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Faith and Thought

A Journal devoted to the study of the inter-relation
of the Christian revelation and modern research

Vol. 92 Number 2 Winter 1961

EDITORIAL

Quite recently Geoffrey Parrinder has published a new book entitled *Comparative Religion*. This is a book with a difference from many others in the same field. In this not only are we introduced to the problems of studying the world's religions side by side, but the problems are presented as a challenge and crisis to all traditional forms of theology. The author marks out what he terms the 'confrontation' of religions. There is now, he claims, all the more necessity and a greater possibility for Christians to open up a frank and sincere dialogue with the non-Christian religions. They, in common with Christianity, are suffering from the close contacts and secular stresses of today. Most of them show all the signs of adaptation. So, with communication made easier through international exchanges of scholarship, and the special attention given to languages and anthropology, all the world is prepared to listen to a united voice.

★ ★ ★

It was a disappointment to many that the Symposium which was to be devoted to a study of *the Nature of Man* could not, after all, take place in October last. We have, however, published in this Number two of the contributions. Dr R. J. Berry writes on *Some Genetical Aspects*, and Dr Ian Lodge Patch contributes on *Evidence From Psychology and Psychiatry*. The Gunning Prize for 1960 has been awarded to Rev. A. Garfield Curnow for his Essay entitled *Religion: Fancy or Fact?* Mr Curnow has proved himself to be a capable and provocative writer. We are grateful for the interest he shows in the activities of the

Institute. Dr C. E. Allen Turner has been associated with the Victoria Institute since 1948 and has contributed a number of papers in the past. His present article on *Puritans and the Royal Society* is a refreshing contribution and will remind many of us of his paper on *Puritan Origins in Science* in 1949 (vol. lxxxi). We are very glad to have yet another contribution from Dr R. E. D. Clark of Cambridge. This is a comment on the paper read by Mr Gordon Barnes at the Symposium in 1960.

* * *

At a meeting of the Council held recently, the whole future of the Victoria Institute was discussed. It was felt that we all should be perhaps clearer than we are at present concerning the specific place which the Institute ought to hold in the areas where Religion and Science meet. For the purpose of devoting special attention to the *Journal* a small committee has been set up. We would remind all Fellows and Members, however, that the success of the Victoria Institute still ultimately depends upon the militance of those who belong to the Institute.

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CONTRIBUTORS

A. GARFIELD CURNOW has been a prize winner on a number of occasions with the Victoria Institute. He is a retired Methodist minister having had some forty years' experience in London and the West Country. During the First World War he ministered to the Forces in Salonika, and still retains office as an Honorary Chaplain.

R. J. BERRY is a graduate of the Universities of Cambridge and London. He is undertaking research in Genetics, and has contributed a number of papers to scientific journals in this field.

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R. E. D. CLARK is Lecturer in Chemistry at the Cambridge School of Arts and Technology. He obtained a double first in the Natural Science Tripos at Cambridge in 1928. Since then he has occupied a number of teaching and research posts. He was responsible for the invention of the rotary burette, and new methods on analytical Chemistry with the use of Dithyol.

Rev. A. GARFIELD CURNOW

Religion: Fancy or Fact?

SYNOPSIS

PART ONE: INTRODUCTION

Scientists do not deny the existence of religious experiences, but affirm that they are 'psychological', imaginative, illusory.

This position illustrated from H. G. Wells, and in quotations from Walter Lippmann, A. J. Ayer, and others.

PART TWO: INVESTIGATION

Perversions of religion are no argument against religion at its best.

The casuistical plea that religion, though an illusion, should be encouraged because 'useful'.

Drastic consequences of the view that religion is an illusion: the whole rational life of man goes by the board.

Weakness of the view that everything which cannot be proved by scientific means is incapable of proof. The description of reality which science gives us covers only part of the truth.

PART THREE: CONCLUSION

Dubious nature of some arguments for the reality of the spiritual realm.

The impressive argument from the *extent* of religious experiences. Impossible to think that *all* are illusory. This would mean that the best and noblest of mankind were pathological subjects.

Historical evidence a conditioning factor. The personality of Jesus and the dependability of the Christian writings considered.

The word 'absolute' and its meaning.

Anthropomorphism versus mechanomorphism.

Religion the *ne plus ultra* of reality.

PART ONE

INTRODUCTION

THE CLAIM STATED

(1)

The claim to be considered in this essay may be illustrated by citing a modern instance of it. 'One of my colleagues in the scientific faculty of the University in which I now teach', says Dr John Baillie in a well-known book, 'said to me recently, "The difference between us men of

science and you men of religion is that we are realists whereas you are romantics".'[1] This is a familiar charge against 'men of religion', and we shall refer to other examples of it.

But here let us note that it is not that scientists deny the actuality of religious experience. Ever since the publication of William James' *Varieties of Religious Experience*—the Gifford Lectures of sixty years ago —it has been growingly true that scientists and philosophers 'are now prepared in a greater measure than formerly to consider religious experience as among the most significant of their data'.[2] Significant of what? is of course the whole question at issue, as we shall see; but suffice it for the moment to note, with Archbishop William. Temple, that this celebrated book, with its vast collation of evidence, 'encouraged the tendency of thought to recognise the reality and authenticity of religious experience'.[3] So marked was this tendency that a scientist of the calibre of Julian Huxley, writing in 1931, refers to 'the inescapable fact of religious experience, which no scientific analysis can remove',[4] and in a later book urges that science should admit 'the psychological basis of religion as an ultimate fact'.[5]

(2)

Scientists then do not deny the 'reality' of religious experience. It is now widely admitted that to do so would be to turn a blind eye to a multitude of indisputable facts. But the crux of the matter arises just here. It is indicated by the word 'psychological' in the second of the two quotations from Julian Huxley. That word is significant of the interpretation he puts upon the 'inescapable fact' of the first quotation. It means that to him religious experience is purely subjective; there is no objective reality at the back of it. Thus, in the first of the two books alluded to, he speaks of religion as 'a function of human nature',[6] and of God as 'a product of the human mind'.[7] And in the other book he affirms that revelation 'is revelation only in a psychological sense, not literally. There need be no supernatural being or force making the revelation; nor is the revelation one of an external reality.'[8]

[1] *Invitation to Pilgrimage*, Penguin edn., p. 30.
[2] Professor H. H. Farmer, *The World and God*, p. viii.
[3] *Nature, Man and God*, p. 334.
[4] *What Dare I Think?* p. 122.
[5] *Religion Without Revelation*, revised edn. 1957, p. 116.
[6] *What Dare I Think?* p. 187.
[7] Ibid. p. 240
[8] *Religion Without Revelation*, revised edn. 1957, p. 91.

(3)

In all this Huxley is representative of many other writers in our day. The position of the school of thought to which he belongs—variously known as Naturalism, Agnosticism, Positivism, Empiricism, or more frequently at present as Humanism—is that religion is merely a matter of opinion which is not capable of demonstration or vindication. It rests on subjective desire rather than on objective fact. It is nothing more than the communion of man with his own subliminal consciousness which, not recognising it as his own, he hypostatises as someone or something external to himself. It is merely a product of the imagination, a sentimental fantasy, a comforting illusion, a picture of the world as man would like it to be, imaginatively superimposed on the world as it really is. It is a form of the theory that self-existence is the only certainty, sometimes called solipsism, which has been described as 'the circular distorting mirror which shows reflections of ourselves from all directions but nothing else'.[1] In other words, according to this school religion is not at all a report on the truth about the universe, but essentially a branch of pathological psychology. In the literature of this school, and in particular in the works of psychologists like Freud, Leuba, and Durkheim, the massive evidence of religious experience is countered by such phrases as 'psychological explanation', 'father image', 'conditioning', and 'wishful thinking'. In short, the whole array of evidence is just a case of

'The instinctive theorizing whence a fact
Looks to the eye as the eye likes the look.'[2]

(4)

An interesting instance of the genesis of religion according to this school of thought, and of the causes and growth of religious experience, is given by Mr Geoffrey West in his study of H. G. Wells.[3] He says that during the first World War, Wells felt a necessity to 'make an affirmation of positive belief in purpose lest he should fall into an abyss of despair'. Hence such novels as *Mr Britling Sees it Through*, *The Soul of a Bishop*, and others, which to many at the time seemed to indicate that Wells was 'becoming religious'. But, says Mr West, the God

[1] F. G. Young, *Religion and the Scientists*, p. 41.
[2] Robert Browning, *The Ring and the Book*, p. 30.
[3] *H. G. Wells, A Sketch for a Portrait*, p. 214–215.

whom Wells seemed to have discovered was merely 'a highly emotionalized objectification of a personal necessity'. Which is just the view of religion and of religious experience held by agnostics and naturalists and humanists generally, as is seen in the testimony of two prominent representatives of this school, Walter Lippmann and Professor A. J. Ayer.

Lippmann, in his book *A Preface to Morals*, after remarking that the popular religion rests on the belief that the Kingdom of God, the supernatural realm, is an objective fact, goes on to say: 'To the modern spirit, on the other hand, the belief in this kingdom must necessarily seem a grandiose fiction projected by human needs and desires. The humanist view is that the popular faith does not prove the existence of its objects, but only the presence of a desire that such objects should exist.'[1]

Ayer is more cavalier. He roundly declares that 'all utterances about the nature of God are nonsensical'.[2] And again: 'The argument from religious experience is altogether fallacious. The fact that people have religious experiences is interesting from a psychological point of view, but it does not in any way imply that there is such a thing as religious knowledge. . . . Unless he [the theist] can formulate his "knowledge" in propositions that are empirically verifiable, we may be sure that he is deceiving himself.'[3] We can at least be grateful to Ayer for making his position, and that of his school, clear beyond the possibility of misunderstanding.

(5)

It may be worth while to note, in closing this introductory section, that the position of these modern writers, after all the much-lauded scientific development of recent times, in no whit differs from the position of 'sceptics' and 'atheists' of more remote days. Thus it is said of George Gissing, who died in 1903, that 'his one interest in religion seemed to lie in his notion that it was a curious form of delusion almost ineradicable from the human mind'.[4] And here is a reference to Jeremy Bentham, the rationalistic-utilitarian philosopher, who died in 1832: 'The Christian teaching that man is a child of God with an

[1] p. 143.
[2] *Language, Truth and Logic*, p. 115.
[3] Ibid. p. 119.
[4] Morley Roberts, *Private Life of Henry Maitland*, p. 113.

immortal destiny was, in his view, "nonsense on stilts".'[1] The 'nonsense' of Bentham, placed alongside the 'nonsensical' of A. J. Ayer, is a curious sidelight on the alleged progress of this school of thought in over a hundred years.

PART TWO

INVESTIGATION

THE CLAIM EXAMINED

(I)

BEFORE proceeding to a critical examination of the Naturalistic school of thought, there are two preliminary points which should be briefly considered. The first concerns a phase of the question before us in this essay which, on the face of it, lends plausibility to the contention that religious experience is purely subjective. Writing nearly a century ago the author of *Ecce Homo* averred that 'nothing has been subjected to such multiform and grotesque perversion as Christianity'.[2] William James, fifty years later, refers to the 'many grovelling and horrible superstitions' that the student of religions has to become acquainted with, and points out that one consequence of this is that 'there is a notion in the air about us that religion is probably only an anachronism, a case of "survival", an atavistic relapse into a mode of thought which humanity in its more enlightened examples has outgrown.'[3]

There can be no doubt that some forms of religion go far to justify this view. When one thinks of the crazy extravagances of deluded fanatics through the ages, and of the band of credulous folk who are always ready to follow these unbalanced cranks, it is no wonder that many form the opinion that religious experiences are pathological exhibitions and nothing more.

Even William James himself, it may be mentioned in passing, is not without blame in this connection, inasmuch as the religious experiences he relates 'are, nearly always, thoroughly abnormal'.[4] Indeed, they are

[1] John Moody, *J. H. Newman*, p. 28.
[2] Chap. xiv (p. 191 in 1908 edn.).
[3] *Varieties of Religious Experience*, p. 490.
[4] F. R. Barry, *Christianity and Psychology*, p. 134.

often crude and bizarre. It is a pity that the value of such a valuable book should be 'lessened', as Archbishop Temple says it is, by this feature.[1]

But the weakness of the argument that the extravagances of religious fanaticism justify a general charge of subjectivism against religion is easily pointed out. It is well stated by Baron von Hügel. 'Religion', he says, 'is subject to excesses and defects, to diseases and aberrations, more or less special to itself, but which no more prove anything against Religion at its best . . . than do the corresponding excesses and defects, deflections and diseases of Art, of Science, of Politics, of Marriage, prove aught against these kinds of life and reality, taken at their best.'[2]

That is a reasonable and effective declaration. It will be generally agreed that not only Art and Science and Politics and Marriage, but every other department of human activity, to be fairly judged, must be judged 'at their best', and not by their 'excesses, defects, deflections and diseases'. The same rule should apply to religion. The mumbo-jumbo of African witch-doctors is no more an argument against intelligent religion than their loathsome medicinal concoctions are against modern medical science.

