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## ABOUT THIS JOURNAL

**FAITH AND THOUGHT**, the continuation of the **JOURNAL OF THE TRANSACTIONS OF THE VICTORIA INSTITUTE OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN**, has been published regularly since the formation of the Society in 1865. The title was changed in 1958 (Vol. 90). **FAITH AND THOUGHT** is now published three times a year, price per issue £1.50 (post free) and is available from the Society's Address, 130 Wood Street, Cheapside, London, EC2V 6DN. The price of recent back issues (when available) up to the end of vol. 100 is 80p (post free).

**FAITH AND THOUGHT** is issued free to **FELLOWS, MEMBERS AND ASSOCIATES** of the Victoria Institute. Applications for membership should be accompanied by a remittance which will be returned in the event of non-election. (Subscriptions are: **FELLOWS**, £7.00; **MEMBERS**, £5.00; **ASSOCIATES**, full-time students, below the age of 25 years, full-time or retired clergy or other Christian workers on small incomes, £1.50; **LIBRARY SUBSCRIBERS**, £5.00. **FELLOWS** must be Christians and must be nominated by a **FELLOW**.) Subscriptions which may be paid by covenant are accepted by Inland Revenue Authorities as an allowable expense against income tax for ministers of religion, teachers of RI, etc. For further details, covenant forms, etc, apply to the Society. The Constitution and Aims of the Society were last published in **FAITH AND THOUGHT**, vol. 98, No. 1.

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A Journal devoted to the study of the inter-relation of the  
Christian Revelation and modern research  
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## ANNUAL GENERAL MEETING

The Annual General Meeting of the Institute was held in the Heringham Hall, Bedford College, Regents Park, N.W.1. on Saturday, 17th May, 1975 at 10.30 a.m. The Chair was taken by the President - Professor R.L.F. Boyd, C.B.E., F.R.S.

The minutes of the previous Annual General Meeting held on 18th May, 1974 were accepted as a true record.

The nominations of the Council of Professor R.L.F. Boyd, P.E. Cousins and D. Mitcheson, who retire by rotation, were accepted.

The Council noted with great regret that Mr. H.L. Ellison had resigned from the Council.

The Secretary presented the Annual Accounts and Auditors Report, stressing the need for increased membership and donations to meet increasing costs.

The motion to adopt the accounts was carried without dissent.

The auditors, Messrs. Metcalfe, Blake & Co. having signified their willingness to continue, were confirmed accordingly.

The meeting closed at 11.00 a.m. and was followed by an informative and stimulating symposium on 'Christianity and the Environment' at which the chair was taken by Dr. R.W.E. Keay, O.B.E. the Deputy Executive Secretary of the Royal Society.

Papers were presented by Professor R.J. Berry, Dr. R. Gambel and Professor G.T. Goodman. Professor Berry's paper is published in this issue; it is hoped that the other two papers will be available for publication in due course.

### NEW MEMBERS

#### *Fellows*

B.S. Green, Woodford Green; Dal Schindell, Sheffield;  
Rev. M. Francis, M.A., B.Litt., Southampton; Rev. A.E. Bennett,  
Hazelton, Canada; James Brooks, Tech.M.Sc.; Ph.D., Shipley;  
J.M. Hercus, B.Sc., M.B., B.S., Sydney.

#### *Members*

J.A. Skutlin, Elizabethtown, U.S.A; N.K. Challis, M.A.,  
Wanstead, E.11; A. Noble, B.Sc., Ph.D., Falkirk;  
Rev. F.T. Dufton, M.A., Saffron Walden; E.D. Martin, B.Sc.,  
B.Ed., Islington; Dr. J.R. Martin, St. John's, Canada.

#### *Associates*

Rev. J. Simons, B.D., Granham Park, Essex;  
D.P. Rising, Pasadena, U.S.A.

### EDITORIAL

*Balance Sheet.* In the interests of economy we are not printing the balance sheet but those who would like to see it may obtain a copy from the London office on application.

*Binding* (see 101, 185). We regret that the price per volume, covering two years, must now be raised to £3.50.

*Back Issues.* The Society has a number of back issues of the *Journal of the Transactions* in stock. Subject to their being unsold, the following are available at £5.00 each (boards), or £3.00 each (paper): a few of these are water-stained on the covers). Post and packing are free. A few parts of 5,7 and 8 of vol. 2 are also available. Order from the London office.

## IN STOCK

Vol. 7	1873/4	2	<b>copies</b>	Vol. 48	1916	11	copies
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17	1883/4	11	"	" ( 72	1940	2	"
18	1884/5	6	"	" ( 73	1941	6	"
19	1885/6	1	<b>copy</b>	" ( 75	1943	9	"
20	1886/7	1	,,	" ( 76	1944	14	"
21	1887/8	1	,,	Boards 77	1945	10	"
23	1889/90	1	,,	78	1946	1	"
25	1891/2	1	,,	80	1948	103	"
26	1892/3	1	,,	81	1949	43	"
27	1893/4	1	,,	84	1952	3	"
28	1894/5	1	,,	85	1953	1	"
29	1895/6	1	,,	86	1954	3	"
30	1896/7	1	,,	87	1955	41	"
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39	1907	1	,,				
40	1908	3	<b>copies</b>				

*Delay in Publication.* The Editor regrets the late appearance of this issue. He has recently moved from a house to a flat and this together with other domestic difficulties have made it impossible to give attention to VI matters. Owing to a further sharp rise in the cost of printing we have also been looking around for some other way of producing the *Journal*. Plates for this issue, typed by Messrs. Prototype Service, 42 High St., Milton, Cambs., CB4 4DF, were prepared by Messrs. CALL of Cambridge, who have also been responsible, as usual, for the printing and binding.

# News & Views

## "...BEST LAID PLANS..."

In this issue we print Professor Berry's article on Christian attitudes to the environment in which he draws attention to difficulties which have arisen in connection with the Aswan dam in Egypt. For further information on this subject see *Nature* 255, 570. For example, the water table of the surrounding desert was formerly at a level of 20-60 metres below ground but as a result of the dam it rose rapidly, by over 4m a year, and in time brought salt to the surface, threatening half a million acres of desert which have been irrigated and cultivated over the past ten years and threatening also the lower fertile plain which has been under cultivation for thousands of years. See Is. 19:7. There has also been a catastrophic fall in the fishing industry in the Nile Delta, Is. 19:8 - though in part the loss of fish has been compensated by fishing in Lake Nasser.

In USA vast sums of money have been spent on the study of methods of reducing pollution of the atmosphere by automobiles. The catalysts which have been developed are extremely effective in reducing unburnt hydrocarbons, nitrogen oxides and carbon monoxide in exhausts. Unfortunately it is now realised that they are equally effective in ensuring the oxidation of sulphur dioxide to sulphur trioxide, perhaps the most pernicious of all common smog producing compounds, (*New Scientist*, 13 Mar, 1975, p.642). Another difficulty is that by burning CO to CO<sub>2</sub>, HCN may be produced (*Science*, 1975, 109, 149). The huge effort made to clean up exhaust gases may have been largely wasted. With this in mind, it is feared that it will be much harder in future to gain support for anti-pollution laws.

Other instances of a similar kind are given in an article in *Chemistry in Britain* July 1975, p.247). To stop smoke emissions from engines it became customary in USA to add the complex chemical MeC<sub>5</sub>H<sub>4</sub>Mn(CO)<sub>3</sub> which has the remarkable property of so reducing the size of carbon particles in exhausts that they become invisible. However, the small particles are now thought to be dangerous in the lungs and they are of course vastly greater in number. In one locality a brown plume of NO<sub>2</sub> fumes was sent up by a factory and gave rise to many complaints. After considerable research it was found possible so to change the conditions of manufacture that colourless NO was discharged instead. But the brown plume then appeared down wind. Methanol has often been suggested, and frequently used, as a 'clean' substitute for petrol but the formaldehyde to which it gives rise in the exhaust is more dangerous than the noxious products obtained when petrol is used.

An article in *Nature* (255, 360) is concerned with the Occupational Safety and Health Act which came into force in USA on 28 Ap. 1971. Though intended for the benefit of Americans, it has been the cause of much discontent and huge expense. It is estimated that the enforcement of the 90 dB sound limit will cost industry 30,000 million dollars. The writer makes the point that because science tends to pin-point issues about which a good deal happens to be known, it often fails to relate to very important issues. Because of lack of knowledge there are no laws dealing with stress, though its importance in destroying the well-being of a country is of vast importance. On the other hand, because some of the causes of cancer are known it is possible to legislate.

The tendency of scientists is to approach problems in a simplistic way, but there are always a vast number of complex processes at work and the sheer labour required to evaluate them all in order to determine what will happen when an industrial process, or a law, is altered, is often astronomical. The interaction of propene, NO and air involves over 200 elemental reactions each requiring detailed study.

Another instance of the way good projects can cause difficulty is afforded by the advent of computers. These enormously increase the effectiveness of modern weapons of war. A recent BBC documentary (*Listener*, 20 Oct. 1975, p.434) painted a truly frightening picture of how computers open the way to virtually undetectable theft on a scale so gigantic that it is threatening to undermine the stability of Western Society. In the past we thought of thieves as belonging to the riff-raff of society: today they are often to be found among highly respectable men with university degrees.

Christians will reflect that, far too often, man has proudly started to build his towers of Babel, only to find that because of lack of relevant knowledge, coupled with human pride, envy and perversity, the projects have turned sour. Even the best brains can rarely predict the unexpected side effects of the huge projects being undertaken today. Technology needs men of prayer and deep humility with an intuitive sense of where danger lies.

### PRECOGNITION

In an interesting article (*Precognition and Time*, *Jour. Soc. Psy.Res.* 1974, 47, 351) J.E. Orme draws attention to the fact that precognition, when it occurs, tends to refer to events soon to come. Plotting, logarithmically, the frequency of reported

cases of precognition against the time span he obtains a straight line relationship which perhaps "indicates something fundamental about the nature of precognition". The paper draws attention to the difficulty we experience if we try to take warnings seriously enough to act on them. There were more than 40 precognitive warnings about what was going to happen in the village of Aberfan in Wales before the coal tip moved and engulfed the local school, and all important details were given in the warnings, though in no case did one individual receive all the information.

### EARTHQUAKE PREDICTION

As long ago as 1910 H.F. Reid urged that attempts should be made in earthquake prone areas to determine where the strains are greatest, for it was likely that quakes would occur there and so might be predictable. According to Oliver writing in 1970 (*Tectonophysics* 1970, 9, 283) seismologists fought shy of prediction before 1960 because of its association with "seers, mystics, fortune-tellers and the like" and the "great publicity ... given to earthquake prediction based largely on quackery of some sort". Since then three separate lines of enquiry have encouraged the hope that prediction will be possible. (They are, the theory of plate tectonics; the fact that injection of fluid in some areas has created man-made quakes, and the Whitcomb theory which deals with the formation of micro cracks in rock as the stresses build up) (*Nature* 252, 9).

The reason given for the failure of scientists to study the possibility of predicting quakes is interesting. According to H.T. Pledge in his *Science since 1500*, 1939, p.163, Charles Singer suggested that the Greeks may have rejected the germ theory of disease just because the barbarians held it.

According to a recent report (*Nature*, 255, 302) Russian scientists successfully predicted an earthquake on the edge of Blue Mountain Lake, 3 Aug. 1973. The magnitude was 2.6 (about 3 predicted).

### NOAH'S BIRDS

In an interesting article on "Mental Maps for Navigation" (*New Scientist*, 19 Dec. 1974 p.863) Dr. Keith Oatley suggests that in releasing a raven and then a dove Noah was "simply carrying out a normal piece of ancient navigational practice". As an



example he cites a voyage from Shetland to Iceland as described in an ancient Viking saga. According to the story the navigator, Floki by name, carried with him a cage of ravens. A few days after setting sail he released one, which flew back astern, giving a back bearing on the departure point. Later he released a second bird which, after gaining height, flew back and landed on the ship, indicating that no land was near. Later he released a third which flew off ahead indicating the direction of Iceland. Owing to the curvature of the earth a bird, rising hundred of feet into the air, can see land much further afield than a man on a ship who is only a few feet above water level. Today birds are rarely carried but native navigators among the Pacific islanders carefully watch the direction in which birds fly overhead in order to correct their bearings.

### REDUCTIONISM

D.H. Galaty has recently told the story of early German Reductionism (*Jour. Hist. Medicine*, 1974, 29 (3) 295). In the 1840s, in Berlin, E. du Bois Reymond, E.W. von Brücke, H.L.F. von Helmholtz and F.W. Ludwig joined forces to explain life mechanistically.

In 1842 du Bois Reymond wrote, "Brücke and I have sworn to establish the truth that only common physical and chemical forces are at work in the organism" (this is the first known statement of reductionism) and followed it by saying that in biology as in all other sciences attractive and repulsive forces are the *only* basis of explanation and the only permitted event in the cosmos is motion — the view held by Kant.

Helmholtz joined the group in 1845 and a little later wrote his classical paper, one of the earliest in the history of thermodynamics.

At this time the word *Kraft* was in common use by scientists. Biologists mean by it "that which causes the phenomenon which I am studying", while their *Lebenskraft* was the cause and explanation of all vital phenomena. When once they had reduced an animal's activities to *Lebenskraft* they smiled with satisfaction: the magic word never seems to have suggested further problems for research! It conjures up memories of the old protoplasm, another solver of the mysteries of life.

## EVOLUTION

Controversy on evolution, always interesting, continues unabated. The neutralist theory has recently gained a good deal of ground. (According to this view, replacement of amino acid residues in proteins takes place at random at a low but steady rate so that the number of changes is in proportion to the evolutionary time elapsed. In the normal way natural selection does not enter the picture.)

Recently R.A. Crowson of the Zoological Department, Glasgow University, attacked the neutralists Ohta and Kimura ("Anti-Darwinism among the Molecular Biologists", *Nature*, 1975, 254, 464) asserting that much of the supposed evidence supporting the neutralist view is 'cooked': supposed evolutionary ages of taxa being made to fit the Kimura hypothesis. "This view ... strikes some of us as regressive and potentially dangerous to our science", he says, and finishes by referring to "Ohta's evident pride in his (it should have been *her!*) methods of analysis..." Commenting on this Nigel Calder (255, 8) says he really does not know which side is right but he is convinced that the doctrine of natural selection is hardening into a quasi-religious dogma. Indeed, "some of the critics of Kimura and Ohta react like priests scenting blasphemy". This, of course, is what the anti-evolution lobby has been complaining about for a long time: it is interesting to see the point made so forcefully in the pages of *Nature*.

*Evolution and molecular biology.* The tertiary structures of a group of enzymes turn out to be almost exactly the same and most of the internal residues are also the same. The extraordinarily specific reactions are due to small changes on the surface, perhaps involving one or two residues only. At first sight, therefore, it would appear that evolutionary change from one enzyme to another should be easy, involving no more than a few random changes followed by natural selection. But the problem turns out to be much more tricky. In the enzymes studied, over 80% of the surface residues are different while inside the enzyme molecule, clusters of different residues provide radically different solutions to the same space filling problem. The change from one enzyme to another cannot therefore take place gradually for a change will prevent correct folding and this can only occur again when a great many changes have been effected. For the evolutionary process to proceed at all, correct gene duplication must occur, together with mutation of another copy to a 'silent' gene which is inactive and cannot fold. Appropriate changes in the silent gene must then occur over a long period of time until folding is correct

again. The difficulties besetting an evolutionary origin of one enzyme-producing gene from another would seem to be very great. (*Nature*, 251, 200).

