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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 80p (post free) and is available from the Society's address, 130 Wood Street, Cheapside, London, E.C.2V 6DN.

**FAITH AND THOUGHT** is issued free to **FELLOWS, MEMBERS AND ASSOCIATES** of the Victoria Institute. Applications for membership may be accompanied by a remittance which will be returned in the event of non-election. (Subscriptions are, **FELLOWS** £3.15; **MEMBERS** and Library Subscribers £2.10; **ASSOCIATES** aged 25 or under, together with certain other categories, £1.05. **FELLOWS** must be Christians and must be recommended 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.

### EDITORIAL ADDRESS

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# FAITH AND THOUGHT

*A Journal devoted to the study of the inter-relation of the  
Christian Revelation and modern research.*

1972 - 3

VOL. 100

NUMBER 2

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## **ANNUAL GENERAL MEETING**

Held in the Heringham Hall, Bedford College,  
Regent's Park, London, N.W.1  
on Saturday, 20th May, 1972.

The President, Professor R. L. F. Boyd, C.B.E., F.I.E.E., F.R.S.,  
in the chair.

Following the adoption of the Minutes of the previous Annual General Meeting, the Chairman moved that resolutions be passed, carrying into effect the proposals listed in the Notice of Meeting and accordingly, by unanimous vote:

The retiring Officers and Members of the Council were re-elected.

The annual accounts and report presented by the Honorary Treasurer were duly adopted.

Messrs. Metcalfe Blake & Co., having indicated their willingness to continue to serve as auditors to the Society, were re-elected.

The meeting was declared closed.

## MEMBERSHIP

On 22nd May, 1971, the following new members were declared elected.

## FELLOWS

J. B. Lloyd, Ph.D., F.R.I.C., etc.	Cardiff
T. Malcolm Muggerridge, Litt.D., etc. <i>Transferred from Member</i>	Robertsbridge
D. A. Burgess	London

## MEMBERS

J. T. Hansford, M.A., B.Sc.	Witley, Sy.
K. G. Howkins, M.A., B.D.	Hertford
G. C. Snell	Ashford, Mx.

The roll at 16th May, 1972, includes the following new Fellows, Members and Associates.

## FELLOWS

Rev. F. H. Cleobury, Ph.D.	Norwich
Rev. D. A. Elliott	Wallingford, Berks.
G. Mackay, M.B., etc.	Sunderland
R. S. Walker, M.D., F.R.C.P., etc.	Glasgow
A. P. Williamson, M.A. (Theol), M.Litt. <i>Transferred from Member</i>	Coleraine
Prof. F. T. Farmer, Ph.D.	Newcastle-on-Tyne

## MEMBERS

G. W. Scott Blair, D.Sc., etc.	Oxford
I. Barns, B.Sc., B.Ed.	Fitzroy, Australia
Miss V. J. Bossom	London
Rev. Colin Brown, B.D., M.A., Ph.D.	Bristol
D. J. Ditch, M.A.	Chester
C. E. Terence Flanagan, B.A.	Ballymena
S. G. Hamilton, M.A., M.B., etc.	Aldeburgh, Suffolk
I. C. R. Holford, M.Sc.Agr.	Harpenden
Rev. N. E. H. Holmes, M.A., M.B., etc.	Jersey, C.I.

Rev. Byron P. King	Wantagh, N.Y. U.S.A.
D. M. Large, B.D.S.	Todmorden, Lancs.
N. Louis	Bronshoj, Denmark
A. F. B. Mason	Hull
S. J. Morley, B.Sc.	London
C. H. Ong, B.Sc.	London
D. W. Patten, B.A., M.A.	Seattle, U.S.A.
Rev. C. A. R. Rowat	Manotick, Canada
C. W. Stunt, M.A., LL.B.	Sevenoaks
C. S. Siddle	Littleport, Cambs.
A. H. Webb, M.A.	Bengeo, Herts.
R. C. White, B.Sc.	Dover
D. Young, B.A., Ph.D.	Canberra City, Australia

## ASSOCIATES

J. Bazlinton	London
P. M. Nye, B.A.	Beverley, E. Yorks.
K. A. Osseo-Asare	Berkeley, U.S.A.
W. L. Ruppensburg	Riverside, U.S.A.
J. G. Shortt	Bulstrode, Bucks.
S. P. Sutton	Leicester

*Deaths.* During the year the Society has lost two members by death: R. E. Beckett, F.C.A., F.S.A.A. (Walsall) and Major R. B. Withers, D.S.O. (Truro).

## EDITORIAL

*The Flood.* On 20th May, 1972 at Bedford College, London, the V.I. held a well-attended Symposium on Noah's Flood, Professor Malcolm Jeeves being in the chair. The papers given on this occasion by Messrs. D. Clines, C. Russell and F. A. Filby are printed in this issue.

Dr. Filby, it will be noted, leaves the possible causes and date of the Flood very open indeed: for the latter he thinks 4-5,000 BC probable. The Editor had hoped to persuade him to add

further matter on the factual side of the question before publication, but as most readers will have heard he died suddenly a few days after the meeting. In a letter to the Editor (who had asked his views on the Black Sea evidence) received after his death he wrote:

No one at the meeting mentioned the Black Sea question. I have often wished for time to look into the questions of the Black Sea, the Caspian and the Sea of Aral and their connections in the past . . . There is the Greek story that at the Flood of Dardanus the Black Sea and the Mediterranean became joined . . . It is all very interesting [but] I was a little disappointed that several at the meeting took the line that we are wasting our time as historicity (according to them) doesn't matter . . . only the spiritual lessons we can learn from what they call the myth. This I think is dangerous . . . [continue to reason like this] and we might as well give up [Christianity].

Though the papers given are very interesting some of those present have expressed the view that the factual evidence relevant to the Flood was not adequately conveyed. Thus no one referred to Professor Whitelaw's evidence of a great catastrophe around 4,500 (plus or minus 500 ?) BC (see this **JOURNAL 99**, 14-16) nor to the Wilson theory that Antarctic ice periodically slips into the sea, nor to evidence relating to sea levels in the past. To supplement the papers the Editor has therefore added a further short paper with particular reference to the Black Sea.

*Schofield Prize.* In the opinion of the Adjudicators no essay of sufficient merit was received and the Schofield Prize has not, therefore, been awarded on this occasion.