(2)

The other preliminary point is this. Some members of the Naturalistic school endeavour to qualify their view of the illusory nature of religion, or at any rate to supplement it, by a plea which can only be described as casuistical, or even cynical. 'There are those who, like Jung,' writes Julian Huxley, 'believe that religion is an illusion, but also a necessity to the bulk of mankind, and therefore should be encouraged.'[3]

Huxley himself is far from countenancing this view, while Bertrand Russell, another of the same school, indignantly condemns it: 'I can respect the men who argue that religion is true and therefore ought to be believed, but I can only feel profound moral reprobation for those who say that religion ought to be believed because it is useful.'[4]

The admirable candour of these words does honour to their writer. It is indeed melancholy that scientific thinkers, who presumably share the proud boast of science that its aim is 'to seek the truth whate'er

[1] *Nature, Man and God*, p. 334.
[2] *Letters to a Niece*, p. 134.
[3] *Essays of a Biologist*, p. 290.
[4] *Why I am Not a Christian*, p. 172.

it is, and follow wheresoe'er it leads', regardless of consequences and scornful of ulterior motives, should lay themselves open to such a rebuke.

(3)

In subjecting the Naturalistic school of thought to a critical examination, the main thing to be noted is that on its view of the universe it is not only religion that is an illusion. That would be to state the consequences mildly. Much else disappears into mirage. The belief that mechanistic naturalism is a complete account of reality means that this is a quantitative universe, and the fact is that in a merely quantitative universe *all* qualitative life is alien. This is an all-important point. If the cosmos is basically physical and merely quantitative, then all the qualitative aspects of our lives, and not only religion, are subjective fantasies. The appreciation of spiritual values like goodness, truth, and beauty, together with such experiences as colour, harmony, affection, and ideals—all this comes under the ban; all this is swept away by the same argument which disposes of religion.

Indeed, the whole range of the mental life of mankind is similarly affected. The Naturalist cannot condemn other people's thoughts because they have irrational causes and continue to believe his own which have (if Naturalism is true) equally irrational causes. As Mr C. S. Lewis shrewdly puts it, 'The Freudian proves that all thoughts are merely due to complexes except the thoughts which constitute this proof itself.'[1]

Alfred Noyes presses the point even more effectively. He refers to a materialist who told him 'he did not believe in the existence of anything invisible, imponderable and non-measurable', but 'was nevertheless quite certain of the existence of his own thought, which he was unable to weigh, measure or see'.[2]

If anything more is needed to demonstrate the devastating effect of the logical consequences of the materialistic position, and to show its absurdity, the following extract surely administers its *coup-de-grâce*. 'A brilliant young psychologist spent some time demonstrating to me the necessarily irrational nature of my beliefs. He said he was sure I was honest in my faith but my beliefs were merely the result of purely irrational desires and repulsions in the sub-conscious. When he had finished I asked him if the same was true of his psychological theories;

[1] *Miracles*, p. 30.

[2] *The Unknown God*, p. 122.

were they also irrational outcrops from the sub-conscious; and, if not, why not? He had, of course, no answer. He had already successfully destroyed the basis of all rational discussion.'[1]

That is precisely the outcome of the claim that religion is an illusion, and religious experiences merely subjective. If admitted, the whole rational life of man, and every phase of his mental activity, equally goes by the board.

Bishop Gore's weighty summary of the position cannot be improved upon: 'Faith in God . . . has accumulated . . . a body of experience so vast as to make it impossible to deny that man is in real contact with God, without at the same time denying the validity of all human experience and opening the doors wide to a thoroughgoing scepticism, such as would paralyse not only man's religious activity, but his moral, social and scientific activity as well.'[2]

(4)

The root mistake made by those who hold the subjective view of religious experience, and the illusory nature of religion, is to suppose that the universe necessarily ends at the point where our physical senses cease to register its phenomena. According to this view a religious proposition is fallacious because there is no sensory test by which the proposition can be verified. Thus Freud declares that religious doctrines 'are all illusions; they do not admit of proof', and goes on to say that they cannot be proved because they do not lend themselves to scientific method, 'which is our only way to the knowledge of external reality'.[3] That is, everything which cannot be proved by scientific means is incapable of proof, and everything inconsistent with science is thereby disproved. Similarly the logical positivists (to give them their own appellation) are fond of asserting that nothing is true which cannot be empirically verified. We may know phenomena, and the laws by which they are connected, but nothing more. If there is anything more we can never apprehend it. The world of which alone we can have any cognisance is that world which is the subject-matter of the physical sciences. Here, and here only, can we discover anything which deserves to be described as knowledge.

As against this reckless dogmatism it must be affirmed that the description of reality which science gives us, however accurate and

[1] Peter Green, *Our Heavenly Father*, p. 35.
[2] *Can We Then Believe?* p. 37.
[3] *The Future of an Illusion*, p. 55.

marvellous, covers only part of the truth. In the words of General Smuts: 'The world consists not only of electrons and radiations but also of souls and aspirations. Beauty and holiness are as much aspects of nature as energy and entropy.'[1] Or as a writer in the *Daily Telegraph* said: 'Man has two modes of cognition open to him: the one by nature religious, spiritual or intuitive, and the other depending on physical observation and deduction. These two need not be mutually exclusive and should be unified in every inquiring mind, the one being complementary to the other.'[2]

The unification of these two modes of enquiry is indeed greatly to be desired. To bring it about, the next step forward nowadays would seem to lie in the direction of scientists broadening their horizons to embrace the non-material mental and spiritual fields with which theologians and philosophers are concerned, as well as the purely physical field with which they are familiar. This broadening of scientific outlook, though there are welcome individual instances of it, is still far from general, and must be courteously but firmly urged on the ground that 'we can no more exhaust reality by scientific pointer-readings than we can exhaust the Sistine Madonna by a chemical analysis of its paint'.[3]

(5)

One other weakness in the Naturalistic position may be indicated. However 'subjective' religious experiences may be, according to the allegation of this school, they spring from deeply rooted instincts in human nature, instincts which are so widespread as to be virtually universal. Many years ago Professor G. J. Romanes wrote something concerning instincts in general, and religious instincts in particular, which is still relevant. 'If the religious instincts of the human race point out to no reality as their object,' he says, 'then they are out of analogy with other instinctive endowments. Elsewhere in the animal world we never meet with such a thing as an instinct pointing aimlessly.'[4]

In all the years which have elapsed since Romanes penned this passage, no instance of 'an instinct pointing aimlessly' has ever been adduced. Surely then the presumption is that Romanes' analogy is a sound one. Just as truly as hunger points to its satisfaction in food, and so on

[1] Quoted *Life*, by J. C. Smuts, p. 321.
[2] John Wilcox, *Daily Telegraph*, 25 January, 1961.
[3] Fosdick, *As I See Religion*, p. 134.
[4] *Thoughts on Religion*, p. 82.

through the whole range of physical instincts, so the religious instinct, so deeply rooted in mankind, so ineradicable, points to the reality of the spiritual world. Man cannot find contentment without spiritual interpretations of his life, and spiritual sustenance and satisfactions. The Psalmist's cry, 'My soul thirsteth for God, for the living God', indicates a basal need of human nature, and points to and is an argument for the reality of its satisfaction. As the historian Lecky observes: 'That the religious instincts are as truly a part of our nature as are our appetites and our nerves is a fact which all history establishes, and which forms one of the strongest proofs of the reality of that unseen world to which the soul of man continually tends.'[1]

PART THREE

CONCLUSION

THE CLAIM ANSWERED

THE question to be faced in this section may be thus stated: Is there any reasonable ground for the belief that man has access to a plane of spiritual and eternal reality? William James puts the same question in a different way. After affirming that man becomes conscious in his religious experience that the higher part of himself 'is conterminous and continuous with a *more* of the same quality, which is operative in the universe outside of him, and which he can keep in working touch with',[2] he asks: 'Is such a "more" merely our own notion, or does it really exist?'[3] Is it factual, or a mere dream? Can we demonstrate its actuality, or does it belong to the category of wishful thinking? Such is the question we are now to ask, and answer.

(1)

Let us clear the ground by observing that some of the answers returned to this question by those who desire to prove the reality of this 'more', the reality of the spiritual realm, rest on arguments which are unsatisfactory. For example, there is an insidious variant of the argument from the 'usefulness' of religion, to which reference was

[1] W. E. H. Lecky, *The Map of Life*, p. 219.
[2] *Varieties of Religious Experience*, p. 508. [3] Ibid. p. 510.

made in the previous section. It takes this form. Religious experience shows that certain beliefs have elevated human nature and improved its capacities. It seems natural then to infer from this that these beliefs bring the believer into touch with reality. But this inference must be drawn with caution.

On the face of it, it does seem reasonable to say that the spiritual effectiveness of specific beliefs points to the truth of these beliefs. But a very little enquiry produces abundant evidence that ideas and practices of the most contradictory kinds have shown spiritual effectiveness. It is often said that the validity of doctrine or cultus can be sufficiently proved by the power to arouse devotion. But the dubious nature of this plea is obvious on reflection. If pressed it would justify almost any pious fraud of medieval priestcraft. The robust words of Dean Inge strike exactly the right note: 'When Christianity says that a thing is true, it does not mean merely that it works, nor that we should be happier and better for believing it. It means that what it tells us to believe is objectively true, part of the constitution of the world in which we live, part of the laws of God's creation.'[1]

(2)

One impressive argument from religious experiences to the objective truth of religion is their extent. As Archbishop Temple says, 'it is not religious experiences, but religious experience as a whole, that is of chief concern'.[2] And when we consider the great amount of this 'whole', the colossal accumulation of evidence as reported in numerous books over the last fifty years, evidence drawn from all countries, all centuries, and from all ranks of society, it is extremely difficult to write it all off as mere delusion.

It is one thing to say, and indeed quite reasonable to believe, that *some* of these experiences may be based on delusion. But to say that *all* spring from delusion—and it cannot be too carefully noted that this is the contention of humanism—is quite another thing, and anything but reasonable. 'To suppose that *all* of those who . . . have felt the sustaining hand of God were deluded, is to be guilty of monstrous arrogance.'[3] Can there be any doubt that the severe words of this accusation are justified?

[1] *Personal Religion*, p. 54.
[2] *Nature, Man and God*, p. 334.
[3] Trueblood, *Philosophy of Religion*, p. 267.

Think of those who would have to be included under delusion on this hypothesis. Countless thousands of the noblest spirits of the ages, prophets, poets, sages, saints, the very flower of the race, on whose eminence and superlative qualities the verdict of posterity is an unmistakable one—is it credible that all these were deluded?

On this matter of the verdict of posterity Mr Arnold J. Toynbee institutes an interesting comparison. 'The works of artists and men of letters', he says, 'outlive the deeds of business men, soldiers and statesmen. The poets and philosophers outrange the historians; while the prophets and the saints overtop and outlast them all.'[1]

But on the humanist contention prophets and saints, on whom the infallible judgment of time thus sets its supreme imprimatur, were of all deluded mortals the most deluded, for these are the very ones whom we most associate with religious experiences. Is it reasonable to suppose that these best and noblest of mankind were sub-normal mentalities, pathological subjects?

And when to these illustrious personages we add the testimony of untold millions of ordinary, hard-working, plain-living men and women, honourable in their generations for worth of character and moral probity, of unquestioned saneness and balance of mind, the cumulative argument that in their spiritual experiences they were in touch with reality seems irresistible.

(3)

But the evidence of religious experience, however vast in quantity and impressive in quality, must not be regarded as in itself conclusive. Spiritual experience, at any rate as far as the Christian religion is concerned, is subject to historical evidence, and can never be a substitute for it, for Christianity is profoundly based on historical events, on a series of facts in space and time. 'The Christian experience is always based upon and conditioned by a postulate of historical truth.'[2]

It is said of George Eliot that while for her 'Christianity had lost its basis in history, it remained the most relevant and moving symbolism for the mysteries of life'.[3] But there is abundant evidence to show how tenuous is the hold of the 'moving symbolism' of Christianity, and even of its deepest principles, when severed from their roots in history.

[1] *Civilisation on Trial*, p. 3.
[2] Gore, *Philosophy of the Good Life*, p. 280.
[3] Humphrey House, *All in Due Time*, p. 116.

'I can only express my dismay', writes Professor A. S. Peake, 'at the recklessness with which the Christian case is sometimes staked on experience alone.'[1] This tendency has sometimes taken the extreme form of dismissing the historical evidence as unnecessary and redundant, something which can be dispensed with in the interests of a purely 'spiritual' faith. But thus to disregard the historical evidence in favour of the evidential value of our individual experience may lead to putting a halo around our own foibles and eccentricities, and obviously is to play directly into the hands of those who regard religious experiences as subjective. It is a combination of historical proof with the argument from experience which alone is adequate.

And the historical proof available is so cogent that it can leave little doubt in an unprejudiced mind that in the Christian religion we have a category of truth. This opens up a vast subject, and all we can do in the space at our disposal is to make a brief reference to two salient points—the personality of Jesus and the dependability of the Christian Scriptures.

(4)

The historicity of Jesus of Nazareth is the datum line from which we start, and this is generally accepted nowadays by all schools of thought. But even if it is queried, there can be no doubt as to his unprecedented influence during the centuries. The quality of this influence, when all allowance is made for inadequate theological theories and all the misrepresentation of extremists, vindicates the belief that he embodies for us the truth about God, man, and the universe.

We see in Jesus a truly unified personality; he exhibits complete balance and harmony of mind, utter sanity and that ἐπιείκεια of which St Paul speaks,[2] and which Matthew Arnold translated as 'sweet reasonableness'. He manifests freedom and control, intense vitality and absolute self-mastery, deep wisdom, together with triumphant adequacy in the face of the worst that life or death could bring.

