

Faith and Thought

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**CROSS-CURRENTS:
INTERACTIONS BETWEEN
SCIENCE AND FAITH**

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AN IMPORTANT BOOK
WHICH EXAMINES THE RECENT DEBATE
HIGHLIGHTED BY THE TV SERIES
THE SEA OF FAITH
BY DON CUPITT
AND THE SERMONS OF
THE BISHOP OF DURHAM.

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EDITORIAL NOTES

For some time it has been felt that there was scope for a publication which would be a vehicle for shorter items than appear in *Faith and Thought*, and which could also be used for exchange of views, letters, etc. This is the first issue of such a publication, and how it develops depends in very large measure on its readers.

This issue contains mostly items written by our late editor, Dr. R. E. D. Clark, items which had reluctantly to be omitted from the last issue of *Faith and Thought*. Those of you who have appreciated Dr. Clark's comments on many subjects will, I am sure, enjoy reading these pages. There are still some outstanding contributions of his which will be published in the next issue. I would like to emphasise again what had been said in *Faith and Thought*, that any anecdotes, etc., concerning our late editor would be very helpful in compiling a special issue in his memory. I have already received one contribution on these lines.

Having said all that has been said above, please now feel that this news-letter is yours. At the moment we aim to publish half-yearly at the same time as the parent journal, so there will inevitably be a time-lag. Perhaps demand will dictate a more frequent publication! Suggestions for an appropriate title would be welcomed.

SHORT NOTES (R. E. D. Clark)**PLUTONIUM**

Methods available to the International Atomic Energy Agency to ensure that plutonium is not finding its way illegally into the wrong hands have been far from adequate. Uranium fuel and irradiated material can be checked, but if a reactor operator were continuously to remove plutonium and to replace it with unirradiated material, detection would be impossible. However, a new technique has now been discovered. Some of the spent fuel is dissolved in nitric acid and from the solution uranium and plutonium are removed with the aid of a resin. For a given enrichment of uranium in the fuel, the ratios of, say, U-235 to U-236 are found to lie on a straight line no matter how long the fuel has been in the reactor, but not if thefts have taken place. From now on inspectors should be able to detect thefts. (*Nature* 301 292)

It has been stated repeatedly that plutonium derived from British power stations has been exported to USA for the manufacture of weapons. This was categorically denied by the Prime Minister. More information has now been given at the Sizewell Inquiry. Mr. Robert Priddle told the enquiry that, in conformity with an agreement, plutonium from civil Magnox stations has been exported to USA, but he refused to say whether it is weapon-grade material. In return, the USA has been sending enriched uranium for Britain's nuclear weapons. (*Times* 18 Mar. 1983.)

LOSS OF URANIUM

The largest nuclear weapons plant in the USA situated in Oak Ridge, Tennessee, has recently reported that more than 770 kg of weapons-grade uranium is missing. In all, since 1950, 4,500 kg (enough to make 225 Hiroshima-sized bombs) have been lost in the USA. Losses vary from 1 to 4% in various plants but, in any chemical process, it is exceedingly difficult to control yields to any great degree of accuracy. Nevertheless thefts cannot be ruled out and losses are worrying authorities. *New Scientist*, 9 Feb. 1984 p.5

STAR WAR WEAPONS

In a recent book (*Beam Weapons: the Next Arms Race*, Plenum)

John Hecht comes to the conclusion that in the foreseeable future lasers are likely to prove by far the most dangerous weapons in star warfare. At the present time the energy they are able to direct is not enough to kill, though it may blind. One danger is that, because spy satellites travel in computable orbits, they will prove sitting ducks to laser beams which will blind their sensors. But if each side starts to immobilize the opposite side's satellites in this way, it may prove the catalyst to start a war. Similarly, plans (barely feasible as yet) are being suggested for using x-ray lasers which will direct their beams upon incoming missiles. If this possibility (unlikely as it is) were to become widely believed it might create an illusory sense of invulnerability and so tempt a potential enemy to make a first strike.

