpoint, to argue whether a sense of values developed naturally or was divinely given is to accept a false antithesis. To invoke 'natural processes' is not to escape from divine activity, but only to make hypotheses about its regularity; and the historical development of a perceptual mechanism, whether in the single individual or in the race, is quite a different matter from the origin and validity of what is perceived. (For example, we cannot settle the validity of our ideas in geometry by discussing the embryological origin of the brain!)

Undoubtedly there have been some anti-Christian biologists who thought—and claimed—otherwise; but the biblical answer to such men would seem to be to question, not their science (unless for scientific reasons!), but their confounding of the metaphysical origin of ethics with the physical or psychological origin of man's 'ethical mechanisms'. Space does not allow a full discussion of the biblical doctrine of man; but inasmuch as the Bible regards man as a psychophysical unity, it implies that some physical account of the development of each of his faculties in their mechanical aspects is necessarily required, as the complement to the revealed facts of their divine origin. Even complete continuity of physical development would not, of course, preclude discontinuity of spiritual nature between man and other animals. To use a simply analogy, the proportion of gas to air in a burner may be increased continuously until the mixture suddenly sustains a flame. But when this happens we have a qualitatively new entity, with a dynamics of its own, and with nothing to correspond to it in the earlier stages. Similarly, even in a continuous theory of human evolution (if anyone wants to speculate along these lines) one would have to reckon with the likelihood that the growth of a truly 'human' pattern of organisation, in the brain of the first true man, would be a self-catalysing process, raising him at one bound to a qualitatively new spiritual capacity inconceivable to his predecessors. My aim is not to recommend such speculations, but

simply to emphasise the appropriateness of 'reverent agnosticism', here as elsewhere, admitting our ignorance when conclusive evidence is not supplied either by revelation or observation.

Natural laws

A second example of the biblical approach illustrated here concerns the notion of 'natural law'. As long as the world is thought of as a kind of machine, natural laws are bound to have something of the character of invisible cogwheels and levers. As soon as we move to the more dynamic thought-model illustrated by our artist and his screen, however, the notion of law takes on quite a new aspect.

In the cricket field on the screen it is possible to discover numerous examples of orderly behaviour that could be subsumed under general 'laws'. Quite possibly, as already mentioned, we might develop a successful deterministic science of the behaviour we are watching. As long—but only as long—as the artist's activity maintains the required regularities, our predictions should succeed. If his pattern were to change, or to fluctuate irregularly, our predictions might be upset, to a greater or lesser degree. But—and this is the point—the presence of such unpredictable happenings is not in the least essential to our belief that the whole scene of activity is held in being by the artist. In particular, whether the 'natural laws' we discover in the scene are deterministic or indeterministic (ie, statistical) makes no difference to our belief that it has a Creator who is in control of it. This belief does not rest on that kind of evidence.

Perhaps you see now why I insisted earlier that it is a mistake to harness Heisenberg's principle to Christian apologetic. For here, too, the question whether physical laws are deterministic or indeterministic in the scientific sense is irrelevant to the Bible's claim that they betoken the continuance of God's maintaining 'programme'. Thus whereas some have argued that only an indeterministic physics leaves room for God to act in our world, while others, like Monod, see the element of randomness as eliminating the possibility of divine control, biblical theism, if I understand it correctly, accepts neither of these mutually cancelling arguments. For the Christian, as we have noted, the events we classify scientifically as 'chance' are as much divinely given as any others; and natural law is primarily an expression of God's faithfulness in giving a succession of experience that is coherent and predictable. 'While the earth remains, seedtime and harvest, cold and heat, summer and winter, day and night shall not cease' (Gen 8:22). Thus the common saying that God can 'use' natural means to achieve his ends, while undoubtedly true in its intended sense, suggests by its wording quite the wrong relationship of God to natural law. It would seem more correct to say that God sometimes achieves his ends in 'natural' ways (ie, in ways that do not upset precedent from a scientific point of view). God is not like a man, using his laws as tools that would exist independently of him; it is he who brings into being and holds in being the activities, whether scientifically 'lawful' or otherwise, that we may recognise to be serving his ends.