Where in history is there anything approaching this phenomenon? Is it any wonder that a writer so little given to superlatives as Dean Inge should give it as his opinion that 'beyond Jesus of Nazareth . . . the moral stature of humanity can never go'?[3] Or that so unlikely a

[1] *The Nature of Scripture*, p. 236.
[2] 2 Cor. x. 1.
[3] *Christian Ethics and Modern Problems*, p. 191.

critic as H. G. Wells was constrained to exclaim, 'To this day this Galilean is too much for our small hearts'![1]

It is not enough to say, with a recent writer, that 'once we have succeeded in . . . getting back as nearly as possible to the person and the teaching of the historical Jesus, we shall find there, to say the least, a good and safe foundation on which to build a new type of empirical theology for the future'.[2] That is certainly true; but it is not an adequate statement of the case. The construction of a future theology, however desirable, however necessary, must not hide from us what we already possess in the teaching of Christ. Canon Streeter is much nearer the mark: 'Look at the facts and say how and where the march of progress has left Christ behind. Have men since found an answer more true or more inspiring to the questions which every man or woman who thinks and feels is compelled to ask?'[3]

Yes, the answers are *there*, in the teaching of Christ, either in the form of direct statement or, more characteristically, embodied in pregnant principle. But even this is not to say enough. It is not the principles enunciated by Christ, vital as these are, on which we must focus our main attention. It is because of his personality, what he was and not merely what he said or did, that Jesus is seen more and more clearly in every generation to be the key to right understanding of both man and God and of their relations to one another.

For the highest thing our universe has evolved is personality, and, on the principle of Aristotle's famous dictum that 'the nature of a thing is that which it is when its becoming is completed', this means that personality is the clue to the understanding of the universe. From which it follows that personality at its best, as we see it manifested in Jesus, is the interpretation for us of the highest meaning of the concept of reality. As has been well said, 'For mankind there are two unique sacraments which disclose the meaning and convey the experience of reality; they are the created universe and the person of Jesus Christ.'[4] And of these two the created universe, with all its marvel, must give precedence to the person of Christ as a revelation of reality, for in this universe it is not stars and rocks and atoms that are the ultimate truth-tellers about the cosmos, but self-conscious being with its powers of reflective thought, creative art, developed goodness, and effective

[1] *Outline of History*, p. 531.
[2] Dennis A. Routh, *Hibbert Journal*, October 1955, p. 49.
[3] *Reality*, p. 69.
[4] Quoted C. A. Coulson, *Science and Christian Belief*, p. 115.

purpose. In a word, personality is the most significant thing we know; and if this applies to personality as we know it in ourselves, it applies *a fortiori* to personality as we see it in Christ.

Reality, then, must be interpreted in terms of the personality of Christ, and not merely, as is so often done, in terms of spiritual values like goodness, truth, and beauty. Here is a typical utterance in this connection. 'Goodness, truth and beauty are eternal realities, existing by their own indefeasible right. . . . These values are the true meaning, not only of our own little lives . . . but of the universe itself . . . they belong to the innermost heart of Reality.'[1] There is much in this passage to commend itself, especially in a mechano-materialistic age like ours. It is indeed true, and cannot be too much emphasised, that goodness, truth and beauty are eternal realities. But it is not these values in themselves, as theoretical entities, existing as it were *in vacuo*, that we can speak of as 'the innermost heart of reality'. In a universe which has developed personality as its end product, its finest fruit, we must see these values not as 'existing by their own indefeasible right', but as existing in and expressed by personality. And that means, to come back again to the point we are making, the salient point of the whole matter, supremely in Jesus Christ. Just as, in the terminology of the Fourth Gospel, the eternal Logos 'became flesh' in the Man of Nazareth, so did the eternal spiritual values of goodness, truth, and beauty.

(5)

The degree of dependability to be accorded to the Christian Scriptures is obviously a question the importance of which cannot be exaggerated, since these writings are our sole sources of information concerning Jesus of Nazareth. This of course is a matter for testimony from the experts, and of these we will cite, in the first place, two of the most eminent of textual critics. Sir Frederick Kenyon tells us that the New Testament text 'is far better attested than that of any other work of ancient literature. Its problems and difficulties arise not from a deficiency of evidence, but from an excess of it. In the case of no work of Greek or Latin literature do we possess manuscripts so plentiful in number, or so near the date of composition.'[2] To which may be added the

[1] J. H. Beibitz, *Belief, Faith and Proof*, p. 179.

[2] F. G. Kenyon, *Recent Developments in the Textual Criticism of the New Testament*, pp. 74-75.

words of Dr J. O. F. Murray: 'A comparison of the texts put forward by critical editors shows that the passages on which there is still room for serious difference of opinion are few and relatively unimportant.'[1]

That is reassuring as to the sufficient accuracy of the text, and its conformability to the original autographs, which of course have disappeared. On the matter of the overall impression produced by the evangelic narratives, and their inherent characteristics, we will again cite two authorities, one an 'advanced' New Testament critic of our own day, and the other an eighteenth-century rationalist.

William Wrede, the well-known German theologian, writing of the Gospels, pays tribute to 'the plain deep teaching of the purest piety and morality; the illuminating clear parables, the short striking sayings, the rules of life, which are so original in their form'. But besides all this, Wrede continues, we have in the Gospels 'a wholly definite image . . . of a real personality . . . speaking to us with all the force of reality, exalted, majestic, subduing, great and pure, deep and clear, serious and loving, strong and mild'.[2]

Rousseau, in his *Emile*, gives us this succinct testimony: 'The Gospel has notes of reality which are so great, so striking, so absolutely inimitable, that their inventor would be a more astonishing person than their hero.'[3]

Thus, both from the standpoint of the technical authenticity of the text, and from the standpoint of the unmistakable internal marks of genuineness, we can be confident of the dependability of the Christian sacred writings.

(6)

We may close our consideration of the founder of Christianity, and of the writings which give us our knowledge of him, by referring to a word often used in discussions similar to the one in which we are engaged—the word 'absolute'. Sometimes the word is used without qualification, sometimes with reservations. Thus Bishop Gore affirms that Christian theology 'never claims to be able to give expression to absolute truth'. But he goes on to say that the light given us in the revelation which came through Christ 'is the utmost we could receive. . . . It is the reality as far as we can know it.'[4] Surely then we are

[1] *Peake's Commentary*, p. 601.
[2] *Origin of the New Testament*, p. 75.
[3] Quoted Moffatt, *Approach to the New Testament*, p. 167.
[4] *Can We Then Believe?* p. 166.

justified in using the word 'absolute' concerning it? If it is 'the reality as far as we can know it' is that not tantamount to saying that it is the 'absolute' for us?

Dean Inge is more forthright and more convincing than his fellow ecclesiastic. He comments thus on the statement 'the revelation of Christ is an absolute revelation': 'What we mean by it is that after two thousand years we are unable to conceive of its being superseded in any particular. And if anyone finds this inadequate, he may be invited to explain what higher degree of certainty is within our reach.'[1]

(7)

One of the greatest philosophers of the last hundred years, F. H. Bradley, in an oft-quoted passage, declares that 'There is nothing more real than what comes in religion. . . . The man who demands a reality more solid than that of the religious consciousness, seeks he does not know what.'[2] Such is the contention of this essay; and in the second section of it we have seen reason to believe that Bradley's statement is justified. The evidence that religion at its highest and best is

No fable old, nor mythic lore
No dream of bards and seers,
No dead fact stranded on the shore
Of the oblivious years[3]

is compelling and conclusive. A writer of a very different type from Bradley, though equally unprejudiced and dispassionate, Paul Elmer More, the distinguished American literary critic, may be quoted to the same effect. 'I am utterly convinced', he says, 'that an honest search for the meaning of life must lead to the simple faith of theism.'[4] To say that the meaning of life is to be found in theism is only another way of saying that reality is to be found in religion.

At the risk of an apparent digression we may here observe that the very mention of theism is sure to lead in some quarters to the charge of anthropomorphism, the charge of fashioning the Infinite in the form of human personality—man making God in his own image. But if, as we have seen, personality is the highest reach of being with which our universe presents us, and therefore our supreme standard of measurement, it follows that personality, however inadequate for the purpose, is the least inadequate of all the ways known to us for picturing God,

[1] *Christian Mysticism*, p. 327.
[2] *Appearance and Reality*, p. 449.
[3] Whittier, *Our Master*.
[4] *Selected Shelburne Essays*, p. xii.

for fashioning the Infinite, for conceiving of reality. God may be supra-personal—a concept which eludes our limited minds—but he is at least personal.

In any case, if theism is anthropomorphism, the attempt to fashion the Infinite in the image of man, then materialism, its rival theory, its opposite number for the suffrages of our mental allegiance, is mechanomorphism, the attempt to fashion the Infinite in the image of a machine. And which of these two attempts to conceive of reality, to 'explain the universe', is the more intelligent, the more adequate, surely needs no pointing out.

(8)

We may then say of religion, in the words of Professor William. Brown concerning mysticism, that 'it is not just a pleasant subjective feeling, but an awareness of an object and a feeling of union with that object. It is not a merely subjective thing, it is the extreme of objectivity.'[1]

This is emphatic language, especially coming from one so cautious in his utterance as the eminent Oxford philosopher and psychologist. And if it applies to mysticism, which may be defined as religious feeling in an intense form, it certainly applies to religion in the broader and more inclusive sense of the word. The conclusion to which our discussion in this essay leads us is that we cannot make sense of the facts of experience as we know them without arriving at the conviction that there is an Eternal Being who stands behind all life and calls men into relationship with himself. This relationship is the essence of religion, and the *ne plus ultra* of reality.

G. K. Chesterton, in his *Father Brown Stories*, relates the following little piece of dialogue between the hero of the book and a medical doctor. ' "I'm afraid I'm a practical man," said the doctor with gruff humour, "and I don't bother much about religion and philosophy." "You'll never be a practical man till you do," said Father Brown.'[2] The retort of the shrewd and lovable little priest goes to the heart of the matter. Religion and philosophy, rightly understood and at their best, are the most practical things in the world, and the foundation of all practicality. As C. S. Lewis puts it, 'God is basic Fact or Actuality, the source of all other facthood'.[3]

[1] *Science and Personality*, p. 30.
[2] *Father Brown Stories*, p. 744.
[3] C. S. Lewis, *Miracles*, p. 110.

And so it comes about that in a materialistic age, and in a world whose glorying seems to be in technology and mechanism, the splendid paradox of Francis Thompson is proved by those who, believing in an unseen order, humbly endeavour to adjust themselves thereto:

> O World invisible, we view thee,
> O World intangible, we touch thee,
> O World unknowable, we know thee,
> Inapprehensible, we clutch thee.[1]

[1] *The Kingdom of God.*

R. J. BERRY, M.A., PH.D.

The Nature of Man: Genetical Aspects

IT seems to be becoming fashionable for biologists to commit themselves on the subject of man. This year's President of the British Association, Sir Wilfred Le Gros Clark, devoted his presidential address to the subject of 'The Humanity of Man'; Medawar delivered the Reith Lectures on 'The Future of Man'; Waddington has recently published a book on ethics; and Sir Julian Huxley has delivered his latest pronouncements on man within the last few weeks. I am therefore in good scientific company in speaking as a biologist on this subject. What I have to say is illustrated by a story told by Canon Raven. When William Temple and he were young dons together at Cambridge they used to discuss the evolutionary interpretation of life. 'It seemed to us (this may have been the arrogance of youth)', he writes, 'that it was evidently the exception for previous generations to think about the world of nature, the universe, as anything more important than a sort of theatre, on the stage of which the drama of man's experience, man's fall and redemption, was enacted. The universe was for them the setting, the stage, the surroundings, the occasion, but it wasn't an integral part of the play. We were prepared to challenge this and insist that it was an impossible position to take up—that the universe was an essential and significant part on the drama of which we were conscious in the world of ours.' Whatever our views on the history of man's thought of the relationship between himself and creation, it is clearly important for us to see man fairly and squarely in the full context of his environment. On a different plane, our Christian calling in this life, although in relation to the whole of creation, is pre-eminently as a part of the Church (1 Cor. xii. 12), which again involves us in an environment of contact, or conflict, with our fellow-Christians and those who are not members of the Church.

Too often in the past the biological view of man has been synonymous with 'Man's Place in Nature' and the anatomical and physiological comparison of man with the rest of the animal kingdom. This exercise means taking man out of his environment and studying him as a machine, using similar techniques to those one might use in the investigation of a motor-mower. The information one obtains in this way is valuable information, but it is only distantly related to the

study of a species in its environment. Until far too recently biologists have occupied themselves with 'classical' studies of form and function: most important advances in our understanding of the life of animals in their natural surroundings have taken place within scientific living memory. This is particularly true of the human species. It is really only since the war that the natural history of man (a term I prefer to that of 'human biology') has come into its own. Nowadays the study of reactions of various groups of people to different stresses are common. I want to concentrate on some of the basic principles underlying such investigations. My reasons for doing this are twofold: comparative studies of the classical type between man and animals have not advanced greatly in recent years (and any conclusions one might try to draw from them tend to arouse considerable emotion among Christians) and, secondly, as ambassadors of the Gospel, it is perhaps more relevant to know the reaction of people to their surroundings, part of which (we hope) is that Gospel, than to know intimately their physical make-up. From the point of view of experimental studies, this seems to involve consideration of two separate subjects: the controlled response of different people to different environments, and thence the reaction between the inborn constitution and the environment or nature and nurture as it is more commonly called.