## The Victoria Institute or Philosophical Society of Great Britain

## Balance Sheet as at 30th September, 1971

1970				1970			
70		Prepaid Subscriptions	55	180		Subscriptions in arrear	431
467		Sundry Creditors	166	103		Office Equipment	103
		General Fund: Balance at		105		Sundry Debtors	117
	1,137	1st October, 1970	665	815		Cash Balances	605
	312	Less Subscriptions written off as irrecoverable	—				
	<u>825</u>		<u>665</u>				
		Excess of Income over Expenditure	370	1,035			
666	159		<u>370</u>	<u>1,035</u>			
<u>1,203</u>			1,256	1,203			1,256
		<i>Special Funds</i>				<i>Special Fund Investments</i>	
331		Life Composition Fund	234	695		Cash and Bank Balances	723
508		Gunning Trust	508	1,744		Investment at cost	1,744
200		Langhorne Orchard Trust	200			(Market Value, £1,035)	
220		Schofield Memorial Trust	220				
400		Craig Memorial Trust	400				
780		Prize Funds	905	2,467			2,467
			<u>905</u>	<u>2,439</u>			<u>2,467</u>
<u>£3,642</u>			<u>£3,723</u>	<u>£3,642</u>			<u>£3,723</u>

We have audited the account of the Victoria Institute and have obtained all the information and explanations which we have required. Stocks of stationery are held which do not appear in the Balance Sheet. In our opinion the Balance Sheet shows a true and fair view of the state of affairs of the Institute, and is correct according to the books and records thereof and information at our disposal.

6 Gate Street, Lincoln's Inn Fields, London, WC2A 3HP  
2nd December, 1971

METCALFE BLAKE & CO.  
Chartered Accountants

**The Victoria Institute or Philosophical Society of Great Britain**  
**Income and Expenditure Account for the year ended 30th September, 1971**

1970			1970		
1,058	Papers, Lectures, etc. and Printing	324		Annual Subscriptions	
300	Administration: Salaries	333	243	Fellows	232
4	Cleaning &		319	Members	332
	Sundries	—	36	Associates	33
12	Postage	109	175	Library Associates	157
1	Bank Charges	—			754
15	Audit Fee	30	12	Life Subscriptions Proportion	121
		472	702	Sales and Donations	346
30	Cost of Meeting (net)	83	27	Dividends Received	28
200	Editorial Fees	—			1,249
53	Professional Fees	—			—
1,673		879	1,514		1,249
—	Excess of Income over Expenditure for the Year	370	159	Excess of Expenditure over Income	—
£1,673		£1,249	£1,673		£1,249



# IN THE NEWS

**Noah's Blood — Empiricists and Rationalists — The Second Law and the Universe — Chirality and Symmetry — Suicides in Ireland — Aggression and Psychosomatic Disease — Science in Power — Holy Lotus Feet — An End to Hazel Twigs? — 'In the News' Updated (Fireballs, Crucifixion, Weak Radiation Beneficial?).**

## NOAH'S BLOOD

In this issue we publish four articles on Noah's Flood. As we go to press quite a new line of enquiry has opened up: it concerns Noah's *blood*.

For a number of years geneticists have been interested in comparing the amino-acid sequence of a protein in one species with the corresponding sequence of the same (i.e. fulfilling the same function) protein in another. It is often found that small changes in the sequence of amino-acids in the chains have occurred and the further removed from one another the species are, the larger the number of replacements. (This affords strong evidence that evolution has occurred, but not necessarily without limit !)

Why is one amino-acid residue replaced by another? It used to be assumed that each change conferred a selective advantage in the Darwinian sense. No doubt it is sometimes so, but in a general way this is difficult to believe. The changes are quite trivial (methyl for H; ethyl for methyl etc.) and it is difficult to imagine that all small changes in very large structures confer advantage (or disadvantage) to a host, especially as scores of such changes in each of many thousands of proteins are involved.

In 1968, M. Kimura argued that the bulk of these small apparently random changes involve no selective advantage at all (theory of *neutral mutation* or *genetic drift*). Such changes must

of course correspond to changes in the genetic material (*gene genetic drift*).

Alas, it is impossible to prove a negative and in some cases changes which seemed to confer no advantage were later found to do so: the theory can therefore be attacked from this point of view (for examples of such criticism see *Nature*, **231**, 350). Nevertheless it is probably in the main correct (J. L. King and T. H. Jukes, "Non-Darwinian Evolution", *Science*, 1969, **69**, 788, put a good case) and the argument which follows is unaffected even if a small selective advantage is sometimes present.

J. Haigh and J. Maynard Smith, both of Sussex University, have examined the published data on the variations in human hæmoglobin in the light of genetic drift (*Genetical Research*, 1972, **19**, 73 - 89). In their paper, which is mathematical, they consider the following problem. If variants are present in a certain fraction of the normal amino-acid sequence in a protein, then these variants must have arisen by mutation in the past before they became established. But how many of the variants arose, say, between now and 100 generations back, or between 100 and 200? The theory shows that the number of variants now established depends simply on the time available for their formation by mutation: the proportion now present which originated say between 100 and 150 generations ago is the same as the proportion due to those produced between 1,000 and 1,050 generations back.

Now the mutation rate is about  $10^{-9}$  per site (definite position in a protein chain) per year. If, then, we suppose that man has been on earth for a million years, say, we should expect to find that small changes have occurred in about 15% of the possible sites (one-third of which are quickly identifiable by the usual experimental technique). But in the hæmoglobin chains only about 0.15% of people have a chain which differs from the normal. (Changes which are known to be selective such as the well known sickle cell mutant are allowed for.) The number of variations found can be accounted for if they *all* arrived by mutation within the past 10,000 years (a very rough estimate), but none can have originated much earlier.

What is the explanation? *Either* the genetic drift theory is wrong, *very* wrong indeed, say Haigh and Smith, *or* there were no variants present a mere 10,000 years ago which can only have happened if in the very recent past the population of mankind passed through a "bottleneck" — an all-time low.

How could this have happened? More calculations follow. If over a period of 40,000 years the total number of mankind *never* exceeded 1,000 (or 10,000 over 400,000 years) there is a good chance that variants might have bred out. But now R. N. Harkins, P. Stenzel and J. A. Black (*Nature* 1973, **241**, 225) suggest a much simpler explanation. All we have to assume is that the hæmoglobins in the blood of Noah and his family, a mere eight people in all, had the same amino-acid sequences: and what is more likely? Noah's Flood provided the bottleneck: it made mankind genetically homogeneous at least so far as hæmoglobin is concerned.