According to Jonathan Rosenhead (*New Scientist* 23 Aug. 1984, p.52) Hecht is enthusiastic about the possibility that the weapons he envisages may be developed. He seems quite dead to the moral issues involved. Rosenhead asks why it is so many scientists seem to have a feeling in their bones that they ought to develop horrible weapons. Do they think that there is a natural law that what ever can be developed will of necessity be developed and that they themselves are therefore not responsible? Or does the Soviet threat drive them — especially the Americans — to develop obscene technologies in self-defence? Or is Solly Zuckerman right in thinking that mad scientists make such tempting offers to innocent but ignorant government officials that resistance seems out of the question? Or is it just a matter of greed and the vast profits which clever armament makers can expect to get for their wares?

PREDICTION IN SCIENCE

Sir Brian Pippard, the Cavendish Professor of Physics at Cambridge, compared prediction in physics with prediction in sociology. Taking the physics of the atmosphere, he pointed out that reliable weather forecasts are possible for six hours ahead, but that they are less reliable for 24 hours. Forecasts as far as a month ahead are not, and probably never will be, possible. The volatility of public opinion is comparable in some ways with the chaotic condition of swirling air. Opinion polls can predict 24 hours ahead, but are quite unreliable over several weeks. As with physics, however, it must be assumed that laws of some kind operate in social behaviour if politicians are to believe that what they are attempting to do is worth while. A parallel with

Christian activities may usefully be made. Though the Spirit of God acts as He wills, the activity of preaching and making the Christian message known can certainly open the way for His activity.

VENUS

A science article in the *Times* (8 Mar. 1984. See also *New Scientist*, 23 Feb. 1984 p.22) draws attention to the repeated volcanic eruptions which take place on the planet Venus. Although the surface of the planet is invisible, owing to the dense clouds, it has been mapped by astronomers using radio operated equipment from the Arecibo Observatory in Puerto Rico, and also by an orbiting Pioneer spacecraft. For some reason huge eruptions on the Krakatoa scale occur every few years together with large, but frequent smaller eruptions between. It seems that there are no tectonic plates, as on the earth, but the reason for the difference from earth is not understood. Here then again, we may see how suitable a place our earth is for us as an abode of life. Even apart from the CO₂ atmosphere of Venus and its high temperature, no planet could sustain life if volcanic eruptions occurred so often that sun's light was nearly always obscured.

AGE OF THE UNIVERSE

Scientists expect that as, from time to time, new determinations of the constants of nature are made, results will converge towards final values, successive determinations on average becoming more and more accurate. Alas, it seems otherwise with Hubble's Constant, the constant used to determine the age of the universe. G. de Vaucouleurs (*Nature*, 1982, **299**, 303) concludes that the speed of recession of distant matter participating in the expansion of the universe is around 100 km per second per megaparsec. (Mpc) This gives the short time-scale which brings the age of the universe into line with some of the oldest objects it contains. Sandage and Tammann. (*Nature* 1984, **307**, 313, 326) opt for around 50 km per sec. per Mpc which gives the long time-scale of around 20,000 million years. Astronomers are finding it all very worrying. The basic trouble is that there is still no known way of discovering how far away very distant objects are and a good many assumptions are necessary. Disappointing as it may be, it is not a bad achievement to reach agreement within a factor of 2 when the difficulties are so great.

THE METAL BENDERS

(see *Faith and Thought*, 108, 162, 1981) As stated in our review of Hasted's book, earlier work has indicated that a small percentage of normal people possess the Uri Geller power to some degree. Mr. Julian Isaacs, financed by a fund administered by Trinity College, Cambridge, and now working at Aston University, has made a bio-feedback device for detecting bends in crystals. The apparatus generates clicks which change in tone when slight bends occur. Of the 2000 people tested, around 5% seem to possess the power, often manifested weakly. His findings are that, in general, the harder people try, the less likely are they to succeed, while older people who have learned to cope with frustration tend to be more successful than the young. (Lecture at the Royal Institution 26 July, 1982. Reported *Times* 27 July)