I hesitate to dwell at length on the first of these two topics, because I am trespassing into the field of psychology, but the evidence of biology is most important here. Tinbergen and Lorenz have given us reasons for believing that many kinds of behaviour which seem to be peculiarly human are part of a very ancient heritage—'showing off' for instance; playing with dolls; sexual rivalry; and many kinds of 'displacement activity', in which a thwarted instinctive impulse vents itself in actions of an apparently quite irrelevant kind. In this year's Eddington Memorial Lecture, W. H. Thorpe (*Biology, Psychology and Belief*, Cambridge, 1961) reviewed some of the mental processes which we think of as being truly human. He concluded that 'in perception, in concept formation and in curiosity and exploration, the human mind seems to be essentially similar to the animal mind; and all these features have, in the animal mind, a vital part to play for the survival and evolution of the stock'. Furthermore, he believes that 'we cannot even make a hard and fast distinction between the animal and human mind on the grounds of artistic sensibility. We find that monkeys and birds (but not fish) prefer patterns with aesthetic character such as symmetry, rhythm and vivid contrast rather than irregular patterns.'

Thorpe finds a definite difference between the minds of animals and men only in what Hobhouse calls the 'Correlation of Governing Principles', which involves 'a recognition of abstract moral law, eternal values which are in themselves good'. If we accept this conclusion, we must also recognise the fact that most men, most of the time, live on a completely sub-human plane, prostituting their humanity to sensual gratification, indistinguishable except perhaps in degree from that experienced by many animals.

C. H. Waddington (*The Ethical Animal*, London, 1960) has made what seems to me an important contribution to this discussion. He envisages the human infant to be born with probably a certain innate capacity to acquire ethical beliefs but without any specific beliefs in particular. During the first few months of life processes go on by which these innate potentialities become realised, and the infant becomes moulded into an 'ethics participant' by a course which Waddington thinks should be thought about in abstraction from any consideration of what particular ethical system is adopted. 'At the same time as a child becomes ethicising it acquires certain definite ethical beliefs; and as it goes on formulating these beliefs in a more and more definite and specific way, it becomes more fully the sort of being that goes in for having ethical feelings. Similarly, at a later stage in life, rationally formulated criteria for criticising ethical systems soon acquire an ethical value of their own in the mental make-up of the person who holds them. In both these early phases, unconscious mental processes play an enormously important role, and they appear to be of a much more peculiar and unexpected nature than might have been guessed. However, it is important to note that they essentially involve interaction between the person under consideration and his external environment, in particular other people. The most important point for our argument is the contention that the moulding of the newborn infant into an ethicising being is not due wholly to intrinsic forces, but requires an interaction between him and his external circumstances.' One of the difficulties when this topic is discussed in Christian literature is the lack of definition of the characteristic of the individual which undergoes reaction with the environment. Medawar has pointed out that the instruments or tools used by man are *functionally* parts of his body, even if they are anatomically separate and distinct. Hence when we speak of the reaction of a man we must include what is variously called his 'socio-genetic' (Waddington) or 'psycho-social' (Huxley) component. This increases the difficulty of analysis

considerably. As Christians we think of the reacting component as being the soul, the 'Inner Light', or 'Divine Spark', or some other rather vague entity. There seems little justification for distinguishing a spiritual part of man reacting apparently in isolation from the rest of his being, except for its use for purely didactic purposes.

R. A. Fisher's discussion of the nature of creation (*Creative Aspects of Natural Law*, Cambridge, 1950) is relevant in this context. He starts from the premise that there seem to be two main reasons why Christians often find it difficult to accept the evolutionary process as evidence of creation. Firstly, mutations, when considered in isolation against a deterministic world, appear to be 'random', and secondly, natural selection, again considered by itself, appears to be nothing more than a blind weeding-out mechanism. Fisher looked at the word 'creative' 'coldly and dryly, divesting it of emotional significance and moral associations, and takes it to qualify effective causation'. Using a closely reasoned argument, he points out that creativeness does not, and cannot, lie in some overall detailed control of mutation (as suggested by the late Bishop of Birmingham), but must reside in the whole inter-relation between organism and environment, animate and inanimate. It is this environment which determines the nature of selection. Thus creativeness lies neither in the one nor the other but in the interaction of both throughout evolutionary time. Consider the components and they appear quite inadequate to explain the course of evolution; consider them together, as Fisher does, and we arrive at a world picture which emphasises the essential unity of creation and avoids the idea of a God who as Coulson satirises, 'controls His universe by intervening only in those parts of the world mechanism which we cannot at present see into or understand'.

This leads us on to the core of the problem: the relation between our inborn constitution and the environment. It is often said that all men are equal—which would minimise this problem—but this is usually a statement of political aspiration or is actually meant to be that all people should have equal rights and opportunities. As a bald statement of fact it is patently not true—either as a theological or a biological proposition. We, as British, are manifestly different from both the Chinese and the Africans, not necessarily inferior or superior, but different. The idea that human races differ in adaptively significant traits is emotionally repugnant to some people. This attitude almost invariably goes hand in hand with a misunderstanding of the nature of biological heredity. I have purposefully chosen rather mundane

examples to illuminate this theme because they are, generally speaking, better known and easier to understand. I do not think that this choice lessens the value of the conclusions that I shall draw which relate to the more specifically human sides of man's nature.

One of the more important results of modern genetical work is the emphasis upon the whole genotype of an organism: from the moment of conception our whole development is the resultant of the interaction between our entire hereditary component and its immediate environment. None of the reactions which a human being displays could occur without a particular environment, which can only vary within certain restricted limits; and no one is born except from particular parents. We tend to think of individual responses to different stimuli as being of relatively minor importance (although discoveries of susceptibilities to neoplasms, such as the lung cancer precipitated by smoking in some people, may have increased the awareness of their importance). In fact many of the world's races are adapted to local conditions to a marked extent. 'Individuals who have a small amount of body fat, great body linearity and brunette skin can probably march for substantially longer distances in a hot desert than their morphological opposites. Individuals with a stocky body build and large deposits of subcutaneous fat, the typical Eskimo build, can sit nude for considerably longer periods in a cool temperature with less loss of body heat and less metabolic disturbance than the desert-adapted thin man. Experimental evidence has even shown that the American Negro who has his extremities exposed to below freezing temperatures is much more likely to suffer from frost-bite than the American white who is exposed to the same condition. On the other hand, American Negroes show less deviation from normal temperatures when they perform work under hot, wet conditions than do American whites, even though matched for body linearity and fats, factors which might affect strain levels. Australian aborigines who sleep nude under cold conditions apparently have mechanisms of vaso-constriction which permit them to conserve body heat and sleep peacefully in a situation where European whites would burn up great quantities of food and shiver, while totally unable to sleep.'[1]

Such adaptations to local situations are determined by many genes, and are not simply analysable. However, there is no reason to think that the inheritance of such traits differs in principle from the genetic

[1] P. T. Baker, *Human Biology*, **32**, 3-16 (1960).

resistance to certain malarial infections, which is more simply inherited. There are three single gene-determined conditions (sickle-cell trait, thallasaemia and glucose-6-phosphate dehydrogenase deficiency) which probably confer some protection against some forms of malaria. They occur with a high frequency where malaria is, or has been, common. In themselves these conditions are harmful to their possessors, but in malarial areas the disadvantage is overridden by the protection that is afforded against the disease. The fact that three distinct traits, controlled by a single gene, appear to give protection against malaria, suggests how different genes might interact to produce a genic system of disease resistance. Most data on genetic resistance to disease in animals suggest that many genes are involved.

One of the easiest of man's characters to study in populations is his blood groups. Populations in many parts of the world have been sampled for their blood, and atlases have been published showing the distribution of the major blood groups of the various systems. Such maps have been of use to anthropologists in tracing the mass movements of people in the past, but the actual meaning of the distributions has, until recently, been far from clear. They were usually considered to be random, or 'non-adaptive' in the language of selection theory. However, it is now known that highly significant correlations exist between some of the blood groups and certain of the common degenerative diseases of modern life. For example, 'persons of blood group O run a markedly greater risk of developing duodenal ulcer than those of groups A, B, or AB, while group A people run a lesser, but still appreciable risk from gastric carcinoma. Furthermore, the blood groups are the manifestation of differences in the antigenic structure of the human organism, and since the antibody-antigen system of the organism is its chief defence against infectious disease, differences in this system may lead to different diseases. For example, cholera vibrios are extremely susceptible to acid conditions, and one of the major mechanisms by which the body is protected against cholera is the inability of the cholera vibrios to survive the acid conditions in the stomach. But there seem to be differences between the ABO blood groups in the amount of stomach acid, and these may indicate different susceptibilities to cholera. Associations have been reported between the blood groups and many diseases, including filariasis, poliomyelitis, diphtheria, scarlet fever, measles, typhoid, whooping cough and tuberculosis.'[1] In other words, the

[1] F. B. Livingstone, *Human Biology*, **32**, 17-27 (1960).

present distribution of blood groups may be a reflection of the diseases and plagues that ravaged mankind in the past. From this it is concluded that different populations of men have their own characteristics, and any one of those populations must exist in a dynamic balance with the environment.

There are two axioms which are at the base of all evangelistic preaching. They are that 'there is no difference, for the whole human species has sinned and come short of the glory of God' and that 'every individual is personally accountable to God for himself'. Without in any way detracting from the absolute truth of these statements, it seems that we must accept the additional proposition that different people respond differently to identical stimuli. I know that I am on dangerous ground in this context where the sovereignty of God and the work of the Holy Spirit is involved, but I do not think that this necessarily negatives the proposition. Take the basic divorce of the human species into male and female: this is a genetically determined dimorphism, maintained by a simple (in the genetic sense) chromosomal switch mechanism. Two brothers may differ from a sister by only a few more genes than they differ from each other, yet the female outlook upon life, and hence on the human level to the claims of Christ, tends to be vastly different to the male one—as is shown by the sex ratio in most of our churches. The male-female divergence is an extreme one, but I think it illustrates fairly the different responses of different hereditary constitutions to the same thing.

We have already seen that the present genetic composition of a race or population is dependent upon its past history. It is widely believed that the forces of selection acting upon man have been abolished by civilisation, hygiene or better medical care. This is not so. What has happened is that the forces have been altered and transferred at certain points from one genotype to another. They now seem to be 'directed towards defects present at birth and leading to failure of development or of function. Even in highly civilised countries, like the United Kingdom or the United States, nearly half of all fertilised ova are unfit in the crude sense of failure to reproduce, and it may be assumed that this failure is, to a significant degree, attributable to the genes carried by them. Penrose has estimated from evidence from many sources that early prenatal loss accounts for at least 15 %; then 3 % of the remainder are stillborn, 2 % are counted as neonatal deaths and 3 % more die before reaching maturity. Of the survivors 20 % do not marry, and of those who do, 10 % remain childless. In view of

the large extent, and the persistence, of this loss and the rarity of observed mutation, it seems probable that selection is, for the most part, acting on homozygotes at both ends of the scale keeping the population in a genetical equilibrium under these conditions.'[1]

One aspect of the genetically dynamic state of the present-day population is shown by the lowering of the age of onset of menstruation in young girls. 'In Sweden in 1840 the average girl began menstruating at the age of 17 or later; nowadays the figure is about 13½. The last two London County Council surveys conducted at an interval of 5 years show a reduction in the age of almost exactly two months. Thus the reduction has been continuous at about four months per decade, or roughly one year per generation. The reasons for this trend are not entirely clear. The earlier maturing is usually put down to better nutrition, and probably with reason. However the acceleration has by no means been confined to the less favoured social classes; indeed it has been only a little more in these classes than in the more favoured ones. An alternative or supplementary explanation was suggested some years ago by Dahlberg, to the effect that the change was the result of hybrid vigour. At the time there was little evidence for this in man, and indeed the evidence is still equivocal, but at least suggestive. If we accept this evidence, then increased outbreeding—that is, an increased tendency for persons to marry outside their own village rather than within it—could have caused the reduction in the age of onset of menstruation. There are indeed data to show that the degree of outbreeding has been steadily increasing in Europe ever since the introduction of the bicycle.'[2]

Another complication of human breeding systems is that human mating is far from being at random. A study of marriage partners reveals that there is a strong correlation between mates for many characters. This is strongest for intellectual capacity, but also applies to physical attributes, social status, colour and so on. This non-random mating of the species maintains a considerable amount of genetical polymorphism, and acts to retard the effect of any altered selective pressures.

One last point about our adaptation to the environment. Mutation rate and the amount of variability in a population is determined by

[1] L. S. Penrose, *Symposia of the Society for the Study of Human Biology*, **2** 1-10, (1959).

[2] *British Medical Journal*, 19 August 1961.

our environment. A certain degree of background radiation has always been part of our environment. The amount of background radiation will certainly increase over the next few years. The biological question is whether genetic change can take place quickly enough so that organism and environment can remain in equilibrium. The rates of change of characters determined by many genes is probably faster than those determined by only a few, but our information about the genetic variance of man is so incomplete that it is virtually useless to make any prophecies on this point.