### MEANING

Professor R.G. Swinburne's inaugural Lecture at Keel (*Sense and Nonsense in Physics and Theology*, 1973) is a gem of coherent reasoning. RGS is concerned with how to know if a statement is meaningful or nonsensical. A.J. Ayer says, "If ... I ... say 'stealing money is wrong' I produce a sentence which has no factual meaning, that is, expresses no proposition which can be either true or false" (*Language, Truth and Logic*, 2nd ed. 1946, p.107). Positivists held that a sentence is meaningful if and only if it could 'in principle' be conclusively verified through sense experience (strong verification principle). Ayer changed this to '... if some possible experience could count for or against it, not necessarily conclusively, ...' (weak verification principle) which, says RGS, might well include 'God loves me':

The weak verification principle, RGS argues (and elsewhere proves) cannot be proved true. Many philosophers replace it by two tests, (1) is the language correct?, (2) is it coherent? (eg. 'honesty weighs ten pounds' is not coherent). On this showing much of modern physics is probably incoherent but argue as they will philosophers cannot agree about coherence. The ultimate test of meaningfulness is not, it seems, verifiability or coherence but conceivability — can people make sense of a statement? The subject is difficult and philosophers will always be needed!

### EXPLAIN ANYTHING

Attention has recently been drawn to the fact that Eddington (*Observatory*, 1938, 58, 37) 'predicted' that according to relativity theory a very massive star cannot produce a white dwarf when its fuel elements are used up. Rather it will go on "contracting and contracting until, I suppose, it gets down to a few kilometres radius when gravity becomes strong enough to hold the radiation and the star can at last find peace" — in short it becomes a black hole. But Eddington would not accept his own reasoning. It was "almost a *reductio ad absurdum* of the relativistic degeneracy formula ... I think there should be a law of nature to prevent the star from

behaving in this absurd way." So he proceeded to modify his formula to stop stars contracting! To summarise: if black holes are discovered science is ready to explain them: if there are none, science can explain that too.

### SHORT NOTES

*Astrology.* 130 Students at Stockton College, whose dates of birth were known, were asked to collaborate in an experiment to test astrology. Each of them was asked to assess himself on a personality inventory as aggressive, creative, intuitive, extraverted, practical, warm, adaptable, ambitious. There was a 9 point scale for each trait. For each student a friend was invited to assess him independently. Horoscopes were cast, but no relationship at all could be found between the horoscopes and the personality assessments. (B.I. Silverman and M. Whitmer, *Jour. of Psychol.*, 1974, 87, 89-95).

*Parapsychology in Russia.* An article in the *New Scientist* (13 Feb. 1975) describes the crackdown in parapsychology in Russia. E.K. Naumov, one of the best known Russian parapsychologists, was tried in January for accepting lecture fees without permission and sentenced to two years in a labour camp. News of Schroeder and Ostrader's book (see this *Journal* 101, 170) reached Russia through a Voice of America broadcast and was interpreted as a politically motivated attack on Russian ideology, using parapsychology as a weapon. The point that Russian scientists are as divided on the subject as scientists in any other country was not made in the book and the earlier official view that parapsychology is a form of "mysticism" and "pseudoscience" now holds sway. It appears that objective studies on the subject will no longer be publishable in Russia.

*Chirality* (see this *Journal* 100, 114). According to a report in *Nature* (245, 356) recent work at CERN confirms that parity is violated not only in weak but in strong interactions while D and L amino acids do not behave in the same way when bombarded with positrons. The electron itself seems to behave as if it had a helical structure. It is becoming increasingly clear that the basic units of which our universe is composed are far from simple.

*Food Crisis.* Experts place much of the blame for the food crisis which is now facing the world on to the doors of Russia. Sometimes the Russians export grain, sometimes they buy, and always on a scale sufficient to disrupt world trade. The

United Nations have been attempting to gather world-wide information on crops and weather so that shortages can be predicted and met, but the USSR refuses to provide information about their own agriculture. At one of the meetings of Gosplan, the UN central economic planning agency, Mr. Tikhon Sokolov explained this by saying "It is well known that information about foodstuffs is information of strategic importance" (*Times* 9 Nov. 1974). In other words it is more important to be ready for war than to save millions from starving.

*Eniwetok.* It is deeply encouraging to learn that the Eniwetok Islands are to be repopulated again. The area was a testing ground for the USA in 1948-58 when 43 nuclear devices were exploded there. The radioactivity has now fallen to a level comparable with natural radiation and it is considered that the future inhabitants will come to no harm.

*Big Bang.* The background radiation in the centimetre range, first discovered in 1965, corresponds to a temperature of  $2.8^{\circ}\text{K}$ . If this is a genuine result of a black body radiation it should show a sharp peak in the millimetre range at about 2mm. That it does so has recently been confirmed by scientists at Queen Mary College, London (*Nature* 251, 591). "It is difficult to overestimate the importance of this result" writes Adrian Webster in the *New Scientist* (21 Nov. 74), "the evidence that the universe has evolved from a hot, dense, early phase (the "big bang") is now wellnigh overwhelming". The argument is that in the early stages of the big bang matter and radiation were in equilibrium. The universe was in effect a "black body", the temperature of which steadily decreased until, at about  $3000^{\circ}\text{K}$  neutral atoms were formed which no longer imposed their temperature on the radiation. The radiation starting at  $3000^{\circ}\text{K}$  has now dropped to  $2.8^{\circ}\text{K}$  as a result of the expansion of the universe. There is still no indication that the background radiation is stronger in one direction than another, which seems to put our galaxy at or near the centre of the universe.

*Life Elsewhere.* In a discussion at the British Association last year Sir Bernard Lovell drew attention to the fact, ignored in the past, that 90% or more of the  $10^{11}$  stars in the galaxy are of type K or M. These exist for only 10-100 m years and then turn into black dwarfs, allowing no time for the development of a solar system. They have also a strong tendency to flare, frequently blasting off for a few hours with emission doubling. It would be impossible for life to adapt to the rapidly changing radiation. Lovell claims that this fact is a "severe body blow to the popular notion that there may be around 100,000 technological civilisations in our Galaxy." (Reported, in *Nature* 251, 95).

## REVIEWS

Stanley Milgram, *Obedience to Authority*, Tavistock press. Associated Book Publishers, £2.90.

The Nazi extermination of Jews stands out as an extreme instance of abhorrent immoral acts carried out by thousands of people under orders from a state authority. Lesser acts of obedience, seen by the outside world as totally immoral, have been carried out by many before and since. Professor Milgram studies the question in this book and describes a series of experiments designed to throw new and interesting light on it.

In these, ordinary men and women are invited to volunteer to help in a research project on learning and punishment. They were to put questions to a learner and for every wrong answer were to give progressively more and more powerful electric shocks - and to go on whatever the learner's protests, in some cases till he appeared to be dead. The volunteers believed they were giving real shocks, as indicated on the machine. In fact the experiment was so arranged that they were not: thus, they were themselves the subjects of a carefully planned and penetrating study.

Most of those taking part obeyed to a degree far greater than had been expected. Many of them even went to the limit of power of the apparatus without refusing orders.

Questioned afterwards about their feelings, most placed entire responsibility upon the director of the experiment, even though they themselves pressed the buttons, and could see at the time the "victim" apparently in intense pain.

The experiment casts doubt upon the common assertion that the Nazi perpetrators were inhuman, perverted sadists, not to be compared with ordinary men and women. The horrifying fact is that a great many ordinary men and women are willing, under the influence of a powerful authority, to carry out acts which they themselves would condemn outright in others as diabolical and cruel. The Nürnberg Trials illustrated vividly how those guilty of the most bestial crimes often claimed innocence on grounds of "obedience to orders".

The author portrays the results of the experiments with scientific accuracy and care. His aim was to discover the feelings and motivation which made the volunteers act in the way they did. If he is to be criticised on the grounds of using deception as the basis of his work one may ask how else could such vital information be obtained? How otherwise could the response of human beings to the conflicting demands of authority and conscience be studied?

The problem is as old as war itself. Why, he asks, are individuals on both sides in a war willing to obey orders however brutal, however inhuman, when their inmost conscience dictates otherwise? In throwing light on these problems Stanley Milgram has done a valuable service. His book makes important and fascinating reading.

F.T. FARMER

Stanley J. Jaki, *Science and Creation*, Scottish Acad. Pr., pp. viii+367, £4.50.

It would be difficult to praise this book too highly. It comes to grips with the problem of the "still births and birth of science" on a scale never attempted before.

In civilization after civilization, covering thousands of years and widely separated parts of the world, says Professor Jaki, individuals have made discoveries in science but nearly always these have come to nothing. This is because nowhere, until modern times and in a Christian culture, did any one formulate the idea of a physical law, a law of nature which is the starting point of the scientific endeavour. In ancient writings the idea of law in this modern sense is found in the Bible (see F&T, this volume, p 13) but only very rarely and incidentally elsewhere. When laws of nature were spoken of in ancient times the reference was almost always to moral, not physical, laws. But despite the O.T. statements the idea of law coming from a Law-giver did not catch on until recent times. Nor did the idea of testing theories by experiment.

Professor Jaki presents us with an excellent case for the view that cyclic theories of an external universe were the main cause of the still births of science in every culture, every religion, save only where Judo-Christian influence penetrated. In a cyclic theory time has no fundamental meaning and there are no landmarks from which to measure it. There is change, of course, but it is never final change for, given infinite time, everything is restored again. The universe is like the seasons, repeating cyclically, not every year but every Great Year, and many of the ancients speculated at length on how long the Great Year might be.

The cyclic theory makes man a chance ripple on a dark unfathomable cosmic sea which ebbs and flows purposely, eternally. Life in the universe is a circle: start anywhere and in due course you are back at the beginning again. It is an endless

treadmill from which there is no escape. There is no beginning and no end. There is no novelty either, for every discovery has been made and lost countless times in the past, and will be re-discovered and lost again countless times in the future.

Imbued with this philosophy, sustained effort is pointless and the dedicated determination to understand nature at all costs, unthinkable. The author illustrates his point with facts and quotations covering a wide range of cultures. Thus Wang Yang-Ming, the most notable of the Chinese scholars and thinkers of the early 16th century, had a friend who, for three days, tried to discover the principles embodied in the structure of a bamboo. At the end he was mentally exhausted and his poor head ached. Wang then spent seven days on the task but he too could discover nothing and, being overburdened with thoughts, became quite ill. "Thus we both sighed and concluded that we could not be either sages or men of virtue, lacking the great strength required for carrying on the investigation of things." Later Wang himself added, "I saw clearly ... that there was really no one who could investigate the things under heaven."

The dulling of motivation is seen nowhere better than in India where scholars speculated more than in other countries on the length of the Great Year. The pointlessness of life, and therefore of discovery, is endemic in Hinduism.

For the scientist a desire to know truth is a part of his ethical standard: but even ethics is a casualty in Hinduism. Virtuous living might ensure that one's next reincarnation would be in a higher rather than a lower animal form, but soon one would sink again. By the practice of great virtue one might perhaps reach heaven, but would the effort be worth while? Within the framework of eternal cycles heaven is no final resting place: the temporary inhabitant of heaven, according to the Vishnu Purana "is ever tormented with the prospect of descending again to earth".

In considerable detail Professor Jaki covers all the outstanding cultures throughout history, showing how they are dominated by the same all but universal philosophy which blunts the investigating spirit. The various chapters deal with Aztec, Inca, Maya, Chinese, Egyptian, Babylonian and Greek civilisations. The author outlines the discoveries and achievements of each: in each we are made to realise how extraordinarily limited these were and how no attempt was made to follow them up or to discover the principles upon which nature operates. Even in the field of engineering "The best results ... were used mostly for purposes of warfare or as devices of deception and magic in temples", a passive attitude to nature resulting.



This lengthy discussion is followed by Chapter 7, "The Beacon of the Covenant" which contrasts the pagan world with the completely different attitude of Israelites and Christians. The slow outworking of the idea of creation leads to the idea that God has impressed laws on nature, that time is real, that investigation and progress are meaningful and worth while, that events cannot be reversed.

In the next chapter we learn how some of the church fathers refuted the pagan cyclic theory.

A chapter on Islam follows. Mohammed himself commented on the reluctance of men to believe in God as Creator. After his death Islamic scholars became over-influenced by the legacy of Aristotle; and the doctrine of creation, though never explicitly denied, receded into the background. Speculation on eternal cycles was rife. The doctrine that all events are caused by God led to the view that laws of nature are impossible. In this infertile soil science had little chance to grow; nevertheless, in spheres relatively uninfluenced by Aristotelian philosophy, considerable progress was made, notably in optics and mathematics. Not until the days of Maimonides (1135-1204 AD) did a culture begin to arise, both Islamic and Christian, in which creation, rather than cycles, provided a background to thought. From that time onwards the progress of science was assured.

One later chapter (Ch. 13, *Murky Backwaters*) is especially charming. It tells of modern attempts to revive the cyclic theory by Kant (whose universe was created but would exist for ever), Herbert Spencer, Schelling, John Tyndall, Engels (who called Newton an inductive ass!), Mach (who by an oversight, though he made his universe infinite, taught that gravity, which is finite, was caused by the sum total of matter), Nernst and some of our contemporaries too! Here, as throughout the book, we are regaled with a superb collection of apt and documented quotations. Unfortunately, there is no subject index and the name index is far from complete. A signal blemish in a masterpiece!

John W. Wenham, *The Goodness of God*, Inter Varsity P.,  
221 pp, PB £1.40.

It must have taken considerable courage to write this book. It deals with the darker side of the Bible; with every moral difficulty, with every passage which seems 'unChristian' in tone. We are given comments by atheists too. Yet at the end of it all we are asked to behold not only the severity of God but also His goodness.

Mr. Wenham's style, as usual, is simple and to the point. He has read widely and scholars will find the heavily referenced footnotes particularly valuable. Indexes of biblical texts, names and subjects treated are provided.

The book starts with an outline of the problem, couched in the strongest possible terms. Nine features of the world are then outlined which are all 'good' - such as the freedom to choose, the fact that punishment does not last for ever and that rewards and punishment do not at once follow good and evil deeds, etc. In this section the treatment of retribution is outstanding - punishment is to be taken seriously: it is not to be dismissed as a deterrent, or as treatment for an illness. The earlier part of the book develops the theme of Bishop Samuel Butler's *Analogy* - the theme that the difficulties we find in nature run closely parallel to those we find in the Bible, which is only to be expected, since God is the Author of both.

Later chapters deal with the sins of saints, the abominations of the heathen at the time of the Israelitish invasion, the imprecatory Psalms and the nature of God. There are additional notes on the Doctrine of the Good God and on evil in the world of nature. In short, the book is a brilliant refutation of the distorted ideas about God widely held today: it is a 'must' for every serious student of the Bible.