CRYPTO BIOLOGY

The reluctance of educated people, even Christians, to take an interest in the way God has made our world is surprising. Professor Robert May of Princeton University tells us that over the past ten years he has written 79 items of News and Views for *Nature*. Just one of them, written in fun, was called the 'Ecology of Dragons'. The interest aroused far exceeded any of the other 78 items! Editors from newspapers throughout the English-speaking world kept his phone ringing: there were offers to appear on three TV shows and an invitation to write a book on dragons came from a publisher. 'The real wonders that actually exist in the natural world' could hardly be more wonderful but the media and perhaps the public seem 'to prefer meretricious marvels to real ones' (*Nature*, 307, 687 1984).

DOMES FOR LIVING

Most of the world's oil is present in shale, but much of this is to be found in the inhospitable wastes of northern Canada. Living conditions there are all but impossible. In winter the temperature drops to -40°C and although there is a short summer, it is not a pleasant one, for insects then abound and settle on all exposed human skin. One suitable locality for mining the shale is at a latitude of 58 degrees N, not far from Fort Uranium. Here it has been proposed that a town covering an area of 14 hectares should be built. A special teflon film has been developed, strong enough to withstand winds, sufficiently conducting to prevent the build up of electrostatic charge, and transparent

enough to transmit the sun's light and heat. It was hoped that a dome made of this material would cover the town. The dome was designed to stand 100 metres high at the centre and to be supported by air pressure. The cost was estimated at £10 million. For the time being the Government of Alberta have shelved the project, as oil is presently available at a more competitive price (*New Scientist* 8 Mar. '84)

The idea of a huge canopy to protect a city from inclement weather conditions is not new, but it is fascinating to find something of this kind mentioned in the Bible. 'The Lord will create over the whole habitation of Mount Zion, and over her assemblies . . . a canopy. And there shall be a pavilion for a shadow in the day time from the heat, and for a refuge and for a cover from storm and from rain' (Is. 4:5-6). Here the object is to provide protection from the heat of the day and the structure will be illuminated by night: ' . . . a cloud and smoke by day, and the shining of a flaming fire by night . . .' Christians often take such passages in a spiritual sense and think of God's loving protection in the course of their lives and the application is apt. But that does not rule out a literal fulfilment when the Lord returns to reign on earth.

NEWS AND VIEWS (R. E. D. Clark)

DATE OF THE CRUCIFIXION

Pontius Pilate was procurator in Judaea from AD 26 to 36 and we know from the Gospels that our Lord was crucified during this period, a fact also mentioned by Tacitus. The Gospels agree in saying that Jesus died a few hours before the beginning of the sabbath, and all four connect the event with the Passover, the Jewish feast held at the time of a new moon. A first reading of the Synoptic Gospels gives the impression that the trial and crucifixion occurred on the day of the Passover, 15 Nisan, but John puts it one day earlier, 14 Nisan. The dates are not necessarily contradictory and several suggestions which may reconcile them have been proposed. In the accounts of the Last Supper, for instance, no mention is made of the killing of the Passover lamb and this may mean that Jesus, knowing that he was going to die, arranged to have a Passover-like meal a day earlier which would bring John's statements into line with the Synoptics. ('It

was the day before the feast of the Passover' Jn. 13:1; 'Day of Preparation for the Passover.' Jn. 19:14) Linking this with other evidence Colin J. Humphreys and W. G. Waddington, (*Nature* 1983, **306**, 743-746) both of the Department of Metallurgy and Science of Materials, Oxford, come to the conclusion that the interpretation of the Last Supper as a Passover meal cannot be correct. They conclude, therefore, that Jesus died on 14 Nisan, the day on which the Passover lambs were slain. That this is so may also be suggested by such passages as 'Christ our Passover is sacrificed for us' (1 Cor. 5:7).