In the last two centuries, what Whitehead has called 'the invention of modern invention' has produced, and is producing, changes in the material circumstances of man comparable only to those brought about by the invention of urban community life in the Neolithic period. The most obvious sign of the changes that have taken place is the breakdown of community life and the isolation of large sections of the community from direct contact with the forces of Nature. Over the centuries it is reasonable to suppose that man achieved a fair amount of rapprochement with his environment. In particular there must have been selection for primacy and leadership in the rural communities which were the most usual habitat of man. The enormous burst of population increase consequent upon the industrial revolution, the migration into larger assemblies, the disruption of social patterns and allegiances (including those to the local church) must all contribute to a decrease in the adaptation of our species to its environment. This means more 'mis-fits', to use a sociological term, as genetic complexes are broken up and, more important, it means a degree of tension between man and a new environment with a consequent plasticity of behaviour.

I do not know if I am correct in these surmises, but there is one point which directly emerges from the foregoing, and which accords with our Christian knowledge of the nature of man: we cannot shape the future of our species purely by, as we say, 'improving its lot' financially and by education. We have only our individual innate capabilities for realisation as personalities. Whether these are developed to the full depends upon the reaction that takes place with our environment. God has a place for each one of us; in this age of change, we must place ourselves more than ever in the hands of the Holy Spirit to enable us to find that place, and pray that we may always be discontented with a second-best (2 Pet. i. 9-11).

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The Nature of Man: Evidence from Psychology and Psychiatry

A CENTURY or more ago a medical enquiry into the nature of man would have been entirely appropriate. At that time the relationship of psychiatry and psychology to philosophy was altogether closer than now, not only in its immediate history, but also in its prevailing attitudes. Kant's influence on nineteenth-century opinion had opened the self or soul to scientific study, and thereby made psychology a logical possibility. His insistence on mathematical measurement, supported later by Herbart, profoundly affected the course of psychology through Wundt to the present day, requiring a rigorous objectivity in the study of an immaterial and nebulous field.

At that period the psychologist and philosopher were not to be clearly differentiated: and both were concerned with the whole man. Darwin's theory was applied not only to the physique of man, but his mental development and eventually by implication to his spiritual nature. Herbert Spencer, typical in this respect of his time, and the interpreter of Darwin, published his *Principles of Psychology* in 1855, and embarked on his *Synthetic Philosophy* only a few years later. In such a climate also moved the many-sided genius Francis Galton. His many fruitful psychological investigations arose out of his Darwinian philosophy. He sought to delineate and measure man's psychological characteristics, in order to improve the stock of the race eugenically. More recently, William James, while holding a chair in psychology, wrote increasingly on philosophical subjects, but serving rather to divide than to unite the two fields. Such a cleavage was characterised by Karl Jaspers, who wrote his *Allgemeine Psychopathologie* in 1913, and worked ever since as a philosopher.

It is from the time that psychology and psychiatry took their leave of philosophy that they began to develop as objective sciences with their own foundations, and to make real progress. Correspondingly their subsequent course has increasingly been concerned with particular problems, and decreasingly with those general concepts of man and his nature, familiar in the early stages of these sciences. However, at all periods of psychological enquiry, conclusions about man's nature from

study of his behaviour have been ill-founded. Although psychology and psychiatry seem to deal more than any other disciplines with man's essential, immaterial nature, the light they shed is inevitably fragmentary and shifting.

Methods and Limitations

At the outset we must enquire into the sort of information available from these sources and the limitations of the methods. The *Introspective method* of enquiry was widely used by the philosophers and early psychologists. Basically, much of the evidence underlying the psychoanalytic and related theories is introspective, although in other contexts the method commands little respect. There is also much psychoanalytic evidence that is not fully accessible to the patient's introspection and this sort of material can be subsumed under the head of the *Casuistic method.* Here the therapist includes among his observations character and behaviour as well as utterances. He collates them often within a theoretical framework, which he tests by making predictions about subsequent events; inductive generalisations can then be made. Such methods, however, share the weaknesses of those that depend on the study of single cases. Thirdly, the *Statistical method* has been used, in epidemiology, in the testing of psychological measurements (Hull, Eysenck), and generally in ensuring that observations are not merely chance results. Finally, in certain instances *objective techniques* are available, as the electroencephalogram, or biochemical and endocrinal techniques. From these four sources, independently or combined, fundamental theories arise. However, it can be seen that the information on which such foundations stand are very variable. Indeed, when compared with the relative reliability of information in physics or chemistry, psychiatry and psychology are built on shifting sands indeed.

The distinction drawn by Dilthey between 'understanding' and 'explanatory' relationships is also relevant here. The latter, those relationships that are reliably predictable and are not greatly influenced by observer error, are uncommon in psychiatry. Most seem rather to be 'understanding' relationships. They cast light, they form a basis for treatment, but they do not share the absolute quality of the explanatory relationship. So far as this distinction holds good in these sciences, so far is it unjustifiable to reach wider conclusions such as those that concern the underlying nature of man.

Finally it is necessary to bear in mind that the whole body of psychological knowledge and theory has grown up as the result of asking certain questions. These may indeed be the most obvious questions, but it is possible to conceive a different set of problems occupying workers' attention. To some extent Russian psychology, which has developed in relative isolation from the west, displays such a contrast.

For all these reasons, the nature of man is little spoken of in the psychological field, and such statements as are made must be received with caution. Nevertheless, behind much work and theory various implicit views of man's nature may be traced.

1. *The Biological View*

Here we are concerned with the consequences of Darwin's work in the psychological field emphasising the aspects of his nature that man shares with the animal kingdom. The view implies that the controversy in the body-mind problem is settled in favour of discoverable physiological functions lying at the bottom of all human behaviour, and that these functions are more or less identical with those found in animals.

Darwin's biological work in *The Origin of Species* (1859) was quickly extended to imply a continuity of mind between animals. In his *Expression of the Emotions in Man and Animals* (1872), he drew upon evidence from (e.g.) the friendly or savage attitudes of animals and equated these with analogous behaviour in man. This work had two main consequences. Firstly, the development of Darwin's own theme by writers such as Romanes (*Animal Intelligence*, 1882: *Mental Evolution in Animals*, 1883; *Mental Evolution in Man*, 1887).

Further evidence on animal behaviour came from Lloyd Morgan and Thorndike, investigating learning in rats, and from Yerkes, working with primates. In the twenties, John Watson applied a similar approach to man. From his 'naïve behaviourism' consciousness was excluded as the field of study. Behaviour could be explained and understood by the study of behaviour alone. Although supported by the complementary work of Tolman and Karl Lashley, Behaviourism in this form has no adherents. It survives vigorously, however, in the school of Pavlov, who discovered in the conditioned response a useful tool for the study of behaviour. The fact that such responses could be facilitated, inhibited or extinguished with varying ease or difficulty in

different individuals accounted for differing personalities and behaviour on a basis of physiological principles. Pavlov's justification of this wholly physiological attitude towards man lay in his results. When he adopted the current psychological viewpoint, using concepts such as 'desire', 'expectation', 'disappointment', he made no progress with his work; using his physiological concepts, the system developed and gained in coherence.

The second sequence initiated by Darwin was that of genetic studies. It was argued that if the continuity between animals and man were complete, objective measurement of man's mental characteristics was the prelude to selective breeding and improvement of the race. This was the viewpoint of Francis Galton, whose pioneer work in psychological measurement initiated active eugenic work.

This biological view of man finds topical expression in the work of the ethologists—the students of animal behaviour. From the work of Tinbergen and Lorenz such important principles have emerged as 'imprinting'. Here, an animal's behaviour can be shown to be affected permanently by a specific stimulus experienced at a critical but transient stage in its early development. Psychoanalytic writers have suggested that the permanent effect of early psychological trauma in man is due to this process.

It can be seen, therefore, that the biological approach throws light on those aspects of man's nature that are shared with animals. In behaviouristic study the same techniques are applied both to animals and man. Underlying this field of psychology is the assumption that man 'is' ultimately no more than animal, and that his behaviour and experience can ultimately be understood in those terms that serve for animals. Such a conclusion is in many respects self-evident; man's nature is often nothing but 'biological'. But it is the assumption that this approach provides a total understanding of man and his nature that makes the critic uneasy. No view of psychiatry can yet make claims of omniscience.

2. *The Atomistic View*

The second implicit view of man's nature is that which springs from a large number of restricted disciplines. Psychology has advanced only since it abandoned speculative generalisations, and concerned itself with particular functions: it has proved the value of studying a restricted segment of behaviour. Taking these segments together

however, man's nature appears as a mere mosaic of functions, each fragment being illuminated to a greater or lesser extent. Here the unity of man's nature, or the totality of his functioning, is beyond the range of study, or ignored. Such an approach has been traditional where psychiatry has gained most from neurology and neuropathology. Man's 'nature' has there been viewed as the outcome of a complex series of cerebral processes, sometimes distorted by the presence of specific lesions. It was Freud's distinction that, having been trained in this school by Meynert and Wernicke, in his own contribution he again emphasised the individual nature of man, and his function as a whole.

3. *The Deterministic View*

Determinism assumes that man's thought and behaviour is never entirely a matter for free individual choice. Free-will is a fiction and in fact is the resultant of a multitude of factors from the past and present. Ultimately, the extreme view asserts, all such factors must be discoverable. This view of man is stated in a variety of ways. Slater, for example, writes: 'The free-will, on which both law and religion are based, proves a heuristically sterile idea'; meaning, however, not that free-will does not exist but that 'it cannot be used scientifically'. More dogmatically Maddison asserts that 'this type of thinking challenges the traditional . . . in its complete rejection of the doctrine of free-will as a useful, necessary or desirable explanation of human behaviour'.

Man with free-will is too complex an individual for scientific study, by the methods available. To use such methods, therefore, we must exclude certain fields or concepts. But as the application of these methods bears increasing fruit, and the field of knowledge extends, it becomes increasingly reasonable to suppose that the factors in man's behaviour can be wholly accounted for by such means. Thus Maddison claims that 'The argument against it (free-will), in brief, is that extensive clinical experience clearly shows that where circumstances *appear* to offer us several alternative modes of procedure, the path which we in fact take is unswervingly determined by our personality structure'.

What then is the evidence supporting this deterministic view of man?

(i) *Social Determinism*

It is a familiar principle, but one much exploited by Adolf Meyer, that much of man's behaviour, normal or abnormal, springs from his

relationship with the environment. The extreme of this view was held by Karl Marx, that man is wholly the creature of his social and economic environment, which determines his consciousness and existence.

The mechanisms by which the environment may be so effective have been indicated by Pavlov. Conditioned responses may easily be established both in animals and man under artificial conditions. It is not far-fetched to postulate that similar responses, established naturally, may account not only for much behaviour, but also for much of man's mental life. In addition, Pavlov extended his findings to form the basis of classifying human personality.

However the process actually works, the relationship of social factors and human personality has been shown in a variety of ways. Social anthropologists like Malinowsky, Margaret Mead or Ruth Benedict have shown how practices of child-rearing and various cultural attitudes appear to account for the 'typical' personality produced by each society. In Samoa, for example, the lax, easy-going attitudes towards sexual behaviour appear to account for the apparent absence of sexual problems in Samoans, or, indeed, serious conflicts on this topic.

The importance of social factors in suicide is well shown in Sainsbury's study of London. The great differences in suicide rate between the boroughs could be related to social differences, namely the social isolation of the individual and the lack of cohesiveness of the particular society in which he lived. It is similarly known that the psychoses of old age largely arise from external factors, such as retirement, bereavement or a change in domicile, rather than those constitutional causes so crucial in younger patients.

In the ecological studies of Faris and Dunham in Chicago and Hare in Bristol, it was found that individuals living near the centre of cities suffered an increased risk of schizophrenia, relative to those who lived on the periphery. The evidence, supported by Hollingshead and Redlich, suggested that some pathogenic social effect was at work, related to the social differences, but as yet unidentified.

(ii) *Individual Determinism*

The importance of the effects of childhood experience in the origins of behaviour and personality have been identified with Freud's teaching and contributions. Some of his earliest work concerned the part played by childhood memories and experience in the genesis of

hysteria. Such experience may mould attitudes, give rise to character traits, and be an important factor in the development of pathological symptoms. The identification of such experiences, and the associated fantasies and their interpretation, is the basis of psychoanalytic therapy.

However, Freud made a greater contribution to the understanding of man than this. He described man in terms of the libidinal force: he saw man as the resultant of fundamental aggressive and sexual drives, and the internal defences against their immediate expression. Man becomes a dynamic balance between the basic forces of the Id, the 'reality principle' of the Ego, and the conscience of Superego. Where Freud emphasised the pre-eminence of the sexual, Adler saw man as the victim of a struggle for power, emphasising his repeated alternative of aggressive dominance or submission. Jung, while sharing these views, also drew attention to the fundamental ideas held in common by men, the 'collective unconscious', and the mystical side to the nature of man.

In common these schoolmen struck an important new note. Where man had previously been dissected and fragmented, the analysts saw him again resynthesised. He was seen now as a whole, and in the setting of his environment.