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Philip S. Chen, *A New Look at God*, Chemical Elements  
Pub. Co. 2nd ed., 1975, \$5.95.

This popular and uncritical book by Dr. Chen is often curious - very curious indeed. With a plethora of quotations, many of them biblical, the author attempts to show that God lives in the open space in the Orion nebula ("the high and holy place" of Is. 57:15) out of which the heavenly Jerusalem will emerge when it sets out on its long journey to earth. God is proved to be "a person, having eyes, ears, hands and feet" and "there must be some resemblance between man's physical body and that of God" since Jesus was the express image of the Father (Heb. 1:3). There is no sin in flesh but only in blood (p. 128) which is inherited through the male (!)

In science Dr. Chen sees confirmation of Scripture on every hand. The Lord "stretched forth" the heavens means that the universe is expanding. "He spake and it was done" indicates the suddenness of the "big bang".

On the medical side the author believes that science vindicates the OT commands to the Israelites. Animal fats (high in cholesterol, etc.) were forbidden (Lev. 3:17 etc.) because they cause heart disease, but fish oils are safe. Washing and isolation of those infected with communicable diseases made the Israelites the cleanest of all ancient peoples. Not till the time of Semmelweis (ca. 1850) did it become customary for European doctors to wash their hands after conducting autopsies: attention to OT commands would have saved many deaths. Chen advocates circumcision, not just after birth but on the eighth day as in the OT when risk of bleeding is minimal and the operation is painless since the sensory nerves are then still undeveloped.

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### Just received

Dictionary of NT Theology, Vol.1, Edited by Colin Brown, Papernoster Press and Zondervan, 1975, 822pp, £14.00 ( or £10.00 if ordered before 30 Ap.1976; 25 x 17 cm., weight 1.5 kilos.

This is the first ( entries A to F ) of three volumes of an English translation ( updated, enlarged, well documented) of the well established Theologisches Begriffslexikon zum Neuen Testament, edited by Lothar Coenen, which appeared a few years back. The Dictionary contains detailed discussions of NT words with reference to OT background, the Dead Sea scrolls, Rabbinic writings, secular Greek, classical, everyday and NT Greek. No knowledge of Greek or Hebrew is assumed. Entries are made in ordinary non-technical English, eg "Animals in the NT", "Death, kill, sleep" ( followed in this case by detailed discussion of four relevant Greek words).

There is no doubt that this Dictionary will be of great value, both to professionals and to all who read and love the Bible. The price is reasonable by today's standards and if the first volume is typical of what is to come ( as we may well expect to be the case with Colin Brown as Editor ) the complete work will be of more value and cheaper, too, than a collection of many smaller works on the fields covered. We wish the venture every success.

## ESSAY REVIEW

### EZEKIEL'S CHARIOT

The book of Ezekiel is full of puzzles, not the least being that of the vision which the prophet had of a strange vehicle which descended from the sky in cloud and flashing fire and transported men, even the prophet himself, from place to place. It has been variously interpreted in the past. One writer says that Ezekiel is describing a tornado while J.M. Alegro, true to type, claims that the imagery is based on the sacred mushroom. When flying saucers became the talk of the day, it was soon suggested that they had honoured Ezekiel with friendly visits: today this view is accepted by all flying saucer enthusiasts.

Josef F. Blumrich has now written a fascinating book on the subject (*The Spaceships of Ezekiel*, Corgi Books, 1974, 180pp, PB £0.50) which is vastly more critical, readable and sensible than anything we have seen before. He has followed it up with articles in the UNESCO periodical *Impact* (1974, 24 (4), 329,337).

Blumrich's interest started when his son Christopher read von Däniken's *Chariots of the Gods* and told his Dad, a NASA authority on aircraft and spacecraft design, that he really ought to read it too. Dad roared with laughter but got the book and read it. When he came to von Däniken's uncritical account of Ezekiel's flying saucers he turned to his Bible. It would be so easy, he thought, to show Christopher than Däniken was talking nonsense. ... The result? ... "Hardly ever was a total defeat so rewarding" he says.

Blumrich studied Ezekiel carefully, comparing various translations and commentaries where the language is obscure. Finally he decided that space vehicles must indeed have visited Ezekiel over a space of around twenty years and that the descriptions given tally well with the best engineering design.

This conclusion sounds odd. What are we to make of it? Blumrich thinks it is always better to establish facts first and ask questions after. At the risk of adopting a doctrinaire approach we shall start here with questions.

Where could the space vehicles have come from? This poses an insoluble riddle for no other planets or bodies in our solar system are inhabited. It would take thousands of years for vehicles from even the nearest stars in our galaxy (if they have planetary systems) to reach us, let alone return. Again, the space men which Ezekiel saw (if such was indeed their nature) seemed just like ordinary men belonging to our Earth and Ezekiel

was even able to sit in a seat beside one of them. Blumrich suggests that the engineering design for an efficient man must be the same throughout the cosmos. This does not sound convincing: even on Earth people vary greatly in size from pygmies to giants. They are not always comfortable in other peoples' seats!

A more telling difficulty is that no one has yet found relics of saucers left after accidents, or of jettisoned apparatus of a sophisticated kind. Blumrich agrees that there must have been accidents, but thinks they would rarely have occurred near inhabited places. May be, but the same must be said of meteorites, yet we know that the ancients collected and venerated stones which fell from heaven. Would they not have been even more impressed by equipment which showed a high degree of workmanship?

Another difficulty is posed by fuel and energy requirements. Blumrich considers this problem in detail and agrees that the specific impulse of chemical fuels is nowhere near high enough to enable space vehicles to get back into orbit after accomplishing useful missions. Even for nuclear fuel the value is not yet high enough, though it might well be so within a few decades from now. Even so it is hard to think of matter from an atomic reactor being handled red hot, and presumably radioactive, in the manner that Ezekiel describes. Again, the space visitors seem to have experienced no difficulty in communicating with earthly beings. How did they learn Hebrew so easily? Yet again, if space men landed in ancient times why are there no other reasonably accurate descriptions of the vehicles in other ancient books? Blumrich thinks there ought to be and hopes to discover them, but material from the past is limited in quantity and it is odd that they have not turned up by now.

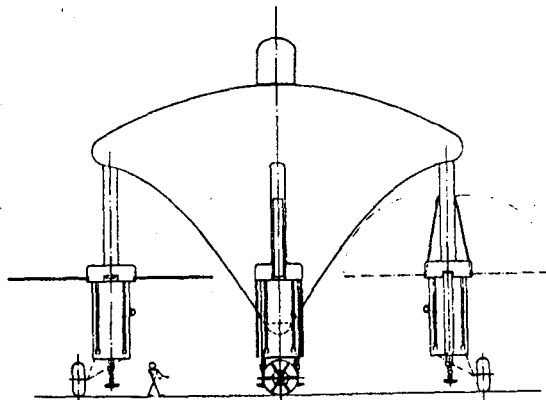
The difficulty of Blumrich's view is increased when we examine the actual text of Ezekiel. The events are referred to again and again as *visions*. Have we good reason to suppose that they were not visions at all but literal visitations? What about the scroll which the prophet was told to eat (3:1) and the seven men (or six) who went through the temple area slaying all they met? Did these things happen?—literally? Was fire from the reactor (radioactive?) spread over the city? There are topographical difficulties too. The description of the temple given here does not tally with Solomon's temple. In the closing chapters the same difficulty arises, for the temple with the river streaming out of its midst has never yet existed: even when Herod built the temple no attempt was made to build it after the pattern given by Ezekiel. Blumrich recognises this difficulty but suggests that perhaps Ezekiel or the astronauts made a mistake in thinking that the city they visited was Jerusalem: perhaps it was some other city, especially as the Mount of Olives is not referred to by name though there is said

to be a mountain on the East side. This does not sound convincing. Finally, what about Ezekiel's emphatic statement that the Thing visited him "as I sat in my house, with the elders of Judah sitting before me" (Ezek. 8:11)? How did the huge space vehicle, weight 63,300 kg and 60 feet across, powered by 70,000 HP engines (Blumrich's estimates) get into his house?

No! No! These difficulties are more than formidable. Perhaps one day, if parts from ancient space vehicles are unearthed by archaeologists, there will be time to think again. Meanwhile it seems fairly safe to conclude that Ezekiel did not encounter space men at all — not in the flesh!

Shall we then dismiss Blumrich's facts and theories as of no consequence? Not at all. He makes the subject all the more intriguing. For Blumrich *does* make out an extremely good case for the view that what the prophet saw was in fact (even in only in vision) a space vehicle.

Though there are obscurities in the language Ezekiel uses, it is fair to say that almost every point makes good sense. In 1964 R.A. Anderson in the journal *Astronautics and Aeronautics* (Dec. issue) published the result of a research designed to determine the best form of vehicle suitable for re-entry into planetary atmospheres. The work was carried out with no reference at all to the Bible, yet what came out of it was an object very like that described by Ezekiel.

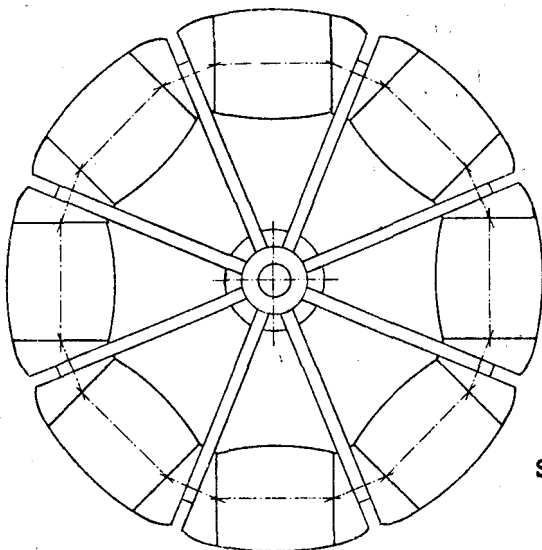


Engineering depiction of the spacecraft

The structure has the form of a top. The main reaction motor is at the bottom and this slows the vehicle on re-entry. As it descends from the sky there is a plume of cloud (compare a Saturn rocket at take-off) with fire in the midst. As the machine descends from the sky the main engine is turned off and four helicopter units below the top-shaped structure but surrounding the central engine unfold their blades (wings) and bring the vehicle gently to earth.

The helicopter units (cherubim) look man-like from a distance. They have a main body (into which the wings can be folded) and two landing legs with straight shock absorbers and highly polished feet which are hemispherical as they should be according to NASA engineers. As the vehicle lands there is a display like lightning as mini-rockets stabilize the motion. On landing a robot hand and a wheel are seen to be associated with each of the cherubim.

After landing the four wheels are lowered to the ground and the vehicle moves to the exact position required (for radio communication?). Ezekiel had seen wheels before, but never the likes of these! In the ordinary way the direction in which a vehicle moves is controlled by steering, but not so here.



**Structural layout  
of a wheel**

The vehicle, Ezekiel says, can move easily in any direction, forwards, backwards, to right or to left, but without steering. In fact the tyres turn both around the axes of the wheels and about their own axes. The complex gearing necessary to achieve this result made a whirring noise (Ezek. 10:13) and the wheels, in motion, gave the impression of wheels within wheels. To stop skidding ordinary treading would be useless so the wheels were covered with round protruberances which to Ezekiel looked like eyes.

Fascinated by the ingenuity displayed in Ezekiel's wheel, Blumrich applied for and obtained a US Patent (3 789 947 of 5 Feb. 1974) for this biblical omnidirectional wheel. Imagine how its adoption would facilitate the parking of cars! He hopes too that it will be invaluable in the design of invalid chairs which could then be moved sideways - if this was done manually no gearing would be necessary.

Ezekiel seems also to be seeing faces everywhere, as we do today when looking at space vehicles (photographs in Blumrich's book illustrate the point). Perhaps, too, he suggests, astronauts do some face decoration for fun!

Above the helicopter rotors there is the shining underside of the 'top', called the *firmament*. Above this again, and in the centre, there is the pilot's seat, looking not unlike a throne and enclosed in transparent plastic. In the sun's rays beautiful spectral colours appear (1:28). When the main power is on there is a great noise like thunder.

In all this some of the minor detail is, of course, difficult to fit in and some of the explanations are imaginative; for example the white uniform of the commander *could* be a space suit but we cannot prove that it is! Nevertheless, where the text is difficult and where there are several translations to choose from, at least one of them usually makes good sense. The overall impression given is certainly that Blumrich cannot be wholly wrong!

Then what are we, as Christians, to make of it? It seems reasonably certain that Ezekiel did not meet space men, but almost equally certain that he did have a vision of a workable, space vehicle, though such a claim could hardly have been made before 1964.



Have readers any suggestions to offer? Here is one - put forward with diffidence! In the vision of Ezekiel the prophet visits the temple complex in the land of Israel but the whole passage (40:1 - 47:12) is prophetic. It describes a river emerging from a temple and there is a city on a high mountain (cf. Rev. chs. 21-22). Ezekiel visited this (in vision, 43:3) in the same machine that he described at the beginning of the book. Are then *all* the references to the vehicle prophetic? Do they describe a kind of land-anywhere vehicle which does not come from outer space but from an earthly airport near the place of the Messiah's throne (43:6) and can get to its destination, anywhere on earth, at enormous speed?

The description of a landing given in 1:4 suggests propulsion by chemical, not atomic fuel, for it would surely require liquid gases to give the cloud, typical of the rising Saturn rocket. But chemical fuel of this kind - liquid gases - could not be carried from a distant planetary system. Nor would chemical fuel provide enough energy for travel in space. Did God reveal to Ezekiel how He would deal with sin in Messiah's kingdom? ... A suggestion ... We tried the idea out on a theologian but he did not like it at all.

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E.K. VICTOR PEARCE

The Biblical Flood: Evidence from Egypt

Preb. Victor Pearce has earlier shown that the Biblical Flood offers a ready explanation of a wide variety of archaeological findings (101, 228 ). In this article he considers in some detail the evidence afforded by Egypt.

Egyptologists, amongst them Frankfort, Petrie, Aldred, Baumgartel and Caton-Thompson; and now more recently Arkell and Ucke, have discussed the problem of the dramatic change in culture in ancient Egypt between 4,100 and 3,400 b.c. (Dates given as b.c. refer to C-14 datings; the BC dates would be about 4,900 and 4,200 BC respectively. See this Journal 101,229). There appears to be a remarkable change at this time between the Chalcolithic Amratian and the early bronze Gerzian cultures. (The old names were Nakada I and Nakada II.)

This change is also accompanied by geological changes. Consequently the Chalcolithic people lived on spurs high above the valleys to avoid the marshes in the times when Sahara was lush with vegetation and forest. By contrast the later bronze-age Gerzians built low down on the mud flats of the Nile valley, because the whole topography had changed. Sahara had become desert. The game animals and vegetation had disappeared. The sites upon the hill spurs once occupied by the Amratians were barren and dry, and only the flats down near the Nile were able to support life and agriculture. It all seems to fit into the general evidence pointing to the Flood occurring after the Chalcolithic age.