But what was the year? — for nearly every one of the possible years has had its advocate. Humphreys and Waddington suggest that the difficulty may be resolved by noting how Peter in his speech at Pentecost, some seven weeks after the Crucifixion, draws attention to Joel's prophecy. (Acts 2:14f; Joel 2:28f.) The crowds were then witnessing the gift of tongues which broke down the language barriers of the day. Peter reminds them that this is what had been prophesied by Joel: 'On my menservants and maidservants in those days I will pour out my Spirit and they shall prophesy, And I will show wonders in the heaven above and signs on the earth beneath, blood and fire, and vapour (pillars) of smoke: the sun shall be turned into darkness and the moon into blood, before the day of the Lord comes, the great and manifest day.'

What was the point of quoting this passage and at such length? How would the crowd have understood it? We may take it that speaking with tongues fulfilled the prophetic part of Joel's prediction, that a day of the Lord in Scripture means a time when God is actively at work, and that the great and manifest day of the Lord refers to the resurrection. Also that the darkness over the land for three hours at the recent Passover festival would have been remembered. This cannot have been due to an eclipse, for an eclipse of the sun is impossible when the moon is full and at best can last only a few minutes: an unusually severe dust storm is a likely cause. The turning of the moon into blood is an age-long way of describing the moon's appearance when it lies in the umbra of the earth's shadow. We may take it, then, that a dust storm darkened the daylight for several hours at the time of the Crucifixion and that in the evening, when the sun set and the earth's shadow fell upon the just-rising moon, the moon had the appearance of blood — both events taking place before the great and glorious day of the resurrection of the Lord. Since the Passover started when the full moon first appeared the people

of Jerusalem must have watched the event, as they did year by year, with unusual care and what they saw would certainly have been remembered a few weeks later at the time of Pentecost. For the full moon to be eclipsed just as it is rising in the evening is an exceedingly rare event.

Using a computer Humphreys and Waddington have worked out the exact time, as seen from Jerusalem, at which the eclipse started for each of the years from AD 26 to 36, together with the day of the week on which the eclipses took place. On only one passover, that which fell on Friday 3rd of April, AD 33 did the eclipse start at the time of the rising of the moon, and on this occasion 60% of the surface of the moon was covered by the shadow of the earth at the mid-point of the eclipse. This part, the umbra, always appears blood-red owing to the refractive power of the air atmosphere: the other part would normally appear yellow orange: 'The small yellow-orange region would have indicated that the moon had risen, but most of its visible area would have "turned to blood", if in fact a massive dust storm was responsible for darkening the Sun a few hours previously. Dust suspended in the atmosphere would have tended to modify these colours, probably further darkening and reddening the moon . . . Instead of seeing the full Paschal Moon rising they [the people of Jerusalem] would initially have seen a Moon with a red bite removed. The effect would have been dramatic. The moon would have grown to full in the next half hour. The crowd on the day of Pentecost would undoubtedly have understood Peter's words as referring to an eclipse which they had recently seen.'

It may be noted that Peter does not continue further with his quotation from Joel. As so often in Scripture, prophecy has more than one fulfilment: another fulfilment is foreshadowed here also. Joel continues 'In Mount Zion and in Jerusalem shall be those who escape, . . . For behold in those days and at that time, when I restore the fortunes of Judah and Jerusalem, I will gather all the nations and bring them down to the valley of Jehoshaphat, and I will enter into judgment with them there . . .'

Humphrey and Waddington's paper was summarised in the *Times* (3 Jan. 1984) and was followed by some ill-informed comment (Jan. 3, 5 1984) to be followed in turn by a reply by Humphreys (10 Jan.) The fulfilment of Joel's prophecy must have impressed the crowds, of which 3000 were converted to the Christian faith, greatly. Though naturalistic explanations are not

lacking, it can hardly be a coincidence that the sun was obscured and the rising moon appeared blood-red on the very day of the crucifixion!

TWO VIEWS OF GOD AND HIS WORLD

When the new volcano Paricutin erupted out of a field in Mexico some years ago sightseers arrived in plenty at the nearest hotel. The conversations, we were told, were of the most varying kind. Artists commented on the beauty of the scene at night, geologists thought of the early ages of our planet, engineers talked of the terrible waste of energy, enough they said to feed the power stations of the entire world and all going to waste, farmers thought of the poor man who had lost his field, mineralogists of the mineral wealth that might or might not be brought to the surface. And so on.