Objective evidence in support of analytic theory is slow to accumulate. The importance of the earliest experiences has, however, been confirmed, for example, in the Goldman-Eisler's studies of breast-feeding. Children who are weaned before three months fall, as adults, into the category of 'pessimists', whereas those weaned late, over nine months, emerge as 'optimistic' adults. Wootton has criticised much of the work relating broken homes to childhood behaviour disorder, but there remains suggestive evidence that prolonged separation from parents at an early age may be a factor in later disturbance. Similarly, West showed that the absence of a boy's father may be an important factor in his later homosexuality.

From evidence of this sort man's nature, and in particular his individual personality, appears as something plastic, malleable to the forces around him.

For evidence concerning the individual constitution, the innate nature on which the environment plays, we must look elsewhere, although it is difficult of access for research. In the field of mental illness its effect is clear, for example in the inheritance of schizophrenia, which can be transmitted in much the same way as certain physical

characters. Studies of twins strikingly confirm the effect of genetic constitution in determining not only illness, but also personality. To some degree the electroencephalogram (E.E.G.) which shows resemblances between twins, confirms the importance of constitution.

Abnormality in the E.E.G. may also be often correlated with abnormality in the personality, being associated with aggressive or immature behaviour. As these character traits diminish, the E.E.G. approaches normal; it therefore seems to reflect the process of 'maturation', although its nature and the factors involved are still unknown: presumably they are biochemical in nature. Hints by analogy come from conditions such as phenylketonuria and Hartnup disease, in which inherited enzyme abnormalities so disturb cerebral functioning as to affect intelligence and behaviour.

A further sidelight on the nature of man comes from the relationship between physique and temperament. It has been known since the time of Esquirol (1774-1840) that the tall slender psychiatric patient suffered insidious deteriorating illnesses, whereas the short thick-set individual suffered from acute but recoverable illnesses. These general impressions have many times been confirmed and extended using a variety of techniques. It may now be accepted that there are significant tendencies for specific physique to be associated not only with certain forms of mental illness, but also with certain temperamental characteristics.

Conclusion

In summary, it is clear that the light that psychology and psychiatry can shed on the *nature* of man is remarkably limited, although they are concerned with his immaterial part, from which the most revealing evidence might be expected. This lack may be because these disciplines are not explicitly concerned with man's nature as such: they *are* concerned with his behaviour and the underlying motives.

Much of this behaviour appears as the Pavlovians have described it, physiological, or to be understood in exactly the same terms as animals, with whom man shares so much. However the subtler aspects of his nature are evidently of the greatest complexity. Highly individual, the product of his heredity, yet also permanently moulded by his environment; dependent in turn on that environment for his integrity, his unity of body and mind is also apparent.

However, beyond this psychiatry can make few pronouncements. Its picture of man is incomplete, and one that is clouded by initial

assumptions as well as by ignorance. It presents no grounds for stating that man's nature or his behaviour are completely comprehensible in psychological terms, although such an assumption is useful as a spur to research. But man's moral and spiritual nature lie largely outside the field of psychology and psychiatry, and therefore beyond their competence to pronounce upon.

C. E. A. TURNER, M.SC., PH.D.

Puritans and the Royal Society

THE official programme of the recent tercentenary celebrations of the founding of the Royal Society included a single religious service. This was held at 10.30 a.m. at St Paul's Cathedral when the Dean, the Very Rev. W. R. Matthews, D.D., D.LITT., preached a sermon related to the building's architect, Sir Christopher Wren. Otherwise there seems to be little reference to the religious background of the Society's pioneers and a noticeable omission of appreciation of the considerable Puritan participation in its institution.

The events connected with the Royal Society's foundation range over the period 1645 to 1663, but there were also earlier influences. One of these was Sir Francis Bacon, Lord Verulam, 1561-1626. Douglas McKie, Professor of the History and Philosophy of Science, University College, London, in *The Times* Special Number, 19 July 1960, states that Bacon's suggested academy called Solomon's House described in *New Atlantis* (1627) was too often assumed to be influential in the founding of the Royal Society, much in the same way as Bacon's method of induction, expounded in his *Novum Organum* of 1620, has been erroneously regarded as a factor in the rise of modern science. But this may be disputed, for Bacon enjoyed considerable prestige as a learned man and his works were widely read. Moreover, an examination of titles of books written during the first half of the seventeenth century indicates that the title of his earlier work, *The Advancement of Learning* (1605), was quoted and copied many times.

J. W. Adamson in *Pioneers of Modern Education*, pp. 16-17, rightly corrects any extravagant views of Bacon's importance as a scientist, pointing out he did little original investigation, that he adhered to the Ptolemaic Theory and remained ignorant of some contemporary science, including the invention of logarithms. He does, however, recognise that 'His tireless industry in her cause, his exceptional powers of imagination and expression, made him the poet, the prophet and the journalist of the New Philosophy'.

His influence through this 'Advancement of Learning' is seen in such books as the one William Petty wrote, *The Advice of W. P. to Mr. Samuel Hartlib for the Advancement of some Particular Parts of Learning*, 1648. Hezekiah Woodward also opens the preface to his book *Of a*

Child's Portion, 1649, with 'Our Great Advancer of Learning noteth . . .'. A title of John Dury's was *An Agency for the Advancement of Universal Learning*, 1649. That year *An Humble Motion to the Parliament of England concerning the Advancement of Learning* was presented by John Hall. The ready pen of Samuel Hartlib produced *The Advancement of Husbandry Learning*, 1651, and three years later edited educational pamphlets 'for the consideration of those who seek the Advancement of Learning in these Nations'. Also in 1653 John Webster presented his criticisms in *The Examination of Academies*, 'to the judgements of those who love the Advancement of Learning'. All the foregoing were Puritans, while the Royalist, Abraham Cowley, in 1661, wrote *Propositions for the Advancement of Experimental Philosophy*.

It is also interesting to note that Bacon was the second son of Sir Nicholas Bacon, Lord Keeper of the Great Seal of England and of his learned Puritan wife Ann. Such a mother may well have influenced her son to study the works of God, especially as the Puritans' great teacher, John Calvin, wrote *The Institutes of the Christian Religion*, 1559, in four books, the first of which is entitled *Of the Knowledge of God as Creator*. In this he states 'There is no portion of the world, however minute, that does not exhibit at least some sparks of beauty . . . the elegant structure of the world serving us as a kind of mirror, in which we may behold God, though otherwise invisible'; and 'Let us not decline to take a pious delight in the clear and manifest works of God'. From this treatise later Puritans were to find inspiration for scientific work. Bacon meantime coined the phrase 'To the glory of God and the relief of man's estate', which was to become the slogan of the pioneers in science.

The establishment of Solomon's House, suggested by Bacon, would be a research institute of some thirty-six fellows, with apprentices and assistants, engaged in various projects, in pure and applied science, a conception remarkable for the imagination and insight displayed by the author. It was this model, quoted later by learned men, that undoubtedly helped to produce a climate of opinion favourable to the establishment of the Royal Society.

William Petty in his 'Advancement' mentioned above refers appreciatively to Bacon's works, and advocates, among other things, the establishment of a College of Tradesmen and an Academic Hospital with a laboratory, botanic garden, library and qualified staff to conduct scientific investigations. Twelve years later Petty was to be one of the founders of the institution which was to foster such activity. This

instance even alone would suggest that Bacon had considerable influence in the creation of the Society.

Another factor favourable to the formation of the Society was the establishment in 1597 under the will of Sir Thomas Gresham of a college in his London house. It consisted of seven professors who lectured respectively on Divinity, Law, Rhetoric, Music, Physic, Astronomy and Geometry. This was no research institute and tended to follow traditional lines, but its professors enjoyed considerable freedom. Among them were a number of Puritan scientists, some of whom became Fellows of the Royal Society, the chief being the founder members, William Petty and Jonathan Goddard.

It was in Gresham House that early meetings of these men interested in science took place. The first was in 1645 when the Civil War was still being waged. Discussions were confined to scientific topics, politics and religion being banned for obvious reasons. Here it would seem that the participants were either Puritans or those less ardent for the king and therefore tolerated in Parliamentarian London. More enthusiastic Royalists would surely have been in the field elsewhere.

John Wallis described these meetings of 'The Invisible College'. They had apparently been suggested by Theodore Haak, who was probably of Dutch origin, born near Worms of Calvinist parents. He became a deacon and was employed in London by the Westminster Assembly (Puritan) to translate into English some Dutch annotations of the Bible which were published in 1657. According to the *Calendar of State Papers* he had been awarded £50 in 1650 by Parliament for 'good service in corresponding beyond the seas'. Haak thus was of definite Puritan sympathies, and in 1663 he became one of the original Fellows of the Society.

The religious views of Wallis himself may have been derived from his father who was a minister and from his education in that seed bed of Puritanism, Emmanuel College, Cambridge. He became a chaplain and, in 1642, by deciphering a Royalist message in two hours, made himself a great reputation. While he gave evidence against the persecutor of Puritans, Archbishop Laud, who was executed in 1645, he signed the remonstrance against the execution of Charles I. Wallis became a prominent mathematician and Cromwell appointed him Savilian Professor of Geometry at Oxford, 1649. He was another of the Fellows elected in 1663.

John Wilkins, a prominent member, had a Puritan background, and was made Warden of Wadham College, Oxford, by Cromwell

in 1648. He wrote on both science and theology, and became Bishop of Chester, 1668, attempting the comprehension of dissenters and opposing their persecution. He was a founder Fellow and the first Secretary of the Society with Oldenburg.

George Ent was one of the London group. His father, a merchant, came to England as a refugee from Roman Catholic persecution in the Low Countries. He had graduated in medicine at Padua in 1636. He wrote in support of Harvey's view of circulation and eventually became president of the Royal College of Physicians and was knighted by Charles II. His Fellowship of the Royal Society also dates from 1663.

Another graduate in medicine attending these meetings and supporting Parliament was Christopher Merrett. He also became a Fellow in 1663.

The Gresham Professor of Medicine, Jonathan Goddard, was a confidant of Cromwell. He too had graduated at Padua. His wide interests ranged from telescopes to chemistry, and fruit trees to medicine, as revealed in the fourteen papers he contributed to the Society. In 1651 he became Warden of Merton College, Oxford, but was ejected at the Restoration.

The senior member of the Invisible College was the forty-eight-year-old Francis Glisson, already Regius Professor of Physic at Cambridge, retaining his chair through the Commonwealth and until his death in 1677. He wrote extensively on medicine and also became a Fellow of the Society in 1663.

The other Gresham Professor at these early meetings was Samuel Foster, who held the chair of Astronomy. He was no theorist but a practical mathematician, a practising observer and a maker of astronomical instruments. Another product of Emmanuel College, Cambridge, he died in 1652, before the end of the Commonwealth, and thus was the sole member of the group who did not join the new Society.

All the above were university men and supporters of Parliament. Charles Scarbrough was the only pronounced Royalist in the group. A physician and friend of Harvey, he was knighted by Charles II and became a Fellow of the Society in 1663.

The other member mentioned by Wallis was the youngest, eighteen-year-old Robert Boyle, a product of Eton, of independent means, and to make his mark as the greatest of these early scientists. Son of the Earl of Cork, he received no formal university education, but travelled extensively, and was learned in theology, interested in the diffusion of the Scriptures and the defence of Christianity against atheism, endowing

lectures for this purpose. He produced numerous papers for the Society on physics, chemistry and other subjects, but declined its presidency and a bishopric.

Cambridge with its University was already under Puritan influence and Parliamentarian control. But only after the defeat of Charles at Naseby in 1645 did Oxford submit. Then non-Puritans in the colleges were replaced by people loyal to Parliament. So the Gresham College meetings, while continuing, lost some members to Oxford; Wilkins in 1648 leaving to become Warden of Wadham College. The next year Wallis became Oxford's Savilian Professor of Geometry. Then in 1651 Goddard was appointed Warden of Merton College. William Petty, a clothier's son, experienced traveller, sailor, interested in things mechanical, graduated M.D. at Oxford in 1649 and became F.R.C.P. in 1655. He was the first leader of the new group, the meetings continuing in his lodging until his appointment by Cromwell in 1652 as Physician General of Ireland. Then they were held in Wilkins' rooms at Wadham. Boyle joined them in 1654 and became host in 1659 when Wilkins left for the Mastership of Trinity College, Cambridge, which he had to resign at the Restoration the next year.

Thomas Sprat, educated at Wadham and graduating M.A. in 1657, became interested in science through Wilkins, and dedicated to him his laudatory poem about Cromwell. At the Restoration he became a high Anglican and was appointed Bishop of Rochester in 1684. He wrote his *History of the Royal Society* in 1667 emphasising its Royalist origins—probably to curry favour, trimmer as he was, for he supported James II, but subsequently helped in the coronation of William and Mary after the Bloodless Revolution of 1688!

Others in the Oxford company were the three Royalists, Seth Ward, mathematician and later Bishop of Salisbury; Thomas Willis, to become Professor of medicine; and Ralph Bathurst, a doctor of medicine and eventually a dean. Lawrence Rooke had left Cambridge for home after graduating M.A. in 1647, but came with two pupils to Wadham to benefit from John Wilkins' science and while at Oxford assisted Boyle with his experiments. A man of wide learning, he, like many of his day, had a profound knowledge of Theology. He was Gresham Professor of Astronomy 1652-57 and then held the chair of Geometry until his death in 1662. Christopher Wren, later to rebuild London, was another member, who was also sufficiently acceptable to the Commonwealth to be able to succeed Rooke as Professor of Astronomy at Gresham College in 1657. His chair was taken over in

1660 by Walter Pope, who had been with him in the Oxford meetings and had acted as one of Parliament's official Visitors to the University, but elected as Fellow of the Society in 1663.