The tools and pots of the Gerzians who settled there centuries later were different in shape and conception, and the clay for their pottery was purified and well processed.

Because the two cultures were located in different places it is difficult to know what time lapse there might be between the disappearance of the Amratians and the arrival of the Gerzians. But the greatest puzzle is the source of the creativity of the Gerzians. They brought the beginnings of civilization with them which rapidly developed into the succeeding dynastic eras.

Later the separate dynasties of Upper and Lower Egypt were welded into a united Nile power by the Scorpion and then by Narmer. As dynasty succeeded dynasty the milieu of the Land of the one mighty river evolved into the concept of a king as the supreme autocratic despot and god-like Pharaohs familiar to Joseph and Moses of the Bible.

A problem is that the source of this upsurge of bronze age creativity appears to have been first established in Mesopotamia. The great questions are, was its appearance a migration of Semetic peoples or of a conquest by them of the Hamitic, or was it an absorption of cultural ideas (called acculturation) by the former Hamitic Chalcolithic Amratians? Or was there a complete cultural and racial break accompanying the geological and climatic change; and so therefore, were the Gerzians a mixture of both Semetic and Hamitic peoples as their language suggests, who migrated more or less together as sections of Ham and Shem's dispersal after the Flood? Emery put the problem in the following words:

At a period approximately 3,400 years before Christ, a great change took place in Egypt, and the country passed rapidly from a state of advanced neolithic culture with a complex tribal character, to two well-organized monarchies, one comprising the Delta area and the other the Nile valley proper. At the same time the art of writing appears, monumental architecture and the arts and crafts developed to an astonishing degree, and all the evidence points to the existence of a well-organized and even luxurious civilization. All this was achieved within a comparatively short period of time, for there appears to be little or no background to these fundamental developments in writing and architecture.

Authorities are divided in their opinions as to the reason for this sudden cultural advance, but it would seem probable that the principal cause was the incursion of a new people into the Nile valley, who brought with them the foundation of what, for want of a better designation, we may call Pharaonic civilization.<sup>1</sup>

Evidence has been weighed from the fields of art, architecture, palettes, writing, pottery, boats, geology and physical-anthropology.

A fresh outburst of discussion was evoked by Arkell and Ucko who are cultural evolutionists and favour the thought that the Gerzian descended locally from the Chalcolithic Amratian and the neolithic cultures before it — the Badarian and Tasian in Upper Egypt and the Fayum, Merimde and Omari in Lower Egypt. They

do not dispute that the bronze age civilization came from Mesopotamia, but they prefer to think that it was an acculturation rather than a movement of peoples. As Ucko is an African this outlook is understandable and useful in promoting the discussion which first commenced in 1965 in *Current Anthropology*.<sup>2</sup> The authors attempt to alter the opinions of the archaeologists before them who carried out the excavations. In spite of two hiatuses – one between palaeolithic and neolithic cultures and the other between Chalcolithic and Gerzian, they wish to contemplate an independent Egyptian evolution of culture.

To set it out clearly, the cultural succession is as follows:-

*Sequence of Cultural Phases in Egypt*

*Palaeolithic* hunter-gatherers

(hiatus of culture in Egypt)  
.....

*Neolithic to Chalcolithic* and predynastic

Kartoum artifacts (Uko argues for their being mesolithic contrary to others)

Tasian in Upper Egypt	Fayum in Lower Egypt
Badarian       "       "	Merinde       "       "
Amratian       "       "	Omari etc.   "       "

(hiatus at about 4,000 b.c.)  
.....

*Bronze Age*

Gerzian (Nakada or Naggada II, Pre-dynastic) 3,400 b.c.  
Unification of Upper and Lower Egypt 3,200 b.c.  
Archaic Dynasties I and II of the Old Kingdom.

Baumgartel, whose work of excavation is well known,<sup>3</sup> had written in 1955 of a "fundamental and abrupt change" between the Amratian and Gerzian. Her reply to Arkell and Ucko in 1964 is that "the changes which come in with Naggada II (Gerzian) are too vital to be explained by development only. As the imported pieces show, there was a connection with Western Asia which had not existed before."<sup>3a</sup>

The Gerzian post-Flood culture replaces what was largely a hunter-gatherer complex with some agriculture, although Caton-Thompson<sup>4</sup> brings evidence that these pre-Flood neolithic and chalcolithic peoples of Egypt were more serious farmers than they were hunter-gatherers. However, these communities were comparatively simple and small and they lived in reed and grass huts of "bee-hive" and rectangular shapes. James Mallaart reminds Arkell & Ucke that even this early farming is a derived culture from the Near East. "Neither the wild ancestors of wheat, barley, etc., nor those of sheep and goat are native to North Africa, and their presence in Egypt is artificial and man-made."<sup>2b</sup>

The chalcolithic Amratians lived, as has been said, when all the Sahara was covered with forest and grassland, inhabited with a full complement of roaming game. According to Myers there are tree trunks where it is now desert and the reason why the Badarians and Amratians built on spurs was to be out of reach of the marshes.<sup>5</sup> The change from forest to desert had taken place before the Gersians arrived with their new culture, and built towns on the mud flats of the Nile banks. It was in exploiting this new ecology that by 3,200 b.c. the large scale organised irrigation, and hoe and plough agriculture, were introduced. This important epoch is depicted upon the famous mace-head of the Scorpion king, now in Ashmolean Museum, Oxford. The Scorpion wears the skittle shaped White Crown of Upper Egypt and is officially opening the excavation of a canal amidst a scene of rejoicing. Organised agriculture is indicative of the growing towns whose populations need to be fed.

There is a problem, however, with the rise of civilisation of architecture and writing. Why is it that this Mesopotamian style of culture has in it much that is exclusively Egyptian?

In explanation, Aldred says that the Egyptians were quick to adopt new styles in all spheres, but only as a rapid transition into a typical Egyptian milieu.<sup>6a</sup> The marks of origin rapidly became assimilated into a Nilotic application.

This is illustrated by the advent of writing in Egypt. The Egyptians soon changed the Mesopotamian symbols in writing to those figures which are typically their own, and although they wrote from left to right at first as the Mesopotamians did, they soon changed from right to left. The story of the advent of writing is as follows.

It may have been the idea of writing which was first communicated to Egypt. The earliest step is thought to be shown upon the macehead of king Scorpion mentioned above. The king's name is pictographically shown by the Horus. Similarly there are two signs on the Hunters Palette. Pictographic writing made its first appearance on small limestone tablets in Mesopotamia, used in recording the tithes paid in gifts to the temple 3,500 b.c.

There are a number of pointers to Mesopotamia as being the source of Egypt's development of writing. First the carbon 14 date places it at 200 years later than its appearance in Mesopotamia. Secondly, writing itself suddenly appears in Egypt without much preparation. The Egyptian system of Hieroglyphic writing in ideograms and phonograms appears in fully developed style and in complete sentences in contrast to the brief tallies in Mesopotamia. This indicates that Egypt received the invention of writing already well developed from elsewhere. That source is certainly Mesopotamia because there we have the record of the evolution of writing. Further, the system of writing which arrives in Egypt is from left to right which is that of Mesopotamia. Later, this is reversed by the Egyptian development to right to left.

Moreover, Aldred contends that the system of writing in origin had been devised to record Semitic manner of speech in spite of the fact that it is mixed with Hamitic words.<sup>6</sup> This supports Frankfort's reply to the problem of why the symbols are not Mesopotamian. He says that Egyptians always liked the pictorial and concrete rather than the Mesopotamian abstract, so they assist understanding by clothing the hieroglyph with their own figures and meaning. This is of course, in keeping with Egyptian treatment in art and architecture where the subjects are clearly Mesopotamian in origin but the application is indigenised by environment.

Again the factor which solves these enigmas is to realise that the Flood affected Egypt as well as the Near East; and that the absence of evidence to show that the Gerzian culture was an invasion is due to the fact that they came into an empty land, and came as a mixture of elements of both Shem's descendants (Semitic) and of Ham's descendant. This would also explain the presence of these two elements in their language, and does not need even the theory of acculturation to solve it. The same explanation clarifies the evidence of Art, Architecture, seals, pottery, and other artifacts, and anthropology. In examining the evidences which these give we shall see that the opinions of most Egyptologists that the Gerzians are of Mesopotamian origin are well founded.

## Art

In art the renowned Nimrod of Genesis 10: 8-12 is depicted on the Gebel-el-Arak knife handle and the Lion hunt palette. The style of both shows affinities with Mesopotamia, yet both of these works of art were found in Egypt. Nimrod is described in Genesis as "a mighty hunter before the Lord". The account tells us that his name became proverbial, and that people would speak of someone as being "like Nimrod -- a mighty hunter, blessed of God".

It is notable that although the knife handle was found in Egypt, Nimrod features in Mesopotamia, and that indeed is where the passage in Genesis places him. He is spoken of as founder of the cities of Sumer and that later he went north to re-build Nineveh. After the scattering of the peoples at the Tower of Babel in Genesis 11, some of the Hamitics and Semitics would reach Egypt. In Genesis Nimrod features as being Hamitic, so therefore the Hamitic element in Egypt was not due to the natives being subjected to Gerzian invaders; they were part of the Gerzian migration. We are told that Nimrod descended from Ham through Cush. It is remarkable that both the knife handle and the palette found in Egypt, contain Mesopotamian art conceptions -- there are carvings of a mighty hunter with an organised hunt of men equipped with bows and arrows, spears and lassoes with the help of dogs, who are hunting lions, deer, antelopes, bulls, and what looks like an ostrich.

On the knife handle which is of ivory carved in low relief, there is depicted in heraldic style two lions rising up on either side of a man as in a lion act. This hero of the hunt bears out the Genesis statement that his name became proverbial for anyone who excelled in hunting. The hero between two lions reflects the Mesopotamian "Lord of the beasts" concept of Gilgamesh. The heraldic motif was a feature in the Ubaidian temple near Ur, of an eagle between two gazelles. Moreover the dress styles of the garment on the Egyptian palettes are Mesopotamian, and even the hair style of winding up of the chignon at the back is similar to that of the mask of Sargon found at Samarra in north Mesopotamia, and likewise the conception of the human figure in leg muscle, thigh and shoulder is Mesopotamian. Yet other elements are Egyptian, particularly on the reverse side of the knife handle where wrestlers are associated with two styles of boats, and later the Egyptians add their own style of leg muscle.

A significant link is a Gerzian styled painting in the tomb of Hierakonpolis in Egypt. It is similar to Ubaidian art in Mesopotamia, and concerning its link with the dynasties Baumgartel writes "The famous painted tomb of Hierakonpolis emphasises the close connection between the Gerzian period and the rise of the dynasties".<sup>3a</sup>

The Lion hunt palette is made of typically Egyptian dark-grey slate ground into a long heart-shape. In the centre there is a lipped flat hollow for paint or cosmetics and all around in low relief is depicted the hunting scene of animals and men. The petit chanchet or wedge-shape of their arrow-heads are true to discoveries in the tombs. The wedge-shape would gash the animals and was calculated to slow down the fleet-footed beasts through loss of blood so that the men could come near enough to lassoe them with the ropes. Something of the democracy of Mesopotamia is reflected in equality of size and therefore of social importance of the hunters. The later ascendancy of chief and pharaoh is depicted in succeeding dynasties by the dominating size of the king and the relatively pigmy size of his subjects.

The Gebel-et-Tarif motifs and the Narmer palette show the same characteristics of heraldic symmetrical arrangement of animals facing each other, and of mythical composite beasts combining parts of the bodies from different animals into one weird creature. On the Narmer palette, for example are depicted two creatures like dogs symmetrically opposed to each other but with intertwined snake-necks upon which are collars and leads each held by a man. The intertwined snake-necks are Mesopotamian. They are the unmistakable serpo-pards of the Mesopotamian seals. One of these was found in a Gerzian grave and had a motif of winged griffins and intertwined snakes.

Yet the palette depicts the white skittle shaped crown of Upper Egypt and the red tall-feathered-hat crown of Lower Egypt. Frankfort describes this as an Egyptian subject depicted in Mesopotamian style.<sup>7</sup> This would be supplied in the formative period when some elements from the settler's Mesopotamian origin was accepted, but the developing Egyptian consciousness was exerting its independence by rejecting the uncongenial, in much the same way as the American colonies did when exerting independence of their country of origin.

Politics likewise was being influenced by the extensive unity of the Nile. The Galleries of the Saqqara tomb depict the king wearing the crown of Upper Egypt, but holding the symbolic flail of a primitive pastoral king. This no doubt



indicated that it was the pastoralists who achieved ascendancy rather than the hardworking agriculturist whose mobility was restricted to his fields, a situation reflected in many a culture since.

#### *Architecture*

The Gerzian building styles of Egypt betray their origin in several ways. The use of bricks of two sizes as depicted on the Hunter's Palette, and the buttressed and recessed facades of the White Temple of Ereck in Mesopotamia are reflected in the tomb of Queen Nithotep at Nagadeh and other immense tomb facades at Saqqara. Professor J. Evans remarked that whereas the breaking up of the facades of buildings was necessary in Mesopotamia, the very complicated facade rebating copied in Egypt was not necessary to that land.<sup>8</sup> Even the pylon type towers of the Djete Stele were used later in Egypt. Yet in contrast the pise walls and ree matting of the first Ubaidian settlers in south Mesopotamia are reflected in the early Egyptian period of the Hunter's Palette.

#### *Boats and Artifacts*

At Hierakonpolis the Gerzian mural depicts boats of Mesopotamian origin with their high dominant prow and streamlined stern.

There is a great contrast in the flint tool shapes. The "U" shaped and comma shaped hamstringers and fishtail knives of the Amratians, are replaced by the flat banana-shaped knives and "V" shaped lanceheads of the Gerzians. The latter also made the bronze dagger of Mesopotamian style with the same techniques of rivetting on the hilt except that the convex shaped border has been given an Egyptian adaptation of a crescent moonshape. This shape eventually passed to Europe reversed to a concave border.

#### *Pottery*

In pottery, the shapes and materials reveal great differences from the pre-flood Amratians and others before them. The spouts of the tortoise jars and pots of the Post-flood Ubaidian handmade ware of Mesopotamia is seen more fully developed in the Egyptian Gerzian teapot shaped spouts and the spouts of larger calibre. This characteristic spout, not seen in earlier cultures, passes on into later cultures, (Ereck and Jemat Nasr). The clay body used to make the pottery is much more finely processed.

The large black-topped storage pots have a completely new shape. These heavier pots are baked upside down in a carbonizing atmosphere. The base which is uppermost gets reddened and the top upon which it is standing gets blackened. These earthenware pots of the neolithic to chalcolithic are mostly of squatter shapes, but the Gerzians make a high vessel with open mouth but with a pointed base. This shape is similar to that depicted on the mosaic frieze in the temple at al Ubaid where in the milking scene it is used for storing the milk after it is strained. This shape for storage jars or amphora which stand on a pointed base passes on into Europe to become a well-known feature down to Greek and Roman times.