The accident at Three Mile Island a few years ago is creating a similar welter of thinking. How did it happen? Who was to blame? Or what? D. L. Sils in a review of Charles Perrow's *Natural Accidents*. (See *Nature* 309, 185) tells us that the electrical engineering magazine *Spectrum* has been collecting some current thoughts on the subject. The result of many investigations and much thought is that after the accident people tended to view it in ways which conformed to their training and predisposition. 'Political scientists saw the accident as a regulatory failure; human-factors engineers focussed upon the confusion in the control room; lawyers saw liability; and sociologists [claimed] that it was a social system that had failed.' All this to say nothing of the view that it was an engineering failure, that the manufacturers were at fault, that there had been an operator error, or just that the relief valve had been badly made.

Such differences are as important to religion as to technology. We tend to a view of God which is a reflection of our own disposition. The unprofitable servant who hides his Lord's money takes a dim view of his master — a hard guy, he reckons, who reaps the fruit of other men's toil. 'To the pure thou wilt show thyself pure; and with the perverse thou wilt show thyself froward' (Ps. 18:26) says the Psalmist. It is the same with every calamity. How comes it that a loving God allows a dear one to die in pain, or permits men to fight one another in savage wars? When the judgments of God are in the earth men blame God rather than

man — a reflection of the type of human character which first of all puts the blame on others rather than self.

The question of multiple causation also arises. Looked at from different points of view, all the explanations of the Three Mile Island accident may be correct. The Bible affords many similar examples. It is both God and the devil who cause David to number the people. The movements of the sun, moon and stars across the sky is the result of the operation of the laws of heaven and earth yet they may be thought of, and often are, as the workings of God. Baruch and Jeremiah are told to hide themselves ('Don't let any one know where you are' Jer. 36:19) but when the king tries to arrest them we read 'The Lord had hidden them', v.26.

In everyday life we think and talk similarly. On the TV we might truthfully say that we heard a politician make such and such a promise yet we know that what we saw was a recording and that the politician in question was not hiding in the box of electronic gadgetry in our sitting room. A man might say that he built a house in a chosen place but we do not think he is a liar because he has no knowledge of building. If we say that a king declared war we do not necessarily think of him as a fighter.

It would seem that Christians are often muddled. Some passages in the Bible seem to speak of God as the direct cause of all that we see and hear — he clothes the lilies of the field, makes his voice to be heard in the storm, upholds the universe, feeds the lions and so on. On the other hand we are faced with the clear statements that the workings of nature are not all the direct activities of God — for the Scripture makes it clear that God has implanted laws in nature and it seems to be implied that these laws operate on their own.

Thus Job is asked if he knows the ordinances of the heavens and whether he can establish their rule on earth (Job 38:33). In such passages as Jer. 31:35 and 33:25 God claims that his promises are as reliable as the laws of nature as seen in astronomy. Similarly on earth the bounds of the sea are controlled by a perpetual decree. (Jer. 5:22) Similarly the heavens and the clouds were created and established by God by a 'decree which shall not pass away.' (Ps. 148:6; 104:19; Prov. 8:29 etc.) The general teaching is, or seems to be, that God created the whole system of nature and implanted laws with which he does not normally interfere. If this be so, we must interpret those passages which seem to speak of God's immanent presence in all nature in much the same way as we speak of our television per-

sonalities, of the doings of actors on the stage, or the sayings of great writers who have pointed to ever-present truths but who, despite the present tenses which we naturally employ, have long since been dead and buried.

If this is not the right way to read the Bible, what are we to make of such a passage as 1 Ki. 19:11 'A great and strong wind rent the mountains, and brake in pieces the rocks before the Lord; but the Lord was not in the wind: and after the wind an earthquake; but the Lord was not in the earthquake: and after the earthquake a fire; but the Lord was not in the fire . . .' It would be difficult to imagine a clearer statement of the fact that, despite common ways of speaking, we are not to imagine that God is at work in all the activities of nature.