It was from these groups, consisting largely of men with Puritan sympathies or tolerable to Cromwell's men, that the Royal Society had its origin. After the Restoration in 1660 the universities were cleared of Parliament's nominees and a number attending the Oxford meetings left. In London on 28 November 1660, following Wren's usual lecture as Professor at Gresham College, twelve men met and decided to form a scientific society like the foreign academies. They were Lord Brouncker (the first President), Messrs Boyle and Bruce (became Earl of Kincardine), Sir Robert Moray, Sir Paul Neile, Drs Wilkins, Goddard and Petty, with Messrs Ball, Rooke, Wren and Hill.

These are described by Professor McKie as ten Royalists, with Wilkins a moderate and Goddard as the solitary Puritan. But this is hardly the case, for Wilkins and Petty, like Goddard, had been promoted by Parliament. Wren was not out of its favour and Rooke, a religious man, had been active at Oxford during the Commonwealth. Abraham Hill (secretary in 1673) was a young London merchant whose father had acted for Parliament. Bruce was a zealous Presbyterian who tried later to help the Covenanters, and Boyle's piety and interest in the Scriptures was more in keeping with Puritanism than the religion of the Court. Even Moray, who was a friend of Charles and largely instrumental in obtaining a charter for the Society, was a moderate whom Clarendon criticised as employed by his fellow Scots to establish Presbyterianism in England in 1645. This leaves Brouncker and Neile as Royalists and the physician Peter Ball whose views are unknown.

The twelve 'founders' drew up a list of forty-one names, of whom Professor McKie states 'thirty-one were Royalists, two had supported Parliament, one did not join and there are seven whose political affiliations it has not been possible to ascertain.' It can be pointed out here that of all these alleged Royalists there were a number who were of Puritan sympathy in religion even if they were not in arms against the king. In that confused age there were many like the famous Sir Edmund Verney, Puritan and disapprover of bishops, who still felt he must support his king. These nominees too were people selected as likely to be approved by Charles II and would not be such Puritans as were discreet enough to be absent from Restoration London.

There are a number of figures connected with the Society to be considered here and some of them are included in others. The 'Twelve'

above and the 40 mentioned became Fellows and are found in the total of 146 admitted as Fellows under the 1663 charter. This number was made up of the 21 members of the Council and two groups admitted on 20 May and 22 June, together numbering 98 and making 119 to which 30 were added on or after 1 July, in 1663.

It is, however, important to note that Dorothy Stimson in *Bulletin of Institute of the History of Medicine*, **3** (1935), states that 42 of the 68 in the first group of actual members (i.e. 62 per cent.) of the Society were clearly Puritan, although Puritans were then a minority in England. Robert K. Merton in 'Puritanism, Pietism and Science' (*Sociological Review*, vol. xxviii, No. 1, 1936) confirms this.

In *English Preachers and Preaching*, C. F. Richardson suggests the Royal Society began among a small group of learned men in which Puritan divines predominated.

So Richard S. Westfall concludes in *Science and Religion in Seventeenth Century England* (1957), p. 7: 'Irene Parker, Dorothy Stimson, R. F. Jones, G. Rosen and R. K. Merton have argued with some cogency the connection between Puritanism and Modern Science.'

Similarly, A. F. Smethurst in *Modern Science and Christian Beliefs* (1955), devotes his second chapter to the subject of 'The Seventeenth Century Pioneers of Modern Science and their Christian Faith', showing how many were zealous Christians as well as keen scientists.

A considerable amount of emphasis has been placed by Professor McKie and others on the Royal and Royalist nature of the Society, and no doubt the glamour attached to the terms is attractive to some. Also the term Puritan in today's careless society is not welcome. The more objective studies made in America and elsewhere, and detailed biographical investigation, however, confirm the major contribution made to the foundation of the Society and its scientific work by Puritans.

It is interesting to note that after the resolution of 28 November 1660, and Moray's success in interesting the king, nearly two years passed before the Society received its first charter. This was on 15 July 1662. A second charter with arms and the Society's mace was given by Charles II on 22 April 1663 after which date the first year's 146 Fellows were elected.

The first joint secretaries appointed that year were Dr John Wilkins, whose Puritan leanings have been mentioned above, and Henry Oldenburg, a German Protestant, who came to England about 1640. The latter was at first a Royalist, but a friend of Milton, and took as

his second wife the only child of the Puritan, John Dury, who was a member of the Westminster Assembly of Divines during the Commonwealth. Oldenburg went to Oxford with two pupils, of whom one was Boyle's nephew, and himself entered the University in 1656. There he met Boyle, Petty, Wilkins, Wallis and others and became interested in science. In the Preface of the Society's *Philosophical Transactions*, **2** (1666), 443, he expressed his attitude, writing of the 'wonderful contrivances of the Supreme Author'. Thus the venture was launched with men of definite Puritan leanings as its officers.

Now Westfall (op. cit. p. 32) writes: 'It is true that during the first flush of enthusiasm following its formation, the Society enjoyed a brief spurt of social prestige; and since they adopted an admission policy that accepted anyone who applied, they found themselves with a long roll of members, including many with no active interest in natural philosophy. A majority of early members attended fewer than five meetings and refused to pay the dues, with the result that the Society almost died shortly after its birth. A small minority of men devoted to science, led by Oldenburg and Haak, kept the Society alive.'

The trouble was that many of the very early members were not scientists, but people interested in its title and Royal patronage. The number of Fellows elected fell to five in 1669 and, excepting one year, did not reach ten until 1677, and after 1684 fell off again. It was at its lowest in 1690 with one elected and not until 1711 did the annual elections exceed ten.

The Society's income was derived from the shilling a week subscription from its Fellows. At the end of 1663 the membership had dropped to 131 and the amount owing was £158. By 1673 the deficit had increased to £1,957. As Sir William Penny, F.R.S., the present treasurer, points out in *The Times* (op. cit., p. 7), the king was asked in 1662 for a grant of lands in Ireland. Charles wrote personally to the Duke of Ormond, the Lord Lieutenant, strongly recommending such an endowment, but was quite unsuccessful. In 1669 he gave Chelsea College and its lands to the Society, but recovered possession in 1681 for £1,300 to build there a hospital for soldiers.

The Royal patronage was genuine, Charles being interested in experiments, and such practical problems as navigation, but he was neither consistent nor generous. The king sent lodestones and glass spheres to the Society, asked about the nature of sensitive plants, and requested that a degree of the earth's surface should be measured, but

found no funds for it. Even the Royal Observatory erected at Greenwich in 1675 was loaned instruments by the Society.

Michael Hoskin, lecturer in the History of Science at Cambridge, describes this early weakness in the Royal support of the Society (*Listener*, 21 July 1961), pointing out that Oldenburg in writing to Boyle expressed the view that 'this Society would prove a mighty and important body, if they had but any competent stock to carry on their designs'. In contrast the secretary had letters from France stating 'the King refuses nothing to the Academy. If it does nothing, it will not be for lack of aid.' Oldenburg was also told of Louis XIV insisting that no expense was to be spared in the establishment of the Observatory, which was part of the Académie des Sciences.

The king supported his mistresses and enjoyed his jokes, laughing at Boyle's weighing of air; and Restoration authors followed in ridiculing the Society in such pieces as Thomas Shadwell's play *The Virtuoso*, Samuel Butler's *Elephant and the Moon* and Jonathan Swift's *Voyage to Laputa*.

It was left to a few enthusiasts to keep the Society going. Some were the amateurs like Samuel Pepys who attended regularly but contributed no papers. Reference to P. H. Maty's monumental *General Index to the Philosophical Transactions of the Royal Society*, 1781, gives a measure of Puritan participation in making reports. The complete list of authors, 1665-1700, contains 460 names. Of these 75 gave five or more papers and 28 per cent of them were Puritans. Ten or more were given by 35, of whom the Puritan proportion rose to 37 per cent. The Dutch biologist Leeuwenhoek heads the list with 124, followed by Edmund Halley's 81 and Martin Lister's 70. Then came the Puritans, John Wallis and Robert Boyle, with 68 and 58 respectively. Surprisingly Sir George Ent and the Royalist John Evelyn produced only 3 and 2.

The distinguished Puritan Botanist, Nehemiah Grew, who wrote *The Anatomy of Plants* was elected a Fellow in 1671, and acted as secretary for the years 1677-79. He prepared a catalogue of the Society's museum, published as *Musaeum Regalis Societatis*, a folio volume, in 1681.

An Essex blacksmith's son, sent to Cambridge by Squire Wyvill, and graduating M.A. in 1651, John Ray, was another great Puritan naturalist. Elected Fellow in 1667, he contributed ten papers to the Society's *Transactions*. He was a friend of Francis Willughby who was an original Fellow of 1663 and son of a Warwickshire knight. Between

them they produced a series of books systematically describing Plants, Fish, Birds, Snakes, Animals and Insects. Of these Willughby's *Fishes* was published by the Society in 1681, thus nearly ruining itself financially.

There were, however, many scientists of Puritan origin remaining outside the Society for various reasons. An example of these is Thomas Sydenham, Parliamentarian Captain, and famous physician, friend at Oxford of Boyle and Petty, but contributing no papers to the Society. Another is Andrew Yarranton, engineer and agriculturalist. A number of others interested in the natural world and disseminating scientific knowledge, but not Fellows, were tutors of Dissenting Academies. Such a one was Charles Morton, a Fellow of Wadham College, Oxford, under Wilkins. On the other hand the physician, Samuel Dale, was one who contributed numerous papers but never became a Fellow.

The greatest of the seventeenth-century fellows, however, was Isaac Newton, elected in 1672, becoming President in 1703 and knighted in 1705. Brought up in Parliamentarian Lincolnshire, and at Grantham Grammar School, he entered Puritan Cambridge in 1660. Showing a deep interest in the Scriptures and leaning rather to Calvinism than otherwise, as well as exhibiting an austere and ascetic character, he belonged to the Puritan tradition. Achieving fame after the publication of his *Philosophiae Naturalis Principia Mathematica* in 1687, until his death in 1727, he long led the Royal Society into a more prosperous period. Thus he continued the succession of deeply religious men of the Puritan type which the Society has never lacked.

R. E. D. CLARK, M.A., PH.D.

The Design Argument and the Limits of Science

(A COMMENT ON THE PAPER BY MR G. E. BARNES—SOME REFLECTIONS ON THE EVOLUTION CONTROVERSY*)

WARMEST thanks to Mr Barnes for his useful and interesting paper. His summaries of some of the thought movements of our day are most valuable and timely, and their value is in no way diminished by the presence, in the paper, of a relatively minor amount of matter with which many will be disposed to disagree. It is with these parts only that the following comments are concerned. And it should be stated at the outset that the quotations from Mr Barnes' paper are taken as representative of widely held views, in no way peculiar to him.

Design and Evolution

The mention of Kant (p. 161) gives a wrong impression. Kant showed that you cannot, *with logical certainty*, prove God's existence from nature, but he strongly *commended* the Design Argument, believing that it leads to a highly probable conclusion. Again, the reference to Paley is wrong. Paley develops the Design Argument in his *Natural Theology*, not in the book mentioned by Mr Barnes.

Mr Barnes states that a major part of the evidence for the Design Argument was concerned with 'the fitness of the environment to sustain life, and the intricate adaptations of organisms to the environment'. He then asserts that the doctrine of natural selection enables this aspect of natural order to be 'explained mechanistically' (p. 162). Later, in his conclusion, he says, 'The theory of natural selection has undermined what was probably the strongest argument of Natural Theology, the argument from Design' (p. 174).

Something seems wrong here. Manifestly, natural selection cannot in any way alter the status of the argument for Design in so far as the

* *Faith and Thought*, 1960, **91**, 158–176.

latter is based upon the 'fitness of the environment'—as, indeed, Lawrence Henderson and Pantin have pointed out.[1] And even if we allow all that is claimed for natural selection, it can hardly be true that the Design Argument as a whole would be substantially destroyed thereby. The best-known statements of the Design Argument in pre-Darwinian days are given in the Bridgewater Treatises, and of the nine volumes of these, only two are devoted to anatomy (3 out of 13 in the later 13-volume edition).

Natural Theology

Having argued that the Design Argument is invalid, Mr Barnes asserts that it is unbiblical. To prove this he quotes from the Bible but twice, and neither passage is pertinent. The question posed by Zophar the Naamathite (Can you find out the deep things of God? Can you find out the limits of the Almighty? Job xi. 7, RSV) is surely irrelevant. Even if we adopt the older rendering, is it seriously suggested that we, as Christians, should base our views on Zophar's perverse theology which, we read, moved the Lord to wrath (Job xlii. 7, 9)? The second citation, that of, Corinthians i. 21, is a pure statement of fact; it does not tell us whether this is what *ought* to have happened—whether the world *ought* by wisdom to have found God. If we take it to disprove Natural Theology we must suppose (*a*) that by wisdom Paul meant or included the study of natural science (which seems unlikely), and (*b*) that men of the 'world' appraise evidence honestly (they certainly do not).