[Note added later.] A letter from Haigh and Maynard Smith appeared in *Nature* (**242**, 73) saying how pleased they are that the relevance of their work to Noah's Flood has been noted. They point out, too, that if Kimura is right more variation of the kind mentioned above should be observed among "clean" animals (cows, antelopes) than "unclean" (pigs, camels, ossifrages) since larger numbers of clean animals were taken into the ark. The outcome of tests on animals will be awaited with great interest.

### EMPIRICISTS AND RATIONALISTS

Professor W. B. Bonnor of Queen Elizabeth College, London University, has recently said that when he first heard of Weber's work on the detection of gravity waves (see this **JOURNAL**, **99**, 175) he immediately, and in a state of great excitement, told the news to a physicist from central Europe who was working in his department at the time. The man looked blandly surprised and said without a flicker of interest, "But we already know from

general relativity that gravitation waves exist" (*Nature*, 238, 244). All of which illustrates, thinks Professor Bonner, the difference between an empiricist and a rationalist !

The story also illustrates the difference between two classes of Christians. Some, it would seem, know what Christianity and the Bible teach from the start. They are indifferent to claims that the expectations of Christianity are borne out in practice. "We knew it all before so why get excited" summarises their attitude. Others (and the *Victoria Institute* caters for such) prefer the attitude of the centurian (John 4: 53) who found his weak faith strengthened when its predictions were confirmed in practice. Perhaps Christians of the second kind are getting rarer today: let us hope that enough of them will remain to keep the *Victoria Institute* alive !

## THE SECOND LAW AND THE UNIVERSE

*An apology.* Dr. A. R. Peacocke has drawn our attention to an error in the review of his book (THIS JOURNAL, 100, 82-4) *Science and the Christian Experiment*, for which we apologise. Almost on the last page he does in fact refer to the second law (in words which might have been a quotation from the late Canon C. E. Raven). "This law, which in one of its forms affirms that entropy in an *isolated* system always increases with time, has been applied by some to the universe as a whole. There is no knowing if this application is justified and any conclusions on this basis about the universe *as a whole* are unwarranted" (p. 198). He goes on to point out that there is nevertheless a reasonable certainty that the earth will eventually be burnt up when, in a later stage of evolution, the sun will swell up enormously enveloping the inner planets. Owing to the vast distances involved, the possibility that the human race will escape to another home is too remote to be considered seriously. "The basis of hope is therefore our trust that God will continue this relation [his relation to man] and bring his purposes to fruition beyond even the

disappearance of . . . the Earth”.

Nevertheless, apart from the closing page or so, Dr. Peacocke's approach is entirely evolutionary. “The scientific enterprise leads one to a perspective of the cosmos in which personalness in man is the summit of the evolutionary processes which the matter of the cosmos has undergone” (p. 165); “The appropriate general adjective to be attached to ‘evolution’ is surely ‘cosmic’ as pertaining to the universe as an ordered whole, rather than to the Earth alone” (p. 78). He seems to overlook the fact that if evolution is seen to apply in the limited environment of man, there is no knowing if it can be applied to the universe *as a whole* and a philosophical outlook coloured by evolution is unwarranted — at least if his argument about the second law holds good.

On the wider question of whether the entropy law can be applied to the universe as a whole the following points seem relevant.

(1) We may ask, What conceivable meaning can be attached to the suggestion that the entropy law does *not* apply to the universe as a whole? Entropy is measured in terms of probability. Is the idea seriously entertained that in the universe at large energy, particles, etc., do *not* tend to reach their most probable states, positions, etc.?

Even suppose it be shown that the measures of entropy obtained by applying the usual mathematical formulae show that entropy decreases, or does not necessarily increase (attempts to do this have been made) owing to relativity or quantum theory, or to queer cosmic features (black holes, quasars, expansion of the universe into empty space, etc.) about which we know little, the discovery would surely be philosophically irrelevant. The basic fact that disorder or mixed-upness increases would hardly be placed in doubt.

(2) Suppose that, in imagination, we divide the universe up into, say, cubes of side 1. Then the volume of the cubes determining the quantity of matter, radiation, etc. which they contain

will depend on  $l^3$ , but their surface determining their degree of interaction with neighbouring cubes on  $l^2$ . In the limit as  $l$  approaches infinity the cubes will approach a condition of complete isolation from one another. Since the law applies to isolated systems, it will increase for the universe as a whole, whether finite or infinite.

(3) The old argument developed by Kelvin, Maxwell and others in the nineteenth century and revived by Jeans, etc. in the 30s, to the effect that because the entropy of the universe always increases there must have been a time, not infinitely remote, when the process started, a creation epoch in fact, would seem to have lost none of its force.

(4) One of the most helpful relatively recent discussions on entropy we have seen is by David Bohm (in C. H. Waddington, Ed., *Towards a Theoretical Biology*, vol. 2, Edinburgh University Press, 1969, pp. 18-70). In earlier books it is often pointed out that if we start with a deck of playing cards arranged in their traditional order and shuffle them, the 'disorder' created increases steadily as they depart further and further from their original arrangement. This increase in disorder is equivalent to an increase in entropy. But *any* conceivable arrangement of cards *could be* regarded as ordered: thus an apparently random but actually carefully pre-arranged order of cards might at any time be used as a code. If such a pack were shuffled, the card arrangement would depart further and further from its first state — the entropy law at work again!

It is clear that if we think of cards *in themselves*, there is no meaning in order or disorder: order is relative only to something outside the system — in the case of cards, to men who by convention think of some particular arrangement as ordered.

Similarly with entropy. In thermodynamics an almost infinitely small proportion of the multitudinous possible micro-states of atoms holds out the possibility that heat may be converted into other forms of energy (mechanical work, electrical energy, potential energy, etc.). If once such a state exists, shuffling (as in the

entropy law) will bring the universe further and further away from the initial highly improbable state. But matter (we use the word to include radiation, etc.) is not ordered in itself. There is nothing about matter as such which tells us that heat energy *must* transform itself into energy of other kinds. Left to chance it is near infinitely improbable that this would ever happen. But in fact it *did* and does happen and all the shuffling in all the universe causes a steady drift away from the first improbable state.

This drift is the entropy law of physics. Clearly there are or could be a near infinite number of entropy laws. Suppose all the atoms in the universe had once been arranged in small groups each one of them spelling a common word, say GOD, then in the subsequent history of the universe there would have followed a further and further departure from this improbable arrangement. Again an entropy law would have been at work, but this law would have little indeed to do with heat and work. The disorder created would be relative to observers who understand the meaning of words. This meaning is not a property of atoms.