We are often reminded that events which appear to be due to chance are not necessarily so. Half a century ago the late F. W. Westaway reminded us of the fact that few activities can appear to be more at random than the movements of a man who is putting on his shirt, yet in fact the over-all activity is highly purposeful. Similarly today MacKay draws attention to the seemingly random last figures of telephone numbers in a directory, these being in fact anything but random! It is easy to multiply examples of this kind. They prove beyond a doubt that apparently random events may be designed — a typical Biblical example being that of the man who by chance shot an arrow at the Israelite army and killed Ahab, so fulfilling Michaiah's prophecy. (1 Ki. chs. 21, 22). What they emphatically do not prove is that there are no random events; that all events are under the direct surveillance of God.

That this is not the case would appear to follow from the need for prayer in the Christian life. In the Book of Acts we are told that the apostles cast lots to find out who should replace Judas among the twelve Apostles. (Acts 1:24f.) But they did not merely cast lots, they asked God first of all to direct the lot so that his will would be made clear. If God controls every casting of lots, it seems strange that the Apostles could not leave the matter with him. But in fact they apparently assumed that unless he intervened the lot would be cast at random. In short does not the theory that God controls every event directly all the time amount to fatalism? If God is working directly in every event, why should I want to interfere by making requests?

A Christian might also argue the case in another way. If God is acting all the time directly and in every event, what kind of God must he be? Surely a Being who is concerned in the main with

trivialities. Imagine the vast number of molecules in a room full of air, or (more easily) think of all the grains of sand on all the beaches in the world. Is God concerned with the movements and positions of every one of them? Does not such a view of God trivialise religion? Or again, imagine the stupendous number of events which involve repetition — electronic orbits jumping up and down, and emitting or absorbing quanta of light, wheels, planets, stars turning with perfect regularity — is God concerned to send stimuli of some kind to ensure every repeating movement? If God acts so, in what conceivable sense can he be a Person? Personality is shown by spontaneity and thoughtfulness, not by endless repetition. Surely to hold such a view of God is to depersonalize him.

Why, then, we may ask, has the view of God we have been criticising become so popular of late? There would seem to be at least two reasons. First of all it is widely held because it seems to link up so neatly with evolution. Materialistic biologists have been claiming for many years that purely random mutations followed by natural selection of the fittest provides the essential mechanism by which evolution operates. That evolution has taken place, is shown by the increasing complexity and adaptability of biological species with the passage of time. Evolution, then, is a kind of law of nature (though not necessarily a deterministic law) and the wonderful end result must, for the Christian, be attributable to God. This provides an incentive to look for the hand of God in the random changes, or mutations which are supposed to provide the raw material of evolution. Out of such ideas 'process theology' is born — the universe is an evolving system because it is entirely, and at all times, actuated by God. Evolution in the language of the late C. E. Raven is the activity of the Holy Spirit. Such a view neatly removes the supposed contrast between science and religion; since God is everywhere and in all activity, the distinction between nature and supernature simply disappears.

There is no space here to develop this theme. It must be emphasized however that it is not a biblical one. The biblical doctrine is much more in accord with the second law of thermodynamics than with the supposed evolutionary process. Nature is becoming less, not more, ordered. The heavens are the works of God's hands, they shall perish but not God, 'they all shall wax old as doth a garment' (Heb. 1:10f.).

A second reason for the popularity of this semi-fatalist doctrine may be that it is an over-reaction to Deism. The Deist claims

that God created the universe, laws and all, wound things up, so to speak, then left them to unwind. After that he did not have to intervene. This view implies a denial of the personal relationship between God and man and naturally enough it horrifies Christians. What easier way to refute it than to go to the opposite extreme and claim that far from leaving the world alone, God is active all the time in everything? But easy though it is, we have seen that this view gives rise to difficulties which are hardly fewer or less harmful than those of Deism.