Once his programme has reached its final consummation, moreover, we are told that the whole of the present world shall be 'rolled together like a scroll', to give place to something unimaginably better (Is 34:4; 2 Pet 3:13).

Miracle

Discussion of natural law leads directly to the problem of miracle. The old objection to miracles was that they involved God in tampering with his own mechanism—an intervention which was pronounced either scientifically impossible or theologically improper, according to taste. Against the full biblical doctrine of the natural world, however, the objection loses any force it had. In the first place, while the biblical concept of natural law, as we have seen, supplies the highest reasons for normally relying on our scientific expectations, it renders meaningless any notion of 'scientific impossibility' where God is concerned. Just as even an ordinary television picture may be unimaginably altered at the turn of a switch, so God's world is entirely open to change at his will.

The last phrase, however, which might seem a gateway to all irrationality, embodies, of course, the most

vitality important safeguard. Since the stability of God's will is declared to be the origin and foundation and standard of all rationality, no change that he sees fit to make in his 'programme' could ever be capricious. He it is who makes and maintains the whole of his creation 'a cosmos, not a chaos'. Some of his actions at special turning-points in history may have been astonishing to us, and his sovereign will does not abide our question; but we are never encouraged to regard them as irrational. This forms a crucial distinction in principle between biblical miracle and magic.

The Bible always presents a miracle, however physically surprising, as the self-consistent expression, at that particular point in history, of God's unchanging faithfulness to the purpose (however inscrutable) for which he has brought the whole pattern of events into being. Even of the central miracle of Christ's resurrection, Peter says that it was impossible that death should hold him (Acts 2:24). Appropriateness and rationality (as seen from the standpoint of eternity, though not necessarily manifest to us), are declared to be of the essence of the biblical concept of miracle. The Christian has no warrant to believe in a God of caprice.

It follows from all this that a biblical miracle is made neither more nor less credible by attempts (however well-intentioned) to find a 'natural' process to account for its physical manifestations. What makes a miracle is not primarily its violation of scientific expectations (though this might be one result), but rather its function as an outstanding sign of God's power and purpose in the situation to which it comes. In some cases this might require nothing that need have shocked a scientist as such, the significance being in the timing rather than the manner of events; in others, if the record is to be read at its face value, it seems hard to deny that the normal pattern of events was radically altered. In every case it is clear that the event could not have fulfilled its communicative purpose unless it had been out of the ordinary in some sense for those concerned. My point is simply that the God of biblical doctrine would have no difficulty in bringing about the one kind of event any more than the other; but that the biblical doctrine nevertheless provides a more stable, rather than a less stable, foundation for our normal scientific expectations, in the stability of the will of a God who is always faithful.

The ground of faith

All I have said thus far is in one sense merely permissive. I have shown, I hope, that the biblical doctrine of divine activity is not only compatible with our scientific knowledge, but also positively encouraging to the attitude towards natural events that we call scientific. At most, however, all such demonstrations can make Christianity only plausible. They are bound to leave us still with the question whether it is true, and how we can be convinced that it is.

Before concluding, then, we must return briefly to the point made at the start: that faith, like scientific belief, is a kind of trust that is based on personal experience as well as on testimony judged reliable. Christian faith is not just a body of second-hand beliefs, however self-consistent—not even if acquired from the Bible itself. Its essence is an active, day-to-day relationship of personal dependence on and obedience to the Giver of our daily round as he has revealed himself and his will in Christ and Scripture, in fellowship with other Christians—a relationship which both illuminates, and is illuminated by, the doctrines from which it is inseparable.

Neither personal experience divorced from biblical doctrine, nor intellectual acceptance of doctrine divorced from experience and practice, can sustain faith in the biblical sense. It is the day-to-day personal confirmation that God is as good as his word given in the Bible, together with the intellectual outworking of the implications of God's acts and purposes revealed there, that combine and interact cumulatively to grip the heart and mind and will with the authoritative conviction we refer to as faith.