To have meaning each and every entropy law must be related to what is *outside nature* — to a being who understands a code or a word such as GOD, or to a universal plan (which we may reasonably suppose involved the bringing of life, dependent on energy transformation, into existence). (Bohm mentions but does not discuss theology: he *does* insist on metaphysics and others at the Symposium were convinced.)

Bohm discusses the laws of nature generally. A law is a statement about a regularity: it means that events are ordered with respect to one another (e.g. on a curve illustrating a law, any one part of a curve is related to any other). But again, he says, such orders — and therefore all laws of nature — are meaningless in themselves. They are only meaningful on account of a metaphysical background which is *not* a part of nature and cannot be investigated by the methods of science.

Reasoning along these lines it would appear that any attempt to build an evolutionary philosophy is foredoomed. Evolution

involves the coming into being of new hierarchies of order but to locate the source of the new order within the system is to forget the metaphysical background.

(5) Following the treatment given in a well known text (R. C. Tolman, *Relativity, Thermodynamics and Cosmology*, 1934) it has been assumed that if an observer could watch two objects, one hot and one cold, moving at different but relativistic (i.e. near the speed of light) speeds and exchanging heat reversibly (as in the Carnot cycle) the entropy law would break down. It has now been shown that this is a fallacy: the usual law holds (P. T. Landsberg and K. A. Johns, *Jour of Physics*, A, 1972, 5, 1433-7).

(6) There are some interesting discussions on entropy, especially on 'entropy as the arrow of time' in a collection of essays (about half from the other side of the 'iron curtain') in *Time in Science and Philosophy* (Ed. J. Zeman, Elsevier, 1971). R. Schlegel (p. 33) makes a statement closely similar to Peacocke's but it is clear from the context that he is thinking only of the mathematical formulation of entropy (see (1) above).

## CHIRALITY AND SYMMETRY

That symmetry, or the lack of it, may have some connection with the fundamental structure of the universe, has long been suspected by scientists and philosophers, both small and great. Pasteur and Pierre Curie in particular gave much attention to the subject.

In a recent most interesting memoir Roger Caillois ("Dynamics of Dissymmetry", *Diogenes*, 1972, (72), 62-92) discusses the subject at length. He argues that at the inorganic level symmetry is paramount but that higher up the scale it slowly becomes more complex or even disappears. In the inorganic world of crystals odd symmetries are very rare though approximately pentagonal



faces are found in the mineral *pyrite* where near regular dodecahedra are found, though they arise only as truncations of the cube. In the organic world, on the other hand, odd number symmetries (star fishes, sea-urchins, cacti, many flowers, worms, etc.) are so common that their presence seems to announce the frontier between the living and the inorganic.

On the borderland the viruses which cannot reproduce themselves, form crystal shapes which correspond exactly to Plato's solids, the tetrahedron, cube, octahedron, dodecahedron, icosahedron (only the first three are found in inorganic crystals).

Pasteur was greatly interested in the subject and did much experimental work in which he sought to introduce elements of dissymmetry into his experimental environments. In 1880 he reached the conclusion that there must exist a cosmic force which he could not identify which was related to the nature of life. *Chirality* (the relation pertaining between the right and left hands, which are not identical but related as mirror images) he regarded as "the only clear cut line of demarcation . . . between the chemistry of dead nature and that of living nature".

Recent years have seen two exceedingly interesting advances ; first the discovery of chirality at the atomic level (Pauli was much perplexed that God seemed to be left handed in weak atomic interaction but ambidextrous in strong ones !) and the reluctant abandonment of the old view that the brain is functionally symmetrical. The left brain is responsible for verbal expression and symbolism while the right is concerned with space perception, sensory motor co-ordination, recognition of the sense of direction, etc. This situation we are told is typically human "no diminution of performance has ever been noted in an animal in which one of the cortical areas was sound and the other injured" (H. Hécuén in *Totus Homo*, 1970, 2, (No. 1), pp. 8-15 is given as the authority). There have been many endeavours to discover a basic difference between animals and man: is it possible that one may be found here ?

Caillois reaches a conclusion not unlike that of Pasteur.

At the back of things, he believes, there must be a force not yet known to science which breaks down established symmetries creating asymmetry: a kind of entropy law in reverse. Many Christians will doubt if impersonal words such as 'force' are appropriate in this connection. A number of physical processes *could* account for chirality in molecules (see *Nature*, 1971, **232**, 105 for survey of the subject), or just possibly chirality of elementary particles might be reflected higher up the scale in molecules (T. L. V. Ulbright, *Quarterly Reviews*, Chem. Soc. 1959, **13**, 48), but this is a far cry from the asymmetries of organisms. It is extremely difficult to understand, in principle, how inorganic nature could give rise to the varieties of odd numbered symmetries which we encounter in the organic world (for some suggestions see D. Nichols, *New Scientist*, 14 September, 1967, p. 546 who discusses 5-fold symmetry: but the suggestions are untestable and 'very iffy').

### SUICIDES IN IRELAND

In an interesting article published in the *British Medical Journal* (5 February, 1972, p. 342) Dr. H. A. Lyons of Belfast gives figures for suicides and incidence of depressive illness in Northern Ireland. Comparing figures for 1964-9 with 1970 when trouble with the IRA started in earnest, he shows that the overall suicide rate fell by a half, though in County Down, the most peaceful part of the area, it actually rose. (The fall in the number of suicides, it should be added, applied only to the working class where feelings ran high; not to academics and business executives.) Despite the shootings and bombings the total number of violent deaths in Northern Ireland, did not rise — though this would hardly apply to the post-1970 period.

Dr. Lyons concludes that his figures support the view that the lack of opportunity to express aggression is the cause of depression and suicide. The connection between suicide and lack of opportunity for aggression has often been noted before, as

Dr. Lyons points out. In war there is always a marked fall in the suicide rate — people identify themselves with the fighting forces and even the boring factory job takes on the aura of helping the war effort. In WW2 the suicide rate fell in *every* belligerent country. In normal times statistics show that murders and suicides are inversely related.

Psychoanalysis of would-be suicides is claimed by many to show that the patient “actually wants to kill someone else but is somehow cheated of his victims” (it is right to add that this view is sometimes contested). He turns his anger on himself not because he wants to die — for those who unsuccessfully attempt suicide commonly implore their physicians to keep them alive — but because of “the need for punishment to relieve an overwhelming sense of guilt” (*Science News Letter*, 12 May, 1945). In the S. Greer *et al* study (*Brit. Med. Jour.* 1966, ii, 1352) it was found that recent disruption of a close relationship was very common: it is well known that love easily turns to hate in such circumstances.