Alfred<sup>6</sup> says that the wavy handled jars are of Palestinian origin which is a reminder that the great high road from Mesopotamia came via the fertile crescent through Palestine; but the pink and buff were with linear painted motifs of triangular hills, flamingoes, ibexes, stylised trees and human figures, are distinctly Mesopotamian, especially the pond and stream motifs. Baumgartel<sup>3</sup> gives very full details of the "Maltese" cross pond motif and the development of Egyptian water motifs from it. One of the important processes introduced by the Gerzians was that of alkaline vitreous glaze.

#### *Physical anthropology*

An important question is whether the new culture from its Near Eastern source was the result of a migration of people. Indications that it was a migration comes from the skeletal remains in Gerzian graves. The Gerzian skulls were broadheaded and longfaced, whereas the Amratians were longheaded. Emery<sup>1</sup> says that the graves of the Gerzians "were found to contain the anatomical remains of a people whose skulls are of greater size and whose bodies were larger than those of the (earlier) natives, the difference being so marked that any suggestion that these people derived from the earlier stock is impossible".<sup>1a</sup>

It should be remembered also that the graves of these people are in different areas, and that no mixed types are found in them.

The context of the above evidences, the geological and climatic changes which preceded the Gerzian Egyptian civilization, have great significance. Karl Butzer says that there was not only a hiatus between the terminal palaeolithic and the neolithic in Egypt, but the great changes before Gerzian times coincide with the European Atlantic phase (when England was cut off from the continent).<sup>9</sup>

Baumgartel speaks of the rejuvenation of the Hils at this time.<sup>3</sup> Geologists know that a river is rejuvenated when either the land is raised or the sea level lowered. This means more than a climatic fluctuation to which some attribute the advance of desert conditions. The lowering of the ocean would lower the water-table in the limestone syncline which underlies the Sahara, and this would result in the rapid disappearance of the lush vegetation through the drying up of the Sahara.

Such changes would not be due to ice-melt at the end of the ice-age because that would raise the ocean and water-table level and not lower it. Neither would it correlate with the Wurm regression as that was 8,000 years earlier. The explanation must be connected with the evidence that there was a general climatic change associated with the Flood, but not caused by what is sometimes called the canopy theory. The sudden lowering of the level of Lake Fayum at this time is significant.<sup>10</sup>

In conclusion, the acceptance that the Flood wiped out the Chalcolithic peoples of Egypt, and that the Gerzians entered empty lands, from Mesopotamia, and ultimately from Ararat, solves most of the Egyptological problems.

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R.J. BERRY

Alternatives and Accusations in Christians'  
Attitudes to the Environment

In this paper, given to the VICTORIA INSTITUTE in a recent Symposium. Professor R.J. Berry outlines, from a Christian angle, current views on man's attitude to his environment.

There are two opposites in Christian attitudes to the environment. The first is described in a story told by Gavin Maxwell (*Observer*, 13 October 1963): "A minister of the Church of Scotland, walking along the foreshore with a shotgun, found two otter cubs (which Maxwell had brought from Nigeria) at play by the tide's edge and shot them ... The minister expressed regret, but reminded a journalist 'The Lord gave man control over the beasts of the field ...'". The other is caricatured by a clergyman in a *Punch* cartoon addressing an old man leaning on the gate of a well-tended cottage garden, "It is wonderful what the hand of man can do to a piece of earth with the aid of Divine Providence". The gardener's reply was, "You should 'ave seen this piece when Divine Providence 'ad it all to itself".

These two anecdotes picture two strands of thought which have persisted in both religious and secular thought over centuries, and which can be described as "triumphalist" and "mystical" respectively or, in terms of the relation of man to nature as "exclusionist" and "inclusionist" (Elder, 1970). Inevitably there are many variations on these themes, and Christians have vehemently defended a host of different positions of varying worth. The following pages set out five particular tensions in environmental thinking which are commonly described as "problems" or "errors". The intention is that exposure of these questions will lead to a surer environmental theology than currently exists. Much thinking at the moment is unconsciously pragmatic, and it is not a little worrying that Christian doctrine is being expounded in ways that have surfaced only in recent years since environmental problems became pressing - notwithstanding or perhaps, because of valuable expositions from two Anglican bishops (Montefiore, 1970; Taylor, 1975).

### 1. Progress v Depravity

Pollution is increasingly obvious, and it is this which has brought home the fact that our environment is more than an envelope. The *Torrey Canyon* disaster in March 1967 was a valuable prod in beginning environmental concern for many people, and stimulating the British government (at least) to take control action. In retrospect the effects of the wreck of the tanker were comparatively small. Much of the damage to wild-life was caused by the detergent used to clear the oil. Several times as many birds were killed 2½ years later off the north and west of Britain without any known acute cause: an estimated 200,000 birds failed to survive the autumn, and the only cause that could be suggested was the presence of high levels of chlorinated hydrocarbons (DDT and its chemical relatives) and polychlorinated biphenyls (an assumed inert by-product of plastics manufacture) in many of the corpses.

But the killing action of pollution is only part of its effects: we are fortunate indeed if we are not plagued by aircraft noise, car fumes, empty plastic bottles or tin cans, sour streams, obtrusive buildings, and other fall-outs from our fellows. So much of this is the fruit of recent technology that it is surprising to find that men have been fouling their nests apparently as long as they have been on earth.

In A.D. 61 Seneca claimed, "as soon as I had got out of the heavy air of Rome and from the stink of the smoky chimneys thereof, which, being stirred, poured forth whatever pestilent vapours and soot they held enclosed in them, I felt an alteration of my disposition", whilst Eleanor of Aquitaine (wife of Henry II) must have had similar feelings in 1257 when she moved to Tutbury Castle from Nottingham to escape "the undesirable smoke".

John Evelyn expressed a sentiment about London in 1661 which many modern Londoners will echo despite the various Clean Air Acts: "That Hellish and dismal Cloud of Sea Coale which is not only perpetually imminent but so universally mixed with the otherwise wholesome and excellent Aer, that her Inhabitants breathe nothing but an impure and thick Mist, accompanied with a fuliginous and filthy vapour, which rends them obnoxious to a thousand inconveniences, corrupting the Lungs and disordering the entire habit of their Bodies; so that Catharrs, Phthisicks, Coughs and Consumptions, rage more in this one City than in the whole Earth besides".

What is new about our present situation is that it is much more difficult to escape than it used to be. We are running out of habitable world at the rate of two babies every second, and it is possible only for the favoured few to flee to unspoiled country or to move into the virgin pastures of a New World - as did the Beaker Folk, the Vikings, the American colonists, or even the adventurers of the heyday of Empire. The human population is now doubling every 30 or so years after increasing only relatively slowly throughout human history. (To put the rate of population increase into meaningful terms, think of twice the number of people as now crowding into buses or shops by the turn of the century). Although it is true that restricting population size *per se* will not solve many problems, it is likely to be a prerequisite for solving most of them.

The standard answer to the problems of 'progress' (which include the decline in infant mortality that is largely responsible for the growth in population numbers) is that they are transient and will yield to technological inventiveness. For example, atomic power will replace fossil fuel, new foods and culture methods will be developed, sophisticated manufacture will be able to control its pollutants, and so on. John Maddox, formerly editor of *Nature* is the chief prophet of this optimistic Utopia.

Unfortunately prophets of doom have a better record of being right than prophets of success, from Thomas More and Francis Bacon on. The "green revolution" is an excellent example of this. The high-yielding strains of cereals developed during the 1950s and 1960s were seen as a probable solution to chronic under-nutrition in places like India and Indonesia. Unfortunately these strains need high doses of fertilizer to achieve their theoretical yield, and this is not readily available in the Third World. Grown with traditional husbandry, they produce only as much or less food than ordinary strains. Borlaug, who received a Nobel Prize in 1970 for his part in developing the Green Revolution strains, prophesied in 1965 that the world's population could be fed for 100-200 years; by 1969 he had shortened the time to "two to three decades".

Without taking sides in the optimism debate:

- a. Technological answers may not help for particular individuals. For example, at the peak of the Babylonian Empire the land between the Tigris and the Euphrates supported two crops a year and considerable grazing in between, but is now largely desert. Probably what happened is that irrigation channels led to more and more salts being deposited on the land. This means declining yields and the need to cultivate more

land to produce sufficient food. As the available water was spread even wider, canals would have silted up, leading to the cultivators spending an increasing amount of their time clearing them. At one time Ur of the Chaldees was a seaport, but now it is 150 miles from the sea, with its buildings buried under 25 feet of silt washed from the alluvial plain. There must have been an "ecological crisis" for the Babylonians, when it was realized that the limits of local production had been reached, and their technology of civilization stretched to breaking point.

- b. Orthodox Christian doctrine has always stressed the depravity of man living in a fallen world. Unfortunately for the theologians, most of us in the west live in an increasingly comfortable world in the material sense (with electric power, piped water, sewers, insulated houses, etc.). The effect has been that the fallen world doctrine has been "spiritualized", producing a weak doctrine of the environment. It is encouraging and challenging that Fraser Darling (Reith Lecturer and doyen conservationist) recognizes that "science without ethics in managing the habitable places of the earth is frightening".

## 2. *Self v Society*

Paul Ehrlich expresses the environment impact of humanity  
 = population x affluence x technology.

Authorities differ about the weighting to be placed on the different elements in this equation, but all writers agree that human impact produces "a complaint from which recovery will not be spontaneous" (Southwood, 1972).

The problem in reducing the impact of "the earth-pest, man" continues the theme of depravity at the point where individuals relate to society. Garret Hardin (1968) has called the result of this "the tragedy of the commons", using tragedy not in the sense of unhappiness, but as meaning "the solemnity of the remorseless working of things".

Hardin's argument is concerned with the impossibility of limiting population growth voluntarily. He begins with a pasture, open to all. Every local will try to keep as many cattle as possible on it. Such an arrangement may work satisfactorily for centuries because tribal wars, poaching and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however comes the long-desired goal of social stability when the logic of the commons inexorably generates tragedy.



Imagine a common which can support 40 beasts, with 20 herds-men entitled to graze their animals. This means two beasts per farmer.

But any of the 20 may ask what would be the effect of acquiring a single extra animal. The answer is spectacular 50 per cent increase in personal output and wealth at the expense of only one extra animal on the common. The problem is that all 20 are likely to reason the same way and 60 animals will appear on land capable of feeding only 40. Results: deterioration of both pasture and animals.

Hardin applies this primarily to the number of children each couple agrees to have, but extends it to the way we treat the environment. For example, discharged waste (sewage, chemical or radioactive effluent) costs less if a manufacturer releases them into the common stream, air, or sea, and then pays his "share" of the cost of purifying the common. In other words, voluntary cooperation for the group good is largely fictitious.

*"The Historical Roots of our ecological Crisis"*

Lynn White, a University of Californian historian, has specifically linked individual depravity to environmental problems (White, 1967). When man first began to settle and farm - what we call the "neolithic revolution" at the time Adam was in Eden with Eve, and all was right with the world - every family unit was independent. Early ploughs did not turn the sod but merely scratched it, so that cross-ploughing was needed and fields were squareish. This was fine for the light soils and semiarid climate of the Mediterranean area, but ineffective on the wet and often sticky soils of northern Europe. By the 7th century, the modern plough with its attached share had been invented. This needed a team of oxen to pull it, and fields became long and thin to make strip cultivation easier.

Now a team of oxen involved the pooling of the resources of individual families. Man became an exploiter of both his fellows and his fields. This is elegantly shown by illustrated calendars which prior to 830 AD showed the months as passive events each with its own attributes, but then changed to depict man as coercing nature - ploughing, harvesting, chopping trees, butchering pigs. Man and nature were two things, with man the master.

Church tradition adapted to this technological change. The significant debate ranged around the rights of possession and wealth (Black, 1970). The early Church Fathers argued that

God "intended the world to be the common possession of men", but because greed was a consequence of the Fall, private right of enjoyment of property was the only way in which an individual's requirements could be safe-guarded.

The development of this to link private property rights with social obligations came in mediaeval times, and was summarized by Aquinas in the 13th century:

1. Natural law provides that natural things are provided by God for the use of all men.
2. Human law requires a system of private property "because every one is more concerned with the obtaining of what concerns himself alone than with the common affairs of all ... for each one, avoiding extra labour, leaves the common task to the next man, and human affairs are dealt with in a more orderly manner when each has his own business to go about ... It is among those who posses something jointly and in common that disputes frequently arise".
3. The use of property must be limited to that which is reasonable for the individual.

Thomist thought limited property ownership and usury, and thus stood in the way of economic development: "He who takes usury goes to hell; he who does not, goes to the workhouse". This impasse was resolved by Locke (*Two Treatises on Government*, 1690) who produced a rationalisation for unequal and unlimited private property rights, arguing:

1. Money cannot be spoilt, and is not a "property" in the same sense as land, and
2. A man's labour is his own, to do with as he likes. This means that society is not involved, and no social obligations are added if labour produces an increase in property-rights. This opened the way for the worst excesses of the industrial revolution.

Locke also maintained that the only justification for the existence of the state was the preservation of private property. Whilst implicitly welcoming the Lockean thesis to escape from the Thomist dilemma, nevertheless the state has intervened increasingly in the economic and social life of individuals on a claim of exercising social responsibility. This has produced a situation not all that far removed from the traditional Christian position, albeit with the State substituted for the individual as the responsible agent (not, as Black *loc. cit.* maintains, substituted for God).

As the state has developed as the agent of social responsibility, problems have arisen because "duty to society" is interpretable only in terms of the decisions of society, and there is no way of restraining resource exploitation if society favours policies which can only end in deterioration. This has led to the "spoilt child" attitude of pressure groups (Taylor, 1975) (such as the decline of water-borne traffic in Britain through the actions of the railway companies). This in turn produces a corresponding submergence of personal responsibility and accountability.

A cruel example of lack of personal responsibility and the denial of a proper relationship between self and society is the Puritan settlement of New England in the 17th century (Carroll, 1969; Paterson, 1971). The colonists regarded North America as the Promised Land - a sanctuary from their Egypt, a testing ground, and a meeting place with God. Since Eden was a garden, they assumed that the reduction of wilderness to garden (and, incidentally, the reduction of the savage inhabitants of the land to civilization through the gospel) was a properly Christian task. To them wild country was basically immoral, and its opposite was glorifying to God. Any action taken to bring wilderness into cultivation or, by labour, to exploit natural resources, partook of the quality of virtue. They would have been horrified by the later, romantic cult of wilderness expounded by Thoreau and Leopold. It was in terms of this Puritan, wilderness-to-garden ethic that the advance of the frontier westward across America took place. The hostility of nature to man was obvious - in flood and drought, forest and desert. "A directly comparable British example was the 'improvements' of the Scottish Highlands in the first half of the nineteenth century, involving the clearance of the inhabitants to the coast or the colonies. In almost all cases this was supported by the local ministers". (Prebble, 1963) To 'conquer' nature in these circumstances was no more than obedience to God's original command to Adam.

### 3. *Over-riding v Intermediate Technology*

A theology that separates man from the rest of creation and produces a dualism between redemption and creation, has much in common with optimistic humanism. A false doctrine of man is as much the heresy of our age as deism was of the 19th century. With varying emphases Charles Kingsley, Bertrand Russell, Julian Huxley, and the theological liberals of a few years ago were telling us that automation and cybernetics would finally remove the curse put on Adam at the Fall. If there was a remaining problem, it was how to educate ourselves to endless leisure. The so-called "developing countries" would catch up

with us in a very short time ("the Development Decade") as science and technology were applied to their problems.