FRED HOYLE

Fred Hoyle recently appeared on BBC2 to give the last of the lectures 'Imagined Worlds' (14 Aug. 1984 and *The Listener*, 16 Aug.) He said that most astronomers accept the Big Bang theory because they want to believe in Genesis, but for himself he still holds to the steady-state theory although for a time he once abandoned it. Gamov had claimed that all the heavy elements were formed at the time of the Big Bang, but if there was no Big Bang, how did they arise? Hoyle had to find an alternative origin and this led him to the discovery that they are formed in stars, a theory now universally accepted. Hoyle was then on the side of the atheists: Christian theology has been a potent source of inspiration in science and has sometimes stimulated productive thought in the minds of those who reject it. Hoyle's story illustrates how valuable Christianity can be!

Hoyle rejects the usual evolutionary views of biology but thinks that living forms, at the bacterial level, are present in space — notably in the tails of comets. The absorption spectrum of dust in space shows a minimum at the expected position were it to consist of dried bacteria. Chemists point out that all compounds with hydrogen-carbon bonds give a minimum at the same wave length. Hoyle showed a curve in which there was an exact agreement between the rest of the curve for bacteria and for dust in space. To a chemist who claimed that the agreement was not exact, he said 'You are a liar!' The chemist showed his bacterial curve together with the points obtained from astronomical sources: the disagreement was considerable.

To most scientists the idea that bacteria live in space seems odd. What do they feed on? Is there plant life with photosynthesis too? And how does this theory remove any of the difficulties

associated with orthodox biological theory? Hoyle has himself argued most convincingly that the universe itself is not large enough to allow for the chance formation of a single living organism. His analysis of current Darwinian theory in his book *The Intelligent Universe* (Michael Joseph, 1983) is (I think) superb and irrefutable. He aptly compares the time it would take a person to solve the Rubik cube if (1) he could see what he was doing, with (2) the time it would take a blind man who cannot see what he is doing to achieve the same end by chance. In (2), when there is no way of telling if a new change will help in achieving the end result the time taken is far beyond the possible — whole universes of blind men for millions of millions of years would never achieve a single correct outcome. Darwinian natural selection working by chance is blind and therefore useless unless each chance change is beneficial in the fight for survival. Biologists (such as Stephen Jay Gould) suggest that the difficulty can be met by supposing that half-way changes towards a final useful biological structure may sometimes have a use other than that finally to be achieved, but this is an obvious rationalisation thinks Hoyle, and may safely be discounted.

A MEASURE OF MENTAL ACTIVITY

In one of the prize winning games played on TV, the competitors are asked to add a final word to an incomplete sentence. The aim is to give the word most commonly used when the experiment is conducted with a large number of people. (The proportion giving a particular word is called the Cloze probability of that word.) An example might be 'Don't touch the wet . . .' where the word *paint* would have a very high Cloze probability, approaching 1.0; an unrelated word such as *sausage* would be rated near zero.

In a recent paper M. Kutas and S. A. Hillyard, (*Nature* 1984, **307**, 161) tell the story of how they placed non-polarizable electrodes on various parts of the scalps of 14 longsuffering persons (students?) and arranged for a computer-controlled video-terminal to read out, one word at a time, 321 sentences at a prescribed speed. The voltages generated on the surfaces of their heads was duly recorded. Special attention was given to the e.r.p's (event-related-potentials) which followed the last word — paint or sausage as the case might be.

It was found that when the Cloze probability was high, the potentials fell by a few microvolts about 0.4 seconds later, but when they were low it shot up by as much as 5 microvolts. When the last word seemed to have something to do with the word with the highest Cloze probability, the rise in potential was not quite so high.

The authors conclude that 'if the N400 amplitude [i.e. the average potential rise after 300-500 milliseconds] proves to be a valid index of semantic priming, it should become possible to investigate the timing and spread of activation within semantic networks and knowledge schemata and to identify automatic and attentional components of processing.' Typical jargon!