A link between hatred and suicide is not unexpected. The Christian is called upon to love others as he loves himself: hatred of others brings hatred of self and *vice versa*.

## AGGRESSION AND PSYCHOSOMATIC DISEASE

Helen Dunbar's well known massive volume (*Emotions and Bodily Changes*), first published in 1935, documents the view that many diseases, but particularly skin complaints, headaches, duodenal ulcers, etc. are often connected with the emotional states. Since the publication of the last edition in 1954 interest has shifted towards the connection, or possible connection, between the environment and psychosomatic disease. In 1970 a *Symposium* on the subject, sponsored by WHO and the University of Uppsala, was held in Stockholm and the first volume of the Proceedings has been published (*The Psychosocial Environment and Psycho-*

*somatic Diseases*, Ed. by L. Levi, OUP, 1971, 484 pp.).

The volume contains a number of papers of varying worth many of which support the connection. One of the most interesting is by J. J. Groen ("Social Change and Psychosomatic Disease", p. 91f). Dr. Groen worked in Holland at the time of the Nazi occupation. Peptic ulcer was common in Holland before the war, when it was treated by rest in bed and careful dieting. When the famine came it disappeared completely. Ulcer patients rode or walked with heavy burdens for hours without ill effect. In the concentration camps attacks of asthma stopped but started again after the liberation. One patient tried hard to provoke an attack but was quite unsuccessful! Migraines, psoriasis, and hyperthyroidism also disappeared in the camps.

These conditions are often attributed to stress, but stress was much greater under the Nazis. Dr. Groen subscribes to the view that psychosomatic disease is caused by lack of opportunity to express aggressive feelings — aggression even against fellow prisoners was common in the camps. He adds that as the common oppression brought people together, their mutual support in adversity and common feeling of aggression toward the enemy tended to relieve unexpressed tensions.

It would appear that feelings of aggression towards others are very harmful to health if unexpressed. It is here that the Christian challenge is relevant. Civilised society demands that we suppress feelings of violence and retaliation: it demands that outwardly we live good lives yet the result of this may be that we shall suffer more than those who take the law into their own hands. Thus the structure of the world seems unfair: good people suffer from neuroses, psychosomatic disease and temptations to suicide, the aggressive enjoying a better deal.

The Christian answer, of course, is that God looks upon the heart. The Law does not only say "Thou shalt not steal", it says also "Thou shalt not covet"; adultery can be committed in the heart as well as physically; outwardly the Pharisee appears righteous to men but within his thoughts are corrupt. The relief

that comes from aggression is the outworking of thoughts and feelings of animosity within which *ought not to be there*. They are brought into consciousness by prayer when forgiveness is received with the ability to forgive the sins of others.

### SCIENCE IN POWER

Secularists often draw attention to the wickedness of the church when in power. Christianity started in a small way and was marked by sincerity and the love of truth. Its corruption followed its rise to power and the day came when it proved possible, even, for murderous gangsters to call themselves Christians and to rise to power in the Christian hierarchy.

Recent happenings underline the fact that a similar development is now taking place in science. In his magnificent Nobel Lecture (*Listener*, 12 September, 1972, p. 335) Alexander Solzhenitsyn analyses our present predicament. The world, he reminds us, "is entirely in the hands of the scientists [i.e. scientist and technicians] for all mankind's technological steps are determined by the scientists . . . the direction the world should take ought to depend . . . on the co-operation of scientists the world over [but instead of joining forces] . . . they shy away in whole congress-loads from the sufferings of others: it is more comfortable for them to remain within the frontiers of science." In substance, the very criticisms so often levelled against Christianity !

Individually many scientists are realising that all is not well with science. In May 1972 in New Delhi, Dr. V. H. Shah, aged 35, an able scientist ("one of the most promising" in India, *Nature*, 238, 175) and agronomist of the Indian Agricultural Research Institute, took his life "in disgust that other scientists may get proper treatment" (*Nature*, 237, 130). In a valedictory letter he complained of how he and other junior scientists were deprived of research students and laboratory technicians, of how he had been passed over in favour of others not even qualified in agronomy

when by his qualifications he had expected promotion, and of how administrative bottle-necks were regularly used to humiliate him and other juniors. Mediocre scientists who sought promotion, he said, were free to bombard the boss with "a lot of unscientific data . . . (to) fit your line of thinking".

In later issues of *Nature* (237, 469 ; 238, 2 etc.) attention was drawn to the fact that this is not the first suicide of a scientist in New Delhi. The organisation of science in India appears to be so bad that many highly qualified Indians look for jobs abroad.

In 1959 Emilio Segré and Owen Chamberlain, physics professors at Berkeley, California, received the Nobel Prize for the year for their discovery of the antiproton. At that time the Bevatron, a proton accelerator, had recently been constructed at Berkeley. Professor O. Piccioni, now Professor of physics at the University of California, San Diego, travelled to Berkeley in 1954 and made suggestions for the detection of the antiproton. He revealed his plans to Segré and Chamberlain who carried them out successfully, he claims, and with little alteration, but Piccioni (though he later discovered the antineutron) was given no credit. Many years have passed since then and Piccioni, after many useless protests, has sued the Berkeley professors for \$125,000 (*Nature*, 238, 8). "I am not boiling as much now as I was then but after 15 years it is still scandalous and it is still important" he says. He hopes the outcome of his battle will be the establishment of justice in the world of science (*New Scientist*, 6 July, 1972, p. 44).

Many other examples of shoddy goings on in the halls of science come to mind. In Russia there was the Lysenko affair which showed that scientists who preferred scientific evidence to the doctrinaire science of the Party were sometimes done to death. Nor do things look much brighter now as the recent publicity in connection with Medvedev has shown.

A sinister feature is the growing callousness in scientific circles towards suffering, both in animals and humans. John Vyvyan (*In Pity and in Anger*, 1969) lays much of this at the

door of the great animal physiologist Claude Bernard (1813 – 1878) who was not only utterly indifferent to the sufferings of the animals he tortured but travelled throughout the world urging the establishment of laboratories similar to his own where animals could be experimented upon in secrecy. In a later book (*The Dark Face of Science*, 1971) Vyvyan tells the story in detail of how, in our own century, the same attitude — free experimentation upon animals without regard to their sufferings — led in WW2 Germany to the demand for experiments upon human beings. First animals were used, then two or three criminals were asked for, then the trickle of human beings rose to hundreds and later to thousands. One does not need to be a die-hard anti-vivisectionist to deplore the utter lack of control on experiments on animals in such countries as U.S.A. and Japan. In American science fairs even school boys are permitted, even encouraged, to experiment on live animals. (See J. Hillaby, *New Scientist*, 15 February, 1973, p. 386).