I should perhaps emphasise that by 'experience' here I am not referring to the esoteric feelings of the mystic, which are often taken as the paradigm of 'the religious experience'. I mean rather something which at the psychological level may be quite prosaic and ordinary, though different from sensory experience

of the external world: namely, the whole realm of our moral experience, at the level of willing and choosing. 'Whoever is willing to do the will of my Father,' said Jesus, 'shall come to know of my teaching whether it is from God' (Jn 7:17). To know the authoritative grip of God's will on one's conscience need involve no abnormal psychological phenomena; but it is the kind of experience that gives empirical content to otherwise theoretical talk of a personal relationship with him. It is not, of course, a matter of uncritically renaming in pious terms all that everyone experiences at this level. This would be mere superstition, akin to the reading of 'messages' in an undisciplined sequence of words from a dictionary. In Christian doctrine God's promise to make himself known to us in personal experience is conditional on our approaching him by the way and in the spirit that the Bible indicates—ready for any consequence of discovering and following the purpose for which he has brought us and our whole world into being. This is no 'nodding acquaintance', for there are deep things to be settled between each of us and God. By nature we prefer purposes of our own quite at variance with his; and for anyone who takes God at his word such unfamiliar concepts as repentance, atonement, forgiveness and grace turn out to have a definite operational significance that may hurt even as it heals.

But my purpose now is not to expound the Christian gospel. It has rather been to bring out something of what I meant by saying at the beginning that faith differs from scientific belief, not in its standards of truth but in its mode of origin. Essential checks against undisciplined subjectivism exist in the biblical revelation itself and in the testimony of fellow Christians past and present; hence in part the importance that has always been attached to intelligent study of the Bible, and to the fellowship of Christians in the church. It is only within this objective framework that the Christian's experience in stumbling obedience can validly grow into the astonished conviction that his faith is the sober truth.

Conclusion

We are emerging from a period of confused conflict during which the biblical doctrine of divine activity seems to have become largely distorted or forgotten. It is in this doctrine, untrimmed by any concessions to the spirit of our age, that I see the basis of the deepest harmony between Christian faith and the scientific attitude. There could be no better basis for our scientific expectations than the rationality and faithfulness of the One who holds in being the stuff and pattern of our world.

Notes

1 For a brilliant essay on this theme see Dorothy Sayers' The Mind of the Maker.

2 This does not of course imply that we can deduce the character of its Author solely from what we are able to see in his world. The doctrine of the Fall indicates that the whole present 'programme' as we encounter it bears the marks of our chosen relationship of rebelliousness towards its Giver, so that apart from Christ's revelation of God's 'eternal purpose' we could go hopelessly astray as to his nature.

3 In justice it should be said that the essence of this point seems to have been appreciated by the much-ridiculed Philip Henry Gosse, FRS, who is best remembered for suggesting that God created the rocks with the fossils in situ. Certainly Gosse seems to have given his contemporaries the impression that 'the creation' was a datable event a few thousand years ago on our timescale; and in this I have no wish to defend him. But, with all his faults, I think he showed more insight into the logic of the Genesis narrative than opponents such as Charles Kingsley, who held that on Gosse's theory the Creator had perpetrated a deliberate falsehood by creating rocks complete with fossils. For whatever the peculiarities of Gosse's view, the point apparently missed by Kingsley is that some kind of inferable past is inevitably implicit in any going system, whether with fossils or without, so that to speak of 'falsehood' here is to suggest a nonexistent option. Creation in the biblical sense is the 'willing into reality' of the whole of our space-time; future, present and past. If the Creator in the Genesis narrative were supposed to have made the rocks without fossils, this would not have helped, for nothing could have prevented the rocks from having some physically inferable past: their past would simply have been different, and moreover inconsistent with

the rest of -he created natural history. On Kingsley's argument, pressed to its logical conclusion, God ought not to have created any matter at all, since even molecules cannot help having some inferable past history!

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