That spoken (and written) language becomes boring, and mental activity minimized, when it follows expected lines was surely well-enough known before. Jesus seems to have gone out of His way to say the unexpected. So often His parables and discourses finish in a way which leaves one wondering how the conclusion he draws relates to what he has been saying. The possibility that he might have done so deliberately often fails to be appreciated by theologians who too often assume that redactors have shifted passages around and turned them into nonsense. This is no way to treat the Word of God.

DISCUSSION

ABORTION AND MURDER

Exodus 21:22f., as slightly paraphrased in most translations, has been appealed to as proving that the destruction of a foetus does not count as homicide, since the only concern, in fixing the penalty, seems at first sight to be with the mother. (e.g. by P. Cousins, *Faith and Thought*, 109, 16) If she survives unharmed, the offender gets off with a fine, despite the loss of the child — or so we are assured. Such is the assumption in the *Good News Bible*, whose version runs: 'If some men are fighting and hurt a pregnant woman so that she loses her child, but she is not injured in any other way, the one who hurt her is to be fined . . . But if the woman herself is injured, the punishment shall be life for life, eye for eye . . .'

The Hebrew text, however, does not narrow the matter down in this way. It says, literally, 'And if men are fighting, and hit a pregnant woman, and her offspring come forth but no harm

occurs, he shall certainly be fined . . . But if harm occurs, you shall give life for life, eye for eye . . .'

'Offspring' (the normal word for 'children') is plural here, presumably to include the case of twins. 'Come forth' is one of the normal expressions for being born, and this is the only place where it is used in a context of mishap (the verb for miscarrying, as in Gen. 31:38; Ex. 23:26 ('cast her young'), Hos. 9:14, *etc.*, is a different one, implying bereavement). And 'harm' here is left unspecified, and therefore applicable to the baby or babies as well as the mother. The restriction of it to the mother alone, as implied in RSV (where 'the one who hurt her' is RSV's interpretation of the simple 'he', as stated in the margin), or as asserted in GNB, is an expression of opinion, not a translation.

To sum up: the text of Ex. 21:22ff. specifies no more than a premature birth, brought on through a blow and involving either no further damage or else a degree of damage which may go as far as death (not restricted to the mother's death) and attract the death penalty. The restrictive interpretations underlying most modern translations are at best a reasonable speculation, certainly not a firm scriptural basis for regarding an unborn child as expendable.

The most accurate translation with which I am familiar is that of NIV here.

DEREK KIDNER

Joint Conference of
THE VICTORIA INSTITUTE
and
THE SHAFTESBURY PROJECT 'LINK' STUDY GROUP
ON THEOLOGY & PHILOSOPHY

THE THEOLOGY OF NATURE & NATURAL THEOLOGY

to be held at the
LONDON INSTITUTE
FOR CONTEMPORARY CHRISTIANITY
St. Peter's Church, Vere Street, London W1
on
SATURDAY 18th MAY, 1985

- 10.15 am Coffee
10.45 am THEOLOGY OF NATURE:
NATURE IN THE LIGHT OF CREATION, FALL
AND REDEMPTION
Dr. R. J. Thompson, Tutor in Biblical and
Historical Theology, Spurgeon's College;
formerly Principal of New Zealand Baptist
Theological College
11.45 am THEOLOGY OF NATURE:
GOD'S REVELATION IN NATURE
Gordon Barnes, MA, Chairman of Council of the
Victoria Institute
12.45 pm LUNCH
2.00 pm NATURAL THEOLOGY: IS IT SCRIPTURAL?
Rev. Richard Russell, BA, MA, MEd, Anglican
Curate
3.00 pm Tea
3.15 pm NATURAL THEOLOGY: ARE THE
PHILOSOPHICAL ARGUMENTS VALID?
Rev. Malcolm MacRae, MA, Associate Minister
at Dunblane Cathedral and leader of the LINK
Study Group
4.15 pm General Discussion

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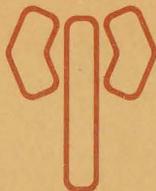
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