Particularly revolting is the use of the highly intelligent and peaceful dolphin in weaponry (F. Hussain, *New Scientist*, 25 January, 1973, p. 182f). Dolphins are being trained to swim near submarines to provide false acoustic signals and attract torpedoes towards themselves, to locate mines and, with knives strapped to their snouts, to attack men. Aggressive behaviour is ensured by implanting stimulating electrodes in the deep centres of their brains. The Columbia Broadcasting System (daily papers, 19 February, 1973) reports the use of dolphins to place detection devices in foreign harbours.

Many scientists dedicate their skill and inventiveness to the production of brutally cruel weapons of war. Many of these, made by the American Honeywell Corporation were described by Alain Jaubert in the *New Scientist*, 30 March, 1972, pp. 685 – 688 ; see also J. S. Tompkins, *The Weapons of the World War III*, (1967). A reader of the *New Scientist* urged that the magazine, to prove its political neutrality, should publish a similar article describing the cruel weapons developed by the Communists. On the subject of science and war many of the issues involved are vividly described by R. W. Reid in *Tongues of Conscience*

(1969. A Panther PB of this fine book appeared in 1971, £0·50).

### HOLY LOTUS FEET

The “holy lotus feet” of Guru Maharaj Ji, the smiling Indian 14-year-old boy, first rested upon the soil of the western world — Heathrow, London — in June 1971. A year later (17 June, 1972) the first issue of the *Divine Times* (price 5p) appeared, by which time his holiness had flitted off to the U.S.A., with an African visit impending. Centres to foster the worship of Ji, the Divine Being, have been opened in London (3 Woodside Avenue, Highgate), Cambridge, Oxford, Manchester, etc. and there is talk of Ji-worshipping schools for the young.

In large headlines in the *Divine Times* Ji is called “Lord of Love”, “Lord of the Universe”, etc. while the articles vie with one another in their unctuous flattery. (“He saves souls . . . He is the ocean of kindness. He is the Almighty and all powerful. He is more magnificent than the unfathomable seas” says the ‘Divine Mother’).

Before leaving India in 1971 Ji headed what was claimed to be the largest ever procession in history: it was 14 miles long, took 10 hours to pass and contained over a million people. He made the promise, “I declare I shall bring in the golden age of peace to the whole world.” In November 1972 he returned to Delhi accompanied by ten Jumbos filled with devotees — tickets were offered in England at £150. (Alas, the Indian authorities became suspicious about the Guru’s finances and started to investigate !)

These happenings bring to mind a point to which Professor R. C. Zaehner draws attention in his Gifford Lectures (*Concordant Discord*, Oxford UP, Ch. 17 and Appendix). In three of the world’s great religions the concept of incarnation has taken firm root. In Hinduism the *avatars* of Vishnu, especially Rama



and Krishna, are, at least in so far as the worshippers are concerned, equivalent to the Word made flesh. The idea is so firmly enshrined in the Hindu psyche that the historical reality of these incarnations is regarded as irrelevant: if they did not exist, they *ought* to have existed. Similarly, the Buddha was the enlightened one who sought salvation for himself and all mankind — salvation consisting of freedom from unending rebirths but having nothing to do with God or sin. He was a man and made no pretensions to be more than a man. But in later Mahayana Buddhism — the form of the religion that proved its viability by missionary enterprise — “the human Buddha is almost forgotten and he appears as the supreme Deity in trinity”. Muhammad, again, claimed only to be a prophet, but though in theory the modern Mohammedan would think it blasphemous to claim the prophet’s deity, he does in fact regard him not merely as a prophet but “something like the incarnate wisdom of God”. The conclusion Zaehner reaches is that “there is in man a craving for an incarnate God strong enough to force its way into the most unpromising religious systems” (p. 443). The craving confronts us in the adoration of Guru Maharaj Ji but Christianity remains the only religion which bases itself firmly on the doctrine that to deliver man from sin God Himself became man. Even where the basic idea of incarnation is found in other religions it is always a heretical development.

### AN END TO HAZEL TWIGS ?

Scientifically speaking dowsing is not a respectable subject. Even if, at times, it *seems* to work, there are so many good reasons why it should *not* work, that it is easy to be sceptical. The orthodox scientific view is that the more stringent the controls, the less successful is the dowser who, when cheating is made *quite* impossible, will produce results at the level of chance (H. J. Eysenck, 28 September, *New Scientist*, 1967, comment on F. Z. Vogt and R. Hyman, *Water Witching*, Chicago, 1959).

Needless to say this attitude produces angry comments from the dowsing fraternity who are never at a loss for half-baked "scientific" explanations.

Among theories in vogue is that dowsing is possible because in the vicinity of conductors (water, metal) there is a change in the strength of the local electric field: the nervous system, making good use of a twig held in the hand, somehow amplifies the change. Plausible enough, till one begins to wonder how dowsters manage so well with maps far away from the sites to be examined, how they find the sex of chickens, diagnose diseases or even, like Mr. C. H. Ryter maintain dowsing contact with Apollo 15 astronauts on the moon (*Jour. of the British Society of Dowsters*, 1972, 23, 38).

According to another view the dowser detects ionisation in his "dowsing field" which may be identified with the field strength of short wave radio in the vicinity (*Electrical Times* 1942, 101, 628). Tom Lethbridge (*The Monkey's Tail* 1969) dowstes with a pendulum; he thinks that nearly all materials can be assigned natural wave lengths and he provides a table showing many of these. Gold, for instance, activates a pendulum just 29 inches long. Once he detected golden treasure underground and with great excitement proceeded to dig. All he could find was a very surprised female beetle, but that did not disprove his theory for it transpired that femininity has the same wave length as gold!

Not long ago Major-General J. Scott-Elliot, the present President of the British Society of Dowsters, addressed the Royal Society of Arts on the subject (*Journal* 1972, 120, 175 - 182). (This is not the first time that the RSA have shown interest in the subject: in 1940 members listened to Mr. Cecil Maby who told them that, when struck by lightning, a big tree throws out four cardinal rays which dowsters easily mistake for two underground streams.)

The General's lecture is charmingly written: he tells remarkable stories which seem to confirm the power to dowse and some are first hand; for example, with the aid of a school atlas he was able to plot his son's journey home across the sea after the Suez

war with tolerable accuracy. But, sensible man that he is, he is quite sure that no conceivable physical explanation will ever tell us how a man can detect water or minerals far below his feet, let alone when he is provided only with a map of a locality a thousand miles away.