But the glory has gone: not only failures like box girder bridges and high alumina cement, but also a psychical disenchantment has set in. Some of this is reaction to excessive claims. This is typified by the Aswan am affair: in a fanfare of promises, water began to be stored in 1964, and the dam was finished in 1971. But:

1. The loss of nutrients washed into the Eastern Mediterranean has mean that a catch of 18,000 tons of sardines a year has declined to 500 tons.
2. The rise in soil salinity in the Nile Valley following the "control" of water flow and extension of irrigation threatens crop productivity.
3. Previously, deposited sediment reduced coastal erosion, as well as protecting the banks of the Nile itself; in recent years, the "regulated" flow of the river has seriously undermined some bridges, and erosion has increased.
4. The sediment from the headwaters of the Nile is now trapped behind the dam, and has to be replaced with artificial fertilizer on the cultivated lands of Egypt.
5. The twice-yearly Nile floods used to interrupt the life cycle of the *Schistosoma* parasite; at least 80% of Egyptian farmers are now affected by schistosomiasis.
6. Evaporation from the lake behind the dam has been far higher than expected, to the extend that the lake was less than half full in 1970 when the predictions from inflow werethat it should have been full.
7. The hoped-for fish crop from the lake has been much less than expected.

Overall, the Aswan scheme may be doing slightly more good than harm, but the profit and loss account is not far from balance.

One of the documents that focussed attention on the failings of technology was the January 1972 number of the *Ecologist*, titled *A Blueprint for Survival* (Goldsmith, Allen, Allaby, Davoll & Lawrence, 1972). This brought together the current asymptotic increase in population and resource utilisation with their likely social consequences, and proposed a list of

possible responses, ranging from emergency food programmes for developing countries to power taxes, a removal of subsidies on inorganic fertilizers, an end to road-building, experimental communities, and a positive use for domestic sewage. The *Blueprint* was based on the conclusions of a computer model from the Massachusetts Institute of Technology which attempted to study the interactions of world population, capital, resources, and pollution. This was later published as *The Limits to Growth* (Meadows, Meadows, Randers & Behrens, 1972), with the 'message', "A whole culture has evolved around the principle of fighting against limits rather than learning to live with them". Although there have been many criticisms of *The Limits to Growth* (notably *Thinking About the Future*, produced by a group at Sussex University), their only positive contribution has been to claim "something will turn up". A *Times Literary Supplement* review summarized the situation "The MIT model which underlies *The Limits to Growth* can be regarded as dead. But the issues it raises are very much alive".

One of the harshest critics in Britain of the *Limits* approach has been E.F. Schumacher, on the grounds that the study deals with problems in overall global terms instead of locating them in areas of particular concentration: "It is perfectly obvious that there is no means whatsoever at our disposal to stop the growth of world capital or of world population. What we can do, however, is to fight the growth of what is unsound and promote the growth of what is sound" (Schumacher, 1973, 1974).

Charles Birch of the University of Sydney expresses the same point in graphic language, "Originally a unit of population was simply a human being whose needs were met by eating 22500 calories and 60 gms of protein a day. Man's daily need of energy was equivalent to the continuous burning of a single 100 watt bulb. A unit of population today in the developed world consists of a human being wrapped in tons of steel, copper, aluminium, lead, tin, zinc and plastics, gobbling up 60 lbs of raw steel and many pounds of other materials. Far from getting these things in his homeland he ranges abroad much as a hunter and more often than not in the poorer countries. His energy need ..... is equivalent to ten 1000 watt radiators continuously burning" (Birch, 1972).

The Amos condemning this imbalance of energy and resource use has become Edward Schumacher. Influenced by work he did for the Indian Planning Commission in the early 1960s, he argues that development aid usually by-passes the rural areas of poor countries, although they are the areas of greatest need and also the areas on which the economies of the poor countries ultimately

depend. Unless this rural poverty is tackled at source, it is bound to lead to mass migration to the cities and the destructive unrest of a hungry urban proletariat. The most effective aid is that which is given in simple ways to enable peasants and half-skilled city workers to advance themselves a little at a time. An Asian Christian youth conference in 1973 had a Coca Cola bottle superimposed on a map of Asia on the programme cover, and the words, "Lead us not into imitation".

Schumacher contrasts:

A textile factory in East Africa, the gift of a European government, which was so highly automated that it needed to employ 500 workers only. The capital value of the plant was about £1½ million, so each work-place had in fact cost £3000. Yet armed guards had to protect the factory from crowds desperate for jobs. The government of the receiving country had asked for the factory to be built in a far-off rural town because there was so much unemployment in the region.

With:

The provision of egg-trays for Zambia where egg production is encouraged to fill the protein gap. Unfortunately marketing eggs requires egg-trays, and most of the world's egg-trays are made by one multi-national company whose smallest production unit would make a million trays a month. Zambia's entire annual need was one million trays. A team from Reading University devised a means of making egg-trays at 1/50th the cost of such a large plant.

Schumacher believes the 19th century truth that the "bigger the better" has become a 20th century myth. He calls for organization and production units to return to a human scale:

1. Small units of production can use small resources — a very important point when concentrated large resources are becoming scarce or inaccessible.
2. Small units are ecologically sounder than big ones: the pollution or damage they may cause has a better chance of fitting into "nature's tolerance margins".
3. Small units can be used for decentralized production leading to a more even distribution of the population, a better use of space, the avoidance of congestion and of monster transport.

4. Most important of all: small units, of which there can be a great number, enable more people to "do their thing" than large units of which there can be only a few.

He maintains smallness is conducive to simplicity, and from the Christian point of view, simplicity is a value in itself. Making a living should not absorb all or most of a man's attention, energy or time, as if it were the primary purpose of his existence on earth. "Complexity forces people to become so highly specialized that it is virtually impossible for them to attain to wisdom or wider understanding".

This extrapolation from technological megalomania to 'intermediate technology' becomes particularly intriguing when it is realised how many have come to the same conclusion from vastly different starting points. For example, Bishops John Taylor, Lesslie Newiggin, and Cuthbert Bardsley have independently asserted recently that the call of God to the Church in this generation is to modify and simplify our life-style.

Leaving aside any Christian connotation, at least two other prophets have come to the same diagnosis about the dehumanising effects of complexity:

Desmond Morris (especially in the *Human Zoo*, 1969) has argued from the biological point of view that the destruction of "natural" social units has led to the erection of substitute landmarks — the frustrated leader becomes the Napoleon of the local chess society, our sexual life becomes stylised and subject to artificial stimuli, and we become increasingly part of a plastic culture.

Rattray Taylor (*Rethink*, 1972) takes essentially the same position, and John Poulton (1973) has extended this as "that cheated feeling ..... a study of alienation":

1. Mobility has destroyed both the extended family and local loyalties, and resulted in a chronic difficulty for many of forming loving relationships.
2. We are faced with challenges we cannot meet, which generate either boredom or frustration through our inability to influence them.
3. We need to feel what we do is worthwhile, and only professional people can feel this: "we have hardly begun to study the problem of rehumanizing work".

4. We cannot achieve security for ourselves and our families; it is done for us, and that is dehumanizing in itself. The government properly looks after the hardest-pressed and deprived, but reduces the psychic health of the majority of us.
5. A goods-orientated society is not equivalent to satisfying psychological needs; indeed it produces a psychological slum through drab despair.

#### 4. *Functional v Arbitrary Morality*

This is the heart of the matter, differentiating pragmatism from puerility. Curry-Lindahl (1972) believes "ecology as a philosophy for survival may well have the potential to develop into a kind of religion for the younger generations of today and the world of tomorrow .....". This is facile and possibly desperate humanism. The Christian doctrine towards the world is undoubtedly stewardship. Taylor (1975) expresses it as positive monism (or holism) through a theology of *shalom*: "the blessedness of the inter-related, God-related community which can be thought of as either wholeness or harmony. This leads to a consistent attitude diametrically opposed to the excess of current Western economics". His biblical bases for this doctrine are:

1. Rejection of greed (Jer. 22: 13-17, Hab. 2: 9-11; Prov. 30: 15,16).
  2. Condemnation of covetousness (Col. 3: 5) and exaltation of moderation (Phil. 4: 4; Col. 1: 16, 17; 2 Pet. 3: 5,6), which leads to a distinction between primary goods (either renewable or non-renewable) and secondary ones produced from the primary by manufacture or service.
  3. God's provision described in the law of gleaning ("Remember what kind of God I am ... Enough is enough, and the less fortunate will be glad of what is left ... Remember you were slaves in Egypt" - Lev. 19: 9,10; Deut. 25: 19-22).
- the law of limited cropping and the fallow seventh year (Ex.23: 10, 11; Lev. 25: 1-7).



the law of first-fruits — a prohibition of snatching the chance of a high price because of the scarcity of the first-fruits. This is a direct contradiction to the accepted law of supply and demand.

the law against usury, which permitted the taking of a pledge as security, but not harshness in enforcing it (Ezek. 18: 16, 17; Deut. 24: 10, 11). The early Church Councils forbade charging interest, and it was for this reason that Western monarchs imported Jews — to serve as money-lenders. The Civil Law of England only allowed the charging of interest in 1571; the Irish Church in 1634 was still subjecting usurers to the same ecclesiastical sanctions as adulterers.

Although the scriptural principles are clear, the ecclesiastical application of them was foolishly rigid. "The Church had become so institutionalized in its thinking that it tried to use casuistry to show how old regulations could be twisted sufficiently to become applicable to the new circumstances" (Taylor, 1975).

*The Proper Model.* The rational use of any resource involves cropping it so that its sustainable yield is maximised, like using interest whilst preserving capital (Berry, 1972). This in turn implies good husbandry of the resource, and about this there may be scientific disagreement. For example, the trend of modern agriculture is towards simplification — the removal of hedges and the planting of large areas of single crops — and particular strains of crops. Among others, Elton (1958) has given a series of reasons for believing that simple (ecological) systems are less stable and more liable to fluctuations than are complex ones, and quotes Is. 5: 8 in this context: "Woe to them that join house to house, that lay field to field, till there be no place that they may be placed alone in the midst of the earth". He argues that efforts must be made to maintain diversity to achieve stability.

The proper management of a resource or habitat involves a knowledge of the normal restraints and controls upon the ecosystem in question. In former days this would have been referred to as natural law, in recognition of the creatorhood of God; nowadays the language will be that of science. Nevertheless the correct treatment of the situation will be the same, whatever the understanding of natural law we happen to have; we must interpret our actions by the system itself, just as we use the instruction in the maker's handbook in looking after and using a motor-car.

A cautionary tale about the relation between God's commands and the proper treatment of a habitat comes from the fate of the Promised Land after several centuries of occupation by the Israelites. Before they entered the land, God warned the Israelites that disobedience to His commands would produce desolation (Lev. 26). In the event they disobeyed in ways which had disastrous effects:

1. The land was chronically over-crowded because the people failed to occupy the whole area intended for them.
2. It was devastated in a series of wars, many of them resulting from unwise or forbidden alliances made by Israel.

The effect was misuse which became embarrassingly obvious in the marginal environment of the eastern Mediterranean.

This interpretation of the responsibility of the Israelites makes sense only if God is active and effective in this world, since then the world has to be treated as His handywork (Berry, 1975). Ironically if God is remote from His World, if He 'finished' it on the sixth day and only interferes on occasion, the attitude of the Christian becomes different. Environmental rape becomes permissible. A care for the environment depends theologically on a dynamic doctrine of God's activity.

This argument has been developed by Moule (1964), especially in his exegesis of Rom. 8: 20 ff: "Creation was subjected to frustration, not by its own choice but because of Adam's sin which pulled down nature with it, since God created Adam to be in close connection with nature", i.e. the 'curse' is a causal consequence of Adam's behaviour, not a petulant action of an arbitrary despot. "BUT the disaster was not unattended by hope — the hope that nature too, with man, will be released from its servitude to decay into the glorious freedom which characterizes man when he is a true and obedient son of God".

##### 5. *Withdrawal v Stewardship*

There is a persisting attitude throughout Christian history of the corruptness of matter: knowledge has been accorded more importance than grace, mind than matter. Evangelicals have contributed to this in the pietistic tradition by rightly emphasizing redemption but wrongly contrasting it with providence (or common grace) (q.v. Anderson, 1968; Triton, 1969).

Derrick, a Roman Catholic, has developed this conflict in terms of environmental attitudes (*The Delicate Creation*, 1972). He points out that it arises from the same negative attitude to the body which for many is the Christian view of sex, and thrives on stress, grievance and disappointment. It starts with the sense of living in a hostile environment, and the feeling we belong elsewhere; creation becomes an area of wickedness and cruelty. In other worlds, the Fall is magnified at the expense of God's control.

Historically this approach was identified with a number of the expressions of gnosticism which Derrick lumps together as Manichaeism: aware of evil in the world, man projects this upon the world and devises a theology to suit. Inevitably such theologies contrast the good God (remote, gentle, and wholly beyond our knowing in this world) with the very inferior working deity who made this material universe. One version of this fallacy equates the lesser deity with the Jehovah of the Old Testament, and thus compounds heresy about God with error about Scripture. A sign of the Manichaean heresy is that its adherents are recurringly perverse and disruptive (since the established order is by definition evil), and bewilderingly perverse. At one time in mediaeval France a girl could get into trouble with the church for contumacious virginity, since (in the absence of religious vows), this could constitute a Manichaean hatred of the flesh.

By opposing the material to the spiritual, Manichaean gnosticism produces a wholly unscriptural dualism. Indeed the main post-Darwinian confusion about the relation of Creator to creation really boils down to an unwillingness to accept a doctrine of God as responsible for and active in creation — immanent as well as irruptive. Scripture is consistent in excluding any contrast between mind and matter. For example, Paul always contrasts the moral antithesis of obedience and disobedience, never a material one of body and spirit. Physical death is described as presence with the Lord in the sense of the climax of letting go of the material which has been going on since conversion (Moule, 1965-6). As John Stott (1970) has insisted in part of an argument about the responsibility of Christians of social involvement, "God did not create souls but body-souls called human beings". Nevertheless Manichaean-type dualism still has its theological supporters, principally such exponents as Harvey Cox and Teilhard de Chardin.

As a reaction to anthropocentrism of this type, there are increasing cries for a mystical neopanteism, and a return to the example of Francis of Assisi who blurred man and nature.

One of the more lucid exponents of this viewpoint is McHarg (1969) who has described man as no more than a plant parasite. (Notwithstanding, McHarg who has made a valuable contribution to practical planning, by suggesting that particular sites should be costed in terms of a range of potential values: for housing, industry, communications; the soil and agricultural importance; for scenic, historical, recreational, and educational uses; etc. - q.v. Disney, 1975).

Neither anthropocentrism nor biocentrism does justice to Scripture (Armerding, 1973). The Manichaeian zest to conquer nature has a long and depressing pedigree through the Hanoverian 'improvers', the Victorian capitalists, and the technological satyrs (Passmore, 1974), but the reaction towards animistic primitivism is as bad, and is gathering strength as a "lust for Eden".