If the biblical case against Natural Theology rests on such texts as these, it must be weak indeed. Why does Mr Barnes forget the many occasions on which Natural Theology is taught or implied in the Bible? What about Psalms xix. or Acts xiv. 15-17, for example? Or what could be clearer than St Paul's words: 'What can be known about God is plain to them, because God has shown it to them. Ever since the creation of the world, his invisible nature, namely his eternal power and deity, has been clearly perceived in the things that have been made' (Rom. i. 19-20).

[1] L. J. Henderson, *The Fitness of the Environment*, (1913); *The Order of Nature* (1917); C. F. A. Pantin, 'Organic Design', *Advancement of Science*, **8**, (1951), 138. For a modern summary of the argument, see R. E. D. Clark, *The Universe, Plan or Accident* (3rd. edn., 1961).

Mr Barnes adds that 'the Bible undoubtedly speaks of God's revelation in nature', but adds that this revelation 'can only be accepted by faith' (p. 174). Natural Theology does not deny an element of faith in the conclusions it would draw, any more than does natural science (for scientific discovery may involve faith of no mean order).[1] You cannot by observation prove that atoms exist or that the earth has a core, but it is none the less true that natural science leads to these conclusions. But Mr Barnes seems to refer to theological faith only, for he says that you must believe in God first before you can 'learn something of His glory and wisdom from the world He has made'. But this assertion is surely in head-on collision with what Paul teaches in the passage cited, 'Men who, by their wickedness, suppress the truth (of Natural Theology) . . . So they are without excuse; for although they knew God (potentially, that is, by Natural Theology) they did not honour Him as God . . . but they became futile in their thinking and their senseless minds were darkened.'

If faith in God is a prerequisite to the appreciation of 'the witness of nature' what does such language mean? In what sense does God make plain or show His power and Deity to wicked men by means of created things, and in what sense do such men know God and then suppress this knowledge—*except in the sense* that Natural Theology is God's witness to all men, including those *without faith* in Him?

Creation as a Phenomenon

The Design Argument implies, or might imply, that God creates order in nature by intervening in its affairs discontinuously. What would be the nature of such intervention?

Mr Barnes (p. 159) states that, according to the theory of special creation an imaginary observer, watching the event, would have seen the equivalent of a conjuror (invisible?) producing a rabbit out of thin air. This view, he says (p. 160), is equivalent to spontaneous generation and stands in antithesis to evolution.

I find this difficult to follow. I develop a photographic plate in a darkened room and a picture of a rabbit appears where there was none visible (or even detectable) before. I dissolve saltpetre in hot water and let it cool when beautifully formed needle-shaped crystals make their appearance as if by magic. Indeed, early scientists spoke of 'natural magic'. An observer, present at the creation, could not have

[1] R. E. D. Clark, *Christian Belief and Science* (1960).

discovered by observation whether God was intervening or not: it is no easy matter to identify magic when you see it.

Nor can the point be evaded by postulating an *imaginary* observer—a clever daemon or Laplacian deity, endowed with superhuman powers. Such a being, though he might have observed the individual atoms as they were placed in position in the first specks of living matter (or in the first rabbit) could not distinguish by *observation alone* the difference between a miracle and a rare, unpredictable event. In addition, there is the difficulty that, by his observation, he would disturb the *status quo*.

I conclude that no real or imaginary observer could, in principle, distinguish between 'evolution' and 'creation'. The introduction of a conjuror (or magician) into the argument does not help. We are concerned with interpretation, not with observation as such. Seeing is not always believing.

Mr Barnes claims that creation or spontaneous generation and evolution are in antithesis. Now spontaneous generation means generation of order *without cause*, or *spontaneously*. It would be spontaneous generation if the atoms in some slime were to come together without cause to produce a man. This is not at all the idea of creation. If we accept creation, we believe that a cause is present—a direct action of a spiritual being on material particles. (It is irrelevant whether such action is possible: if we deny the possibility, then we deny that creation is possible. We must not tell the person who accepts creation that he believes in spontaneous generation—for this is precisely what he does not believe.)

Evolution, on the other hand, in its materialistic form, seems to presuppose that there is a creative power in matter so that genes and chromosomes become more complex as generation succeeds generation. Natural selection merely serves to preserve the favourable *spontaneously generated* mutations or changes. If the changes are due to purely fortuitous movements of molecules, working within the rules of probability, this is scientifically possible. But there is evidence, impressive (on this Mr Barnes agrees), if hard to formulate, that seems to show that much more than this is involved. Yet if this be the case, evolution itself becomes a disguised version of spontaneous generation, and the disguise is only plausible because the finished product is formed slowly. Speeded up on a ciné film an evolution and a series of spontaneous generations producing chromosomes as the product would be indistinguishable.

Discontinuities and the Limits of Science

Mr Barnes states that the theory of evolution postulates that new forms [why the reservation? Is the origin of life excluded from the discussion?] of animals and plants have come into existence by means other than by discontinuities ('scientifically inexplicable discontinuities'—in the context); that the laws that govern the regularities of the universe also govern the novelties. There are thus only two possible views of the control of the universe: 'either God is active all the time in everything or else He is not active at all' (p. 172). 'We have now learned that all phenomena are, in principle, capable of being investigated or explained by the scientific method. The field of scientific exploration is co-extensive with the universe' (p. 173).

What is meant by 'scientific explanation' here? As P. W. Bridgman reminds us,[1] in any physical event, *some of* the features maintain permanence and so can be treated by the methods of science, while some do not. The radioactive atom has a certain mass, energy, momentum, etc., which are conserved and so are predictable even if it explodes. But there is no experiment you can do to find out whether the atom will break up within the next hour. In a growing crystal you can study, by scientific means, the molecular structure that emerges, the rate of growth, the rise of entropy in the process, etc., but no experiment you can do will tell you where the next crystal dislocation will be situated—though the habit of the crystal may be determined by this unpredictable event. You cannot, I suppose, determine by scientific means, when the electric lamp, nearing the end of its useful life, will fail; or the point at which a uniform wire will break when you pull at its ends.

Now in evolution, as in the physical examples, the important factors are often just those factors which cannot be investigated by scientific means. No experiment, real or imaginary, will tell you where the next mutation will occur in the reproducing gene, or what kind of a mutation it will be. *After* the event, of course, you may look back and cover your ignorance with words ('No doubt the same forces which are operating amongst the atoms all the time were operating in this event too!') but a disciplined scientist will frown upon such a procedure.

We cannot have it both ways. Either our after-the-event guesses are

[1] For example in, *The Way Things Are* (1959), pp. 118 ff.

not science at all (my view), in which case the scientific method cannot be applied to all phenomena and the field of scientific exploration is *not* co-extensive with the universe, *or* they *are* science in which case another difficulty confronts us. For it then transpires that in asserting that 'all phenomena are in principle capable of being investigated or explained by the scientific method' we are asserting precisely nothing at all (except, perhaps, that we are clever at guessing).

For an assertion to have meaning, we must be in a position to contrast it with the opposite assertion. 'Bats have wings' is meaningful, because it is possible to think of bats without wings: 'Bats boojo' is meaningless (to me) because it does not stand in intelligible contrast to 'Bats not boojo'.

Similarly, if scientific exploration and explanation means only that I can make after-the-event guesses, then it is surely impossible to say: 'There are some phenomena about which it is impossible for man to speculate scientifically'—for you have but to name the phenomenon to start the speculation! By merely asserting that X cannot be thought about in scientific terms, you make your assertion untrue.

To illustrate, let us try some difficult cases. Creation of the universe (see rewinding suggestions in Haldane's *Possible Worlds*); kettle freezes when put on the fire (laws of science are probabalistic); monkey hitting keys of typewriter produces Shakespeare (intelligent monkey, *or*, bound to happen occasionally, etc.); rabbit appears in thin air (inadequate controls against trickery, testimony doubtful, etc.); river runs uphill (new law of science to cover such cases); man rises from dead (observers reliable? Not really dead?); drunkard converted and leads a new life (subconscious was at work, brainwashing); etc.

The upshot of our discussion is this. Severely limit the field of science and there is plenty of room in God's universe for Him to act discontinuously upon nature when and if He pleases; spread your net and claim the universe for science and your claim itself becomes meaningless, whilst the science you proclaim becomes undisciplined speculation—you are back, in method, if not in jargon, at the stage of the Middle Ages. Just as Spinoza's philosophy, with its pantheistic god whose workings are equated with nature's ways, becomes, ultimately, indistinguishable from atheism; so pan-science which can investigate everything becomes indistinguishable from non-science.

It would seem, then, that instead of saying with Mr Barnes that 'all phenomena are, in principle, capable of being, etc', we should say 'Some aspects of all phenomena, etc.'. But it turns out that the aspects

in question are the ones that have least to do with the novelties. Nor can we allow that these novelties involve no scientifically inexplicable discontinuities—for many discontinuities are inexplicable by science.

In conclusion it may be noted that the claim that all phenomena are, in principle, capable of being investigated or explained by science, goes further than that made even by many materialists. Thus Mehlberg,[1] arguing from a logical analysis of the principle of verifiability, only concludes that those problems which cannot be solved by science are 'unsolvable by any other non-scientific method'-surely a more moderate claim.

[1] H. Mehlberg, *The Reach of Science* (1958).

BOOK REVIEW

Evolution and Christian Thought Today. Edited by RUSSELL L. MIXTER. The Paternoster Press, 1959.

The ideal book on the subject of evolution and Christian thought would need to cover a very wide field. Its author would need to be a competent biologist, familiar with an abundant literature, in order to assess the present status of evolutionary theories. He would need to be a theologian in order to appreciate the significance of the biblical creation narratives, and of the other scriptural passages which derive their inspiration from them. And lastly, and most important of all, he would need to be a philosopher in order to discuss the relation between the logical categories of science and theology. It is perhaps not surprising, therefore, that the ideal book has not yet been written.

A symposium is bound to have certain drawbacks, such as heterogeneity in style and value, and the almost unavoidable overlaps; but one would readily overlook such flaws if the work succeeded in doing what a single author could hardly be expected to do.

This book is, in fact, a symposium, produced under the auspices of the American Scientific Affiliation, a fellowship of research scientists who are committed to an evangelical Christian faith. The contributors include a number of well-qualified scientists and a well-known theologian; so one could hope that this book would approach the ideal.

It is, undoubtedly, one of the better books dealing with this problem. The scientific facts and arguments are presented clearly, and theories assessed very fairly. Full authority is given to scriptural statements; and the attitude displayed by the authors is one of open-minded humility. But, despite all this, the book is very far from the ideal.

The most serious flaw in it is that no attempt is made to examine the fundamentals of the relation between science and revelation. Not only are these fundamentals absent from the book, but it is obvious that they have received no previous satisfactory consideration by the authors. This results repeatedly in a confusion of the scientific and philosophical (or theological) categories of thought. For example, creation (a philosophical concept) and evolution (a scientific concept) are, throughout the book, regarded as antithetical; and the authors feel obliged to limit the theory of evolution in order to establish the concept of creation. If they had examined the biblical teaching on the subject of creation they would have discovered that it is irrelevant to the mechanism of speciation; and if they had thought more about the logic of the scientific method they would have realised that to limit the extent of evolution is to argue in favour of the spontaneous generation of complex organisms—an idea that they would all repudiate. A study of the fundamentals, therefore, would have revealed that the concepts of creation and evolution are tenable together; that they are complementary, not contradictory.

Nowhere is this confusion of categories more marked than in the last chapter, which has a sustained attack upon what the author calls 'the fact of evolution'. In it he rates scientists for not defining the word 'evolution', but he does not

define it himself: and it only slowly dawns upon the reader that what the author is attacking is not the scientific concept of evolution at all, but a philosophical view, derived from ancient Greek philosophy, and irrelevant to scientific thought; a view which probably most scientists themselves would repudiate. This just exemplifies the serious problem of lack of adequate communication between scientist and theologian today.

The general outlook of the book may be represented by the question, 'How much of traditional Christian thought are we *forced* to give up by modern scientific knowledge?' This attitude is shown in the repeated discussion of the biblical phrase 'after his kind'. The authors are agreed that it can no longer be restricted to species, but they differ among themselves on exactly how much they are forced to give away to the theory of evolution.

This type of treatment is merely a temporary palliative: it does nothing to cure the intellectual malady which is the cause of science-religion controversies. What is needed is a drastic rethinking, from first principles, to construct a Christian world-view embracing knowledge from *both* divine revelations, Scripture and nature.

But, despite these criticisms, the book ought to be read by anyone concerned with the relation of modern thought to Christian faith. It does not solve the problems: it exemplifies them. But, if it provokes Christians to further, really basic, thought in the area where science and theology meet, it will serve a good purpose.

GORDON E. BARNES

Books Received

Ed. Wm. Barclay and F. F. Bruce, 'Bible Guides', Lutterworth. L. Toombs, *Nation Making;* G. Robinson, *Historians of Israel* (1); H. Anderson, *Historians of Israel* (2); F. F. Bruce, *Paul and His Converts.*

R. E. D. Clark, *The Universe: Plan Or Accident?*, Paternoster.

J. Macmurray, *Reason and Emotion*, Faber.

J. Maritain, *On The Use of Philosophy*, Oxford.

G. S. M. Walker, *The Growing Storm*, Paternoster.

A. S. Wood, *The Inextinguishable Blaze*, Paternoster.