Then how, in the General's opinion, *does* dowsing work? There seems to be only one answer, though it falls far short of what an adequate answer should be. Man's mind must possess the "strange ability to know by focussing the mind. This is, I believe, the real explanation behind dowsing". Take away all the frills — hazel wood twigs, twitching muscles and maps — and one fact only is left: by deep directed concentration, man can seek and find the knowledge he desires. It isn't easy and under test you may get jittery, says the General; above all if you let the brain or reason intrude when you are trying to dowse, you might as well give up.

Dowsing on this view, might link up with discovery. After (but rarely during) deep concentration the answer comes, but it isn't easy. Would dowsers make good intuitive scientists — ? Perhaps it links up with religious faith too for here also there is deep concentration and determination (Mt. 7: 7) is followed by conviction. Again, not easy, and again truth is endangered if intellect intrudes at the wrong moment.

In another connection it is worth remarking that just as silly explanations of dowsing may bring its reality (let us assume this for the sake of argument) into disrepute, so the over-facile 'explanation' of a miracle may encourage disbelief rather than belief in its reality.

#### **'IN THE NEWS' UPDATED**

*Fireballs.* (see this **JOURNAL**, 99, 8). Stanley Singer's *The Nature of Ball Lightning*, (Plenum Press, 1971, 170 pp., \$14) has

now appeared. Thirteen theories of the nature of the phenomenon are outlined. No really satisfactory theory to explain the long lasting bright balls seems to have emerged. The author thinks that many balls are due to materials, particularly metals, vapourized when lightning strikes an object.

Fireballs were featured on BBC2 (7 February, 1972, D. Ashby and C. Whitehead explained their work done at Harwell: it is consistent, they think, with their anti-matter theory.

This interesting programme gave some account of the life of Charles Fort who spent decades collecting instances of unexplained phenomena and concerning whom a biography appeared recently (D. Knight, *Charles Fort : Prophet of the Unexplained*, Gollancz, 1971, £2). Stress was laid on the enormous difficulty which a discoverer often experiences in gaining acceptance for his views. The case of the South African chemist J. L. B. Smith was cited: he was ridiculed for supposing that the specimen which he had brought to his laboratory was a genuine coelocanth.

*Crucifixion.* (see 99, 8 - 9). “. . . there is no evidence to show in what precise way our Lord was crucified . . .”. Dr. D. W. Lyon writes to raise the question of the Holy Shroud of Turin which, if genuine, might settle the question. He draws attention to Pierre Barbet's book, *The Passion of our Lord Jesus Christ* (Dublin 1954; also 1950 and earlier French edition) and asks if any readers have studied it.

The Shroud cannot be traced back *with certainty* earlier than the 14th century at which time it was declared a fraud, though the exposure may well have been actuated by malice. The earliest literary reference to it or a similar object is dated 436 A.D. Until fairly recently many scholarly Catholic writers were sceptical, e.g. Leclercq in *Dictionnaire d'archéologie chrétienne*, 1953, but according to the *Catholic Encyclopedia*, 1967 ed., the case for its authenticity is now considered to be stronger. Barbet makes a case yet many will find it difficult to think that the early disciples who were Jews and for whom everything which had been in contact with death was unclean, would have preserved a blood-

stained cloth: did they not rejoice in Christ's resurrection rather than His death? Even the sign of the cross is very rare in the early catacombs. The Shroud has not yet, it appears, been C-14 dated.

Canon E. R. Oxby argues that the Shroud cannot be genuine since it consists of a cloth laid flat on a body and covering the face. Our Lord, however, was wrapped in the Jewish manner with the body but not the face covered by the cloth. Our Lord's head was wrapped round separately in a napkin (John 20: 7), (Letter to the *Times*, 3 June, 1970) Professor Bruce makes the same point. But Barbet derives Gk. *soudarion* not from L. *sudarium* (= sweat cloth or napkin) but from the Aramaic *soudarâ* which, he says, could mean a full linen garment or shroud. However, both Professor Bruce and Dr. J. P. Kane (an authority on ancient Jewish burial practices) have informed us definitely that this is not so — the Aramaic word was, in fact, borrowed from the Latin and did not have a different meaning.

Nevertheless Barbet's book is well worth reading. His masterly description, written from a sensitive doctor's point of view, of the suffering which our Lord must have endured is most moving.

*Weak Radiation Beneficial?* (see 99, 10). In later work by M. F. Lyon *et al* at the MRC Harwell Unit it was found that gene mutation rates are independent of, or at least not obviously dependent on dose rates at low radiation dosages (*Nature New Biology*, 1972, 238, 101).

DAVID CLINES

## Noah's Flood:

### I: The Theology of the Flood Narrative

**Sheer familiarity with the Bible combined with a habit of rapid reading makes it easy to overlook points which should be obvious enough. In this scholarly and refreshing analysis of the text of the biblical Flood story as we have it, which he contrasts with other Flood stories, Mr. Clines of the Department of Biblical Studies in the University of Sheffield, draws attention to a number of points which will certainly prove fresh to most of us.**

Like the other narratives in the 'primeval history' (Gen. 1-11), the Flood narrative (Gen. 6-9) displays a pattern of sin, judgment and mitigation of the penalty.<sup>1</sup> The following study of the theology of the Flood narrative follows the same sequence. In some ways, however, the Flood is different from the other primeval stories: on the one hand it is climactic, marking a turning point in the history of mankind, with the motifs of destruction and new creation;<sup>2, 3</sup> and on the other hand, it can be viewed as a further stage in the continuing spread of sin which these early chapters of Genesis depict.<sup>4a, 5a, 6a, 7</sup> Thus the Flood narrative serves differing functions in the primeval history according to the varying thematic structures that are visible in Genesis 1-11. Since our

purpose here is to examine the Flood narrative in itself, and not primarily in relation to the rest of the primeval history, we shall follow the sequence of the deepest underlying structure: the theme of sin, judgment, mitigation.

### I. *The Reason for the Flood*

The folktale type of the 'myths of catastrophe'<sup>8</sup> to which the story belongs when considered purely as a narrative, exhibits three kinds of explanation for the catastrophe of which it tells. In all cases the catastrophe is thought to be sent by the gods, but the reason for it is variously believed to be (i) the unfathomable will of the gods, (ii) some non-moral fault in mankind which has angered the gods, (iii) a moral sin on the part of mankind. Only in the case of (ii) or (iii) can a flood or other catastrophe be spoken of as a 'punishment'.