The error is justified by asserting that the Creation is fallen as well as man, and is thus merely an extension of man (e.g. Schaeffer, 1970). This contradicts the clear Genesis account that man is distinct from nature specifically and explicitly in his possession of God's image. Consequently laudable efforts to insist on the insignificance of man in relation to God has the byproduct of exalting and sentimentalizing nature. The Garden of Eden becomes a repository of all virtues, and the more we can identify with 'pure' nature, the more sanctified we are.

In November 1974, the *Ecologist* devoted a whole issue to "Religion and Ecology". The editor (Edward Goldsmith) wrote of religion as a control system in limiting behaviour patterns, and the desanctification of nature produced by the decline of religious restraints as that which "makes it possible for modern society systematically to destroy it". It is a short step from this to another article in the same issue (by Robert Waller) which states "Ecology and religion together teach that there is an indivisible structural trinity, humankind, nature and God" - but, and this is the fallacy - that "Nature is the link between the other two".

Another consequence of 'biocentrist' thinking, is that it gives escapism respectability. There are few better comments on this than that of Thor Heyerdahl of *Kon-Tiki*, Easter Island and Ra fame who desired to opt out of the dirt and tension of pre-1939 Norway (!). He found a wife to think as he did, and lived for a year on the Marquesa Islands in the Pacific, where the couple were parasitized, diseased and hungry; polluted by bamboo dust; persecuted and robbed by the local inhabitants.

After they left, Heyerdahl wrote (quoted by Jacoby, 1968):

'There is no paradise to be found on earth today. There are people living in great cities who are far happier than the majority of those in the South Seas. Happiness comes from within, we realize that now ... It is in his mind and way of life that man may find his Paradise - the ability to perceive the true values of life, which are far removed from property and riches, or from power and renown'.

These considerations inevitably lead us to the question as to whether we ought justifiably to describe nature as morally perfect, or tainted with evil. Fortunately this is relatively simple: nature is good, because it is from and upheld by God. But only if nature is an extension of God's being can we impute moral attributes to it.

Consequently:

1. It is unreal to speak of withdrawal or involvement: creation (nature or the environment) is the stage on which we work out God's purposes and which is a vehicle to glorify Him.
2. Our understanding of ourselves becomes doubly important because we are not only responsible to God for the environment, we are responsible to Him for our own maturity which is shaped and modified by our surroundings.

In this context, René Dubos is interesting. He collaborated with the economist Barbara Ward to produce the "key-note" work of the United Nations Stockholm Conference, *Only One Earth: the Care and Maintenance of Our Small Planet* (1972). In reaction against this, he later wrote *A God Within* (1973) as a complementary document. In this he points out that each individual has a unique picture of the world based on genes, family, and experiences, and he describes the conquest of nature as a criminal conceit, philosophically untenable, and destructive, on the grounds that any 'conquest' involves the imposition of homogenized and therefore trivial pressures on our surroundings.

### Conclusions

Obviously there are legitimate conflicting principles in environmental attitudes. For example, DDT is a life-saver in developing tropical countries, but a largely unnecessary pollutant in the temperate Western world. There can be valid argument

about the best conservation practice in a variety of situations and sometimes a Christian will be right in his advocacy, sometimes wrong. However there are at least two specifically Christian contributions which are more than merely educative:

### 1. *Posterity*

The only *logical* reason for a concern for posterity is if an influence persists indefinitely (or for many generations at least). The world's viewpoint is well put by Andrew Schonfield: "Looking after the environment for one's grandchildren is a rich man's preoccupation". Edmund Leach in his Reith Lectures tried hard to rationalize concern for the future with "It will give you a sense of purpose" and "Gods have much more fun", but neither reason holds any ethical water. "Until men come to believe in their hearts that all life is held in trust from God, there can be no ethical reason why we should owe a duty to posterity" (Montefiore, 1970).

### 2. *Monism*

Scripture teaches emphatically that man is a whole body, mind, and spirit. It may be permissible to consider or treat one part of a man for particular purposes, but permanently to separate any part of our being is philosophically disastrous as well as theologically incompetent. It can be argued that our environmental troubles spring entirely from introducing distinctions where they do not exist (Browne, 1972); "dualism is the worst form of pollution" (R.H.L. Disney, *pers. comm.*). "Salvation is an ecological word in the sense that it is the restoration of a right relation which has been corrupted" (Sittler, 1970).

The evolution debate, rightly concluded, can show us how incomplete is our understanding of the immanence of God; likewise the environment debate should force us to examine some of our sacred cows of behaviour and make us whole persons as opposed to heterogeneous conglomerates. "The Gospel is to the technocrat foolishness and to the revolutionary it is a scandal" (Bishop Leslie Newbiggin). Christians who think of themselves as stewards of the mysteries of grace are, by the same dispensation, stewards of the realities of earth" (Sherwood Wirt, Editor of *Decision*).

One final quotation:

"The problem of the environment involves the salvation and enhancement of the positive values which man uses to develop

his humanness. It involves, ultimately, a social organization in which each person has much freedom in selecting the stage on which to act his life:

a peaceful village green  
the banks of a river  
the exciting plaza of a great city.

Survival is not enough.  
Seeing the Milky Way,  
experiencing the fragrance of spring  
and observing other forms of life

continue to play an immense role in the development of humanness. Man can use many different aspects of reality to make his life, not by imposing himself as a conqueror on nature, but by participating ... Otherwise man may be doomed to survive as something less than human". (René Dubos in *Life*)

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R.E.D. CLARK

## Creator God or Cosmic Magician?

A study of the idea of creation, in contrast to magic, as an explanatory principle and of the value of the Judeo-Christian idea of creation in science.

Is God a cosmic supermagician? The language used to describe His creative acts sometimes gives the impression that this is the way Christians think of Him. Are such thoughts warranted?

Consider a common line of argument. It is claimed that this or that feature of nature — the condensation of dust clouds to form suns or planets, the origin of life from lifeless matter, a miracle recorded in the Bible, and so on — cannot be explained in terms of the concepts of science no matter what assumptions are made. They must, therefore, be due to divine intervention: to creation, to miracle. There is, we are told, no other conceivable explanation.

Often the claim is fully justified: there *is* no other — at least no other *plausible* explanation. Nevertheless the argument is weak to the disbeliever while even the believer often looks askance. Why?

Three main reasons may be given:

1. The argument appears to imply that what cannot be explained by science must be explained by God. God, then, becomes a "god of the gaps" and someday may be squeezed out as science advances its frontiers further into the unknown.
2. It is objected that words like *creation* or *miracle* explain nothing. In the Western world we do not allow magic as an explanatory principle: is God-magic to be reckoned as more reputable?
3. Complaint is often made that creation spells the dead end of human inquiry. If events are due to God, what is there more to be said? Even the scientist who is a committed Christian may wonder at times if the God who called him to devote his life to science really wishes to stop him thinking in so abrupt a manner.<sup>1</sup>

### Gaps

The first objection will not be explored in detail. It appears to be a pseudo rather than a genuine difficulty. It is included because by repetition it has become a cliché in recent years. However, a few comments may be in place.

First, no one believes — perhaps indeed no one has ever believed — that what cannot be explained by science must necessarily be explained by God. This is at once apparent if we remember that in the Middle Ages such events were often ascribed to devils. God is invoked not because other explanations fail, but because some events are suggestive of His master mind. They show evidences of His planning or of His goodness and mercy.

A point commonly overlooked is that when we are considering origins we are never concerned with gaps. There is no gap for future science to fill between the beginning of creation and what happened before that beginning. To make God creator is to place Him at the beginning of a train of causes. Gaps are not in the picture.

We can think of God not only as creator of nature but also of the purposefulness which we see around us; but it is difficult to think of purposefulness as a gap between two bodies of well-established scientific knowledge. (If it is indeed a gap in any sense it is not one which science is likely to fill.)

To illustrate this point, we might consider, for instance, the earthquake at Philippi (Acts 16) in which the apostle Paul was involved. It is possible, no doubt, to "explain" this earthquake, like all other earthquakes, in terms of sudden release of stresses in the earth's crust. But when we read the New Testament story this is not at all what strikes us. The miracle is not the release of stress which certainly comes within the scope of science, but the *synchronism* between this release and the prayers and needs of the Christian. It is difficult to think that such synchronism will ever come within the purview of science and almost impossible to think of it as a 'gap' between two domains of knowledge with God in the middle who is being squeezed out as the gap closes. Strange thinking!

It is evident that vague talk of closing gaps will not do. In any given case we have but to state clearly what we suppose to be the thought processes that are taking place and we will see that the gap objection is irrelevant.

### Magic

Let us turn to the more serious objections. Suppose we consider a particular event - say the creation of the universe or of the first living organism - about which we conclude that it happened as a result of the direct creative power of God. We are agreed, let us suppose, that no further scientific search for the cause is necessary; we are satisfied that divine fiat provides the answer to our search. What then?

In the past the orthodox have too often tended to reply, Why, nothing! God is the explanation and you cannot investigate God. He alone is in control of His universe: He has but to say the word and it - *anything*, absolutely anything He commands - just happens!

The deep sense of piety revealed by such an assertion is not in question. It is understandable if many Christians (in common with Jews and Muslims) out of a sense of profound respect for and adoration of God, should be content to believe that if God merely tells something to happen, it will happen immediately and automatically. Yet it is easy in this way to degrade God's activity to a kind of magic. As in a fairy story, a castle is created in response to a wish!

It is often overlooked that this tendency to magnify God by ascribing to Him all power *in the magicians' sense* is incompatible with grounds for belief in God which are commonly advanced. If we point to wonderful design and thoughtfulness apparent in nature as evidence of a mind beyond the world of sense, we deny that God is a magician. The magic wand that produces in a moment that castle of our dream is not endowed with a mentality that thinks and plans the architectural detail of the edifice. It elicits wonder, perhaps, but not adoration, appreciation, or thankfulness.

When we turn to the Bible we find little to support that view of God which makes Him the supermagician. He is creator of the worlds. But a magician does not create; he merely expresses a whim and things create themselves. God, on the other hand, works on six days and rests on the seventh. The wonder of His wondrous works fills the minds of His creatures. The psalmist of old, contemplating the human body, sees in it evidence that God's knowledge is too wonderful and fearful for man; again, no fit description of a magician.

In the New Testament the story is the same. When Jesus effects a cure, He senses that power has gone out of Him, yet

the magician of our imagination has but to wave his wand and the results costs him nothing. Our Lord says, "My Father worketh hitherto and I work." Before He leaves the world, Jesus speaks of going to prepare dwelling places for His disciples: words which again are surely incompatible with the notion that God has merely to utter magic words in heaven and the dwelling places will fall into place of their own accord! Paul bows in prayerful adoration when he discerns one small facet of the wisdom and knowledge of God. Knowledge and wisdom are needful to the artificer of intricate mechanism and to the planner of strategy; not to the magician. Similarly the apostle John sees the New Jerusalem descending from heaven adorned as a bride for her husband, again implying that care and trouble will have gone into her making.

It can hardly be doubted that this is the teaching of the Bible. Yet not unexpectedly there are passages where thought is eclipsed; passages where God's command, His word, or His will is said to make things happen. We eclipse our own language in the same way without implying a magical relationship between the command and the effect. The general who orders his army to advance expects obedience, but not automatically as if by magic. The factory manager declares that a commodity will be put on the market on a certain day and it is done; again not by magic. We use our common sense in interpreting such language; we must do the same in reading the Bible.

Let us face it: there is nothing in the Bible to warrant the belief that because God is almighty He can create without doing work. If such a God were to exist, He would inspire neither loyalty nor devotion. If the gifts He bestows on man cost Him nothing, man need feel no thankfulness, no sense of obligation to the Giver. In contrast, the Christian message proclaims the trouble, care and — in the life and death of our Lord — the suffering of God for the sake of humanity.

#### *God in Islam*

At this point it will be helpful to contrast the Christian view of God the creator with the Muslim view which, at least in its extreme traditional form, makes God the great magician.

In their desire to magnify the greatness of Allah, Islamic philosophers, culminating in al-Ghazali, opposed the Aristotelian doctrine of causes in nature. To claim that natural events take place because they are caused, and to claim that causes and agents lie behind the natural order, it was asserted,

is to fall into the error of the pagans who people the earth with gods and demons. But Allah, and Allah only, is in control of His world. There are no causes in nature. It is not even correct to say that the existence of the world in past time is the cause of its existence at the present moment, for the world is incapable of existing by itself and needs to be recreated anew all the time. (No agreement was reached as to how many new creations occurred in one second of time.) Similarly, since God is the only cause, there are no wills in the world other than His will: it is an illusion to imagine that by our will we can make events happen.

Averroes was the last of the Arabic philosophers to accept the Aristotelian notion of causes. He was deemed heretical in his time, but as "the Commentator" on Aristotle he exerted great influence on the Western world through Aquinas and others long after his death. Averroes adopted the extremist attitude of orthodoxy but in reverse. Instead of overstressing the direct acts of God, he understressed them. Miracles did not fit well into his scheme, which made God out to be almost as impersonal and distant as Aristotle's Unmoved Mover.

Thus, after three centuries of controversy, culminating at the end of the tenth century, Ash'urite orthodoxy won the day. It is still the accepted doctrine in Islam. Inevitably it has left an enduring influence on the lives and thinking of the followers of the Prophet.<sup>2</sup>

Allah was so great that no one else mattered, or even existed. Man became a marionette obeying the master of the show. Sin was unreal or at least could not be considered a cause of sinful actions. Despite some promising starts in earlier centuries, science - which like ethics is concerned with the study of causes - was rendered stagnant. Since Allah was great and controlled all things, man found himself with little incentive to help himself. In catastrophe he bowed to Fate. Whatever happens is, after all, but the will of Allah; and that cannot be opposed.

Thus, in Islam, Allah is near to becoming the supermagician before whom man can only remain passive. The mind of the magician is unintelligible, mysterious; he is the "wholly other." Since God is the only cause, His creatures - who are not in this respect made in His image - cannot begin to understand His doings. Islam has no place for the words of Jesus, "The servant knoweth not what his lord doeth, but I have called you friends" (John 15:15). Nor can Islam understand the suffering of God in Christ; it denies that Jesus died on the cross (though on this point the Prophet himself appears to have held orthodox Christian doctrine<sup>3</sup>).

In Islam we may see the ultimate consequences of conceiving of God as a magician. It is important that Christians avoid even unintentionally, language which suggests this conception.

### *Consequences of Creation*

The scientist and technician of today are well aware of the difficulty of constructing things that work. New designs must be thought of, creatively, over and over again until something serviceable is made. It seems nonsense to suggest that this labour can be short-circuited. The more we learn of the complexities of organic nature, the more unlikely does it seem that those vast complexities arose either by evolution during the relatively very short time available (only a few aeons, according to evolutionary uniformitarianism) or suddenly in automatic response to a command of God. Similarly, when for some reason a mechanism in the human body fails, can we believe that it will be put right immediately, effortlessly, magically by an angel in response to prayer?

Before developing this line of thought further, it will be well to consider a possible criticism. Are we not picturing God as altogether too limited and manlike when we suppose that because our creative efforts involve hard mental and physical work, He also is involved in labour? Perhaps. Yet it may be doubted if we honour God at all if we take the alternative view. Should we think of Him as in some way like that which is real and within experience, something which calls for our respect and even love; or should we think of Him as something wholly mythical, the imaginary magician who commands no respect? Scripture freely applies such words as *work* to God. Can we profitably change its language? We may grant that the "arm of the Lord" is no literal arm, that the "word of God" is not a literal word spoken in the vacuum of heaven, and that the "work of God" is not literal work in the human sense; yet analogical words are not easily replaced with profit. Let us be content to think of God in the biblical way even though, in the last resort, we know that God's thoughts and deeds are higher than man's and in their fullness far beyond his comprehension.

### *Magic in Psychology*

How do conceptions of God influence us as individuals? It is instructive at this point to take a cue from psychoanalysis. Psychoanalytical therapy depends upon bringing the patient to

the point at which he reenacts the original situation that marked the beginning of his breakdown. Relaxation, hypnosis, or drugs are used to recover the early memories. The trauma, the long forgotten early twist to life which started as a rebuke, a snub, a misunderstanding, a rudeness, an indication that the patient was unwelcome, an accident which removed him from home, or a death followed by devastating loneliness, is now brought back to consciousness. In "transference" the therapist himself plays the role of the offending person, ambivalently loved and hated, who occasioned the breakdown.

The entire setup of analysis, coupled with lack of wisdom on the part of the analyst, will often, as Kent has observed, destroy the beneficial effects which might have accrued. Why? Because the patient looks to the therapist for a cure. He makes him doctor of his soul, he puts him in the position of "an authority who knows, who can cure, or even possesses magical powers." Just when the patient begins to understand himself and cure is in sight, he reacts so violently against his therapist that treatment may have to be terminated.<sup>4</sup>

This, accepting Kent's analysis, is simply because the therapist has allowed himself to become the magician. The past has been reenacted; the therapist has become the original mother, husband, or grandmother responsible for the trauma. But this time he is more. He is counsellor, physician, and god of magic, too. Then why, if he is a good and moral man, or god, does he not preserve the patient from his trauma? It is no wonder the patient rebels. He rejects advice. He works revenge on the therapist by allowing himself to go to pieces, so inflicting punishment by thwarting the therapist's hope that a cure will be effected<sup>5</sup>.

We will be in danger of acting in the same way if we think of God as the supermagical physician of the soul, or the magical creator of the world. In great trouble a man will sometimes turn his thoughts to God his creator, only to reject God, whom he blames for allowing the situation to develop in the way it has done. What right had God to create him as he is? Or the world as it is? The magician has only to say his *abracadabra* at no effort at all to himself, and all he wishes will come to pass. Why does not God, the magic God, save us from our troubles in the same way? How can we believe in God, or trust in His goodness, or feel thankful to Him, when He does not lift a finger in aid? It is against this God that man rebels, failing to notice that the God he rejects is not the biblical God at all but the magic god, the chimera of his imagination. Souls cannot be mended by *abracadabras* spoken on high.

### *Chain from Heaven*

Let us be content then to accept creation in a real, not a magical, sense. But can we progress from here? Is it not still true that if God created something no more can be said? Is not creation still a dead end to human thought, the denial of God's gift of a questioning mind?

By no means. It is instructive to ask how some of the great creators of science in the past, men who believed in creation passionately, faced the dilemma. The answer we find in Kelvin, Tait, Balfour Stewart, Stokes, and others is one which goes back to an idea grounded in the classics. Lucian tells of a threat by Zeus, "I will let down a chain from heaven and you shall hang on it." The ancient Stoics made good use of the imaginary chain, which was later revived in the early scientific era, notably by William Wollaston (1659-1724).

Suppose a chain hung down out of the heavens from an unknown height and ... a question should arise: What supported ... this chain: would it be a sufficient answer to say, that the first (or lowest) link hung upon the second (or that next above it), the second, or rather the first and second together upon the third ... and so *ad infinitum*? To assert (that there is an infinite effect without an efficient cause) ... would be as great an absurdity as to say, that a finite or little weight wants something to sustain it, but an infinite one or the greatest does not.<sup>6</sup>

In yet later days the analogy was often referred to as, for example, by George Gabriel Stokes in his address to the British Association in 1869:

We know not how many links in the chain of secondary causation may yet remain behind; we know not how few ... Let us fearlessly trace the dependence of link on link as far as it may be given us to trace it, but let us take heed in thus studying second causes we forget not the First Cause, nor shut our eyes to the wonderful proofs of design which, in the study of organized beings especially, meet us at every turn.<sup>7</sup>

The picture is one of the great chain dangling from the sky. You look upward but can see little through the mist. You climb and explore it link by link. You satisfy yourself that each link is carried by the one above; but since the whole chain does not come crashing to the earth, you know that somewhere — perhaps far above — the entire chain must be held up in a way



that involves some new principle, something which is not just another link in the chain.

The point of the analogy is that our belief that the entire chain is somehow held from above does not and cannot discourage us from exploring the link next higher up. It is the same in science. We may push our causal sequences as far back as we will, but the overall conviction that nature is not its own explanation remains. "When we discuss nature as a whole" said Kant in 1785, "we must necessarily assume some divine arrangement, but we are not exempt from the obligation to pursue the chain of natural causes as far as possible."<sup>8</sup>

Other analogies are, of course, possible. Tait and Stewart thought in terms of a seemingly endless avenue of trees with the sun shining through from the farther end.<sup>9</sup> The brilliance of the sun determines the beauty of the sight, but this self-evident fact will not deter a man from venturing farther down the lines of trees. He will not argue to himself that if he proceeds too far he will explain away the sun.

Another profitable analogy of which more use might well be made is afforded by words. The philologist tracks a verbal form back from language to language: his science consists in doing just this. But he does not doubt that ultimately at some point in the distant past words were created, even though no one on earth has ever witnessed the creation of a language.<sup>10</sup>

### *Influence on Scientists*

Influenced by what we may call the "chain-philosophy" of creation, William Thomson (Lord Kelvin), a firm believer in creation for his entire life, was led to explore many avenues of thought. He often insisted that the power to analyze, to look for causes, was itself a creation of God. To fail to look for causes because God Himself is a cause was therefore, in his view, to nullify part of God's own creation.

Throughout his long life, Kelvin never ceased to look for causes, for causes of causes, and for causes of these in turn. Seeking a cause for the escape of heat from the earth, he became in the end the founder of geophysics and the joint discoverer of the second law of thermodynamics. His speculations on the formation of atoms, suns, and planets had a profound influence on the science of his day.

The sheer venturesomeness of Kelvin's speculations was possible only because of his underlying certainty that behind all lay the power of the creator God. Science, in his view, could never lead a man to disbelieve in God.

Clerk Maxwell seems to have thought along even bolder lines; his thoughts were always startlingly fresh. In a vast universe, with its myriads of atoms, was it conceivable, he wondered, that God would put each one of them individually in its proper place? This is what the second law of thermodynamics seemed to imply: the laws of science involved the running down of the availability of energy, or the rise of entropy; so that there must have been a time, not infinitely remote, when the process started. Before that there must have been either a creation out of nothing, or a "running up." In either case it was tantamount to creation by God.

Maxwell early recognized that belief in creation is of great value in science, and he applied the creation idea fearlessly in his thinking. In the above instance, his belief led him to speculate on the possibility that God first made gigantic numbers of elementary minds or spirits which could then move the atoms in obedience to the divine command.

Strange idea! He let it simmer for twenty years; and then, in 1871, he published his conception of the unit mind, able to circumvent the second law by wathing for fast molecules and letting them pass through a trap door while their colder and slower fellows were left behind. In this way, by mind alone — but mind possessing information — he showed that the second law might be reversed. Today this idea is of vast importance, for it lies at the basis of information theory. Maxwell had shown, in fact, that information and entropy can be balanced against each other. His mode of thinking may seem strange to us, but it shows that for him at least a belief in creation did not stifle thought.

When Maxwell turned to the question, what is God likely to have created? the result was even more striking. Faraday (but more explicitly Maxwell himself) reckoned that it was dishonouring to God to suppose that He had created the universe out of atoms and nothingness, but chiefly of nothingness or space. This led him to the view that space must be a created 'thing,' and therefore one possessed of properties. It was the search for these properties that led to the prediction of and finally to the discovery of radio waves.

*Least Action*

Many other examples of the stimulating effect of the doctrine of creation in the scientific field might be cited. One in particular may be mentioned here, the discovery of the principle of least action by Leibnitz and Maupertuis, his disciple (1751). This important principle owes its discovery to the consideration that, if God made the world, it is reasonable to suppose that He would have done so in such a way that events would take place with the maximum economy of effort. Leibnitz and Maupertuis went into raptures of enthusiasm over their discovery, believing that here at last they found clear evidence of a Supreme Intelligence reigning over nature.

Today, as Planck points out,<sup>11</sup> the principle is still as difficult as ever to understand without reference to purpose or intelligence. Consider a single photon, or packet of light, from a distant star as it enters the earth's atmosphere. The refractive index of the air changes all the way down to the ground as the photon approaches the surface of the earth, yet the photon continuously bends in its movement in such a way that it will eventually reach the surface in the least possible overall time. How does it know which path of all the millions of possible paths to take? The invention and creation of a law of this kind can hardly be a matter of blind chance.

It is interesting to note that we do not encounter this economy of effort in all natural processes. In some, as in the reproductive process, there is a principle of selection at work: not every acorn becomes an oak, not every tadpole a frog. Yet in basic processes of nature, principles of efficiency and economy of effort often operate. The gradual processes by which the energy of a foodstuff is released for storage are a marvel of ingenuity. The catalysts of the organic world, like the biochemical pathways, are wonderfully efficient. It is not unreasonable to ask if we can sometimes discern a principle of least action in the creative powers of God, such as we might expect to find utilized by a creator rather than a magician.

Suppose it is God's intention to bring about a certain event. How may we expect Him to set about it? A least-action principle might suggest that He would often wait until conditions were ripe for the event in question to take place spontaneously, or on the application of a small triggering impulse, rather than that He would bring it about at just *any* time and *any* place. In this way intervention would be minimized.

Though it would be wrong to limit a creator God by insisting that He *must* make use of such occasions only, frequent use of them might help to distinguish creation from magic.

These considerations introduce the question of miracle — a large subject beyond the scope of this paper. Suffice it to say that although by no means all Biblical miracles can be regarded in the light of the above suggestion, a great many certainly can. The creation of woman *de novo* would involve far more creativity than that of a woman from a man; in the Genesis story God chooses to make use of a man. God could have divided the water of the Red ("reed") Sea directly, but used an east wind. Miraculous earthquakes are mentioned in the Bible, but only in an earthquake zone. Naturalistic explanations may be advanced for some of the ten plagues of Egypt, their natural sequence strongly suggesting economy of miraculous effort on God's part. Psychological 'explanations' of conversions, such as that of the apostle Paul, are plausible though by no means wholly adequate. Many other examples might be given.

In addition to this, even a casual reading of the Bible reveals a God who often guides events in seemingly trivial, naturalistic ways. In the Book of Esther the hand of God is revealed, though no explicit mention of God is made.

In mathematical analysis the points at which very small alterations in parameters cause vastly different outcomes are known as points of singularity.

If we then trace the causal chain up toward heaven, uncertain as to whereabouts in that chain new factors outside our experience must enter, it will be reasonable (as Balfour Stewart and Clerk Maxwell pointed out a century ago) to look for intervention at points of singularity.

#### *Explanation*

We turn to our last point.

Has the hypothesis of creation explanatory value? If we attribute an event to God's creative activity, are we saying more than that the event just happened? Are we explaining it in any accepted sense of the verb *to explain*?

All explanation depends, in the last resort, upon analogy with inner experience. It would be meaningless to explain natural events mathematically if mathematics were totally

unfamiliar to us; it would be meaningless to explain them in terms of forces or energy, were it not that we experience pushes and pulls in our muscles and are aware of the expenditure of energy. It would be meaningless to accept the view that other people are endowed with conscious minds were it not that self-awareness is familiar to us. We understand the outer world in terms of the inner; we can do no other.

Turning now to creation, though it is true that we have no direct experience of the creation of matter or energy out of nothing, it is indubitable that the sense of creating new organization, as in dreaming, thinking, or speaking, is among the most familiar of all experiences. Moreover, it is creation of organization, of order, rather than of matter or energy, which most impresses us about the external world — not the mere fact that there is something rather than nothing, but the fact that this something is an organized whole: a cosmos, not a chaos.

For us, creation out of nothing still lies beyond the limits of intelligibility. To say that God made the world out of nothing explains nothing; God may have done so (for this is said to be the teaching of the Bible, though not all have agreed<sup>12</sup>); but for us it is still like magic. Unless or until we can find a link with experience we cannot speak of such creation as *explanatory*, though we may accept that it is true. However, we need to consider the possibility that a link with experience will someday be discovered.

Concerning creation of the *order* of the universe, we can understand this by analogy with our inner experience of creation. Creation by God is the only rational explanation of the natural world order that man can envisage. Though to our inquisitive minds, creation is by no means as sophisticated an explanation as we (or the rational part of us) would like, it is not in principle any less satisfying than many other kinds of explanations which we commonly accept without question. Arguments commonly used by atheists against belief in God can mostly be used in attacking belief in atoms or the forces of nature, and so forth; but such arguments are but rarely pursued in these other directions.

In conclusion, we may say that the Biblical stress on God as a working creator makes sense. It offers a rational explanation for much in nature that would otherwise be ascribed to chance and chaos. It points to purposefulness, instills reverence, and encourages science and investigation generally. Though, in some contexts, the creator God may occasionally seem like God the supermagician, this arises only on account of our present limited experience and understanding. It is emphati-

cally not the aspect of God's creative activity to which we should direct major attention. God is the working creator, creator of man, creator of the wonders of nature, and creator of the cosmos.

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## CONTENTS

ANNUAL GENERAL MEETING	97
EDITORIAL	98
NEWS AND VIEWS	
" . . . Best Laid Plans . . . "	100
Precognition	101
Earthquake Prediction	102
Reductionism	103
Evolution	104
Meaning	105
Short Notes	106
REVIEWS	
Stanley Milgram on <i>Obedience to Authority</i> (by Professor F. T. Farmer)	108
Stanley Jaki on <i>Science and Creation</i>	109
John Wenham on <i>The Goodness of God</i>	111
P. S. Chen on <i>A New Look at God</i>	112
Dictionary of NT Theology	113
ESSAY REVIEW	
Josef Blumrich on Ezekiel's Chariot	114
ARTICLES	
Preb. E. K. Victor Pearce, <i>The Biblical Flood: Evidences         from Egypt</i>	120
R. J. Berry, Professor of Genetics at the Royal Free Hospital Medical School, London, <i>Alternatives and         Accusations in Christians' Attitudes to the Environment</i>	131
The Editor, <i>Creator God or Cosmic Magician?</i>	151