The variant versions of the Flood story to be found in Mesopotamian literature belong to types (i) and (ii). In the best-known Babylonian Flood story, contained in the Gilgamesh epic where it is recounted by the 'Babylonian Noah' Utnapishtim speaking to Gilgamesh, no reason appears to be given for the Deluge. We read simply that "the great gods decided to bring on a deluge".<sup>9, 10</sup> Some ethical motivation for the Flood has been seen in the words of reproach addressed by Ea, god of wisdom, to the sky-god Enlil: "O warrior, how thus indiscriminately couldst thou bring about this deluge? . . . On the sinner lay his sin, on the transgressor lay his transgression . . . Instead of thy sending a Flood would that the lion had come and diminished mankind . . . that the wolf had come and diminished mankind . . . that a famine had occurred and impoverished mankind . . . that a pestilence had come and smitten mankind".<sup>11</sup> But the point here is precisely that Enlil, in not distinguishing between the sinful and the righteous, has totally disregarded ethical considerations.<sup>12</sup> The absence of any reason on the side of mankind for the sending of the Deluge may simply be due to the setting of this narrative in the Gilgamesh Epic as Utnapishtim's answer to Gilgamesh's question: "Tell me how thou didst stand in the gods' Assembly and find life everlasting?".<sup>12a</sup>

The causes of the Flood are not especially relevant to that question.<sup>13</sup> But it is perhaps not without significance that the Flood story could be told at all without reference to any motivation outside the will of the gods. It is not so easy to imagine a similar thing happening in Israel.

In the other important Mesopotamian epic which contains a story of the Flood, the Atrahasis epic,<sup>14</sup> the cause of the Flood is fully explained: due to the multiplication of mankind their uproar is disturbing the sleep of Enlil. The epic begins with a lengthy description of the creation of man, brought about in order to relieve the gods of the hard labour against which some of them have revolted. Then,

Twelve hundred years had not yet passed  
 When the land extended and the peoples multiplied.  
 The land was bellowing like a bull,  
 The god got disturbed with their uproar.  
 Enlil heard their noise  
 And addressed the great gods,  
 "The noise of mankind has become too intense for me,  
 With their uproar I am deprived of sleep".<sup>14a</sup>

Enlil thereupon determines to send a plague to reduce or perhaps to destroy mankind, but this plan fails through the wiles of Enki (Ea). Other attempts to reduce the clamour of mankind by drought and famine also fail, and the Flood is Enlil's last desperate attempt.

It has seemed to some scholars that the mere noise of humanity can hardly have been regarded as the reason for the Flood, and they have suggested that the words for 'noise' and 'uproar' connote evil behaviour,<sup>15a, 16, 17a, 18a, 19</sup> specifically an uprising or revolt of men against the gods, like the revolt of the lower gods, the Igigi, with which the epic commences.<sup>14b</sup> But more recently it has been stressed that the 'noise' of mankind which brought on the Flood should not be understood in any sense as a moral evil, but rather as the natural result of the production of the teeming masses of humanity in monstrous and



chaotic volume.<sup>20a</sup> According to W. L. Moran, "The Atrahasis Epic ignores almost completely the ideas of sin and punishment, and is not in any sense a theodicy, a justification of Enlil's ways with man".<sup>20b</sup> Rather the epic is concerned with the ordering of the cosmos and with man's place in the established order; the Flood is "an event in the long process by which the cosmos emerged",<sup>20c</sup> a resolution of the inter-divine rivalries which had plagued the earth up to that time. So while it seems reasonable to suppose that the Atrahasis epic offers a more subtle reason for the sending of the Flood than the mere noise of humanity disturbing a cantankerous deity's sleep, the concept of the Flood as a punishment for *sin* is absent from this narrative.<sup>21</sup>

That the Flood was a punishment for human sin is an idea that is of course not unique to the Hebrew narrative. It is attested in the story of the Flood in Ovid's *Metamorphoses*<sup>21a</sup> and in a number of Flood stories from various parts of the world (e.g. Lithuania, Bengal, Andaman Islands, New Zealand<sup>22</sup>), where the sin is variously reported as war and injustice, incest, disobedience to divine commands at creation, quarrelling and war.<sup>23a</sup> The great majority of Flood myths, on the other hand, to judge from the rich collections of Frazer<sup>24</sup> and Gaster,<sup>23b</sup> seem to have little interest in the reason for the Flood but are largely devoted to recounting how some few human beings escaped the deluge.<sup>25</sup>

In contrast to that, the Hebrew narrative, by introducing the Flood as a punishment for sin, adds another dimension to the world-wide story of a primeval deluge. While for so many other peoples the Flood is simply one of the unaccountable natural catastrophes which occur, and whose only interest for the teller and hearer is in the resourcefulness or luck of those who escaped the Flood, in the Hebrew setting the Flood is fundamentally a narrative of God's dealings with man, and the Flood is an expression of His will and activity. He alone is responsible for the catastrophe; thus any ideas of inter-divine conflict or mere chance are negated. Moreover, His relationship to mankind is that of Judge, to which function the legal speech of sentence (6: 13) corresponds.<sup>1a</sup> There is nothing hasty, ill-considered or

vengeful about God's decision; though He is far from being coolly dispassionate about the situation — he was 'sorry' he had made man and it "grieved him to his heart" (6: 6) — it is noteworthy that there is no word here of divine *anger*; rather the rational element in the divine decision is strongly marked (6: 5, 11ff). Further, as Judge, God is specifically concerned with moral evil. Nahum Sarna has commented: "The idea that human sinfulness finds its expression in the state of society, and that God holds men and society accountable for their misdeeds, is revolutionary in the ancient world. No less remarkable is the fact that the Bible, dealing with non-Israelites, does not conceive of their sin in . . . 'religious' terms. That is to say, he does not accuse them of idolatrous or cultic offences. The culpability of the generation of the flood lies strictly in the socio-moral sphere."<sup>18b</sup>

## II. *The Sin of the Generation of the Flood*

What precisely is the sin for which the Flood is sent? Several phrases are used:

- 6: 5      "the wickedness of man was great in the earth"  
             "every inclination of the thoughts of his heart  
             was only evil continually".
- 6: 11f.    "the earth was corrupt in the sight of God"  
             "the earth was full of violence"  
             "all flesh had corrupted its way upon earth".

Up to this point the narrator has "simply described the fact of rapidly spreading sin, without giving any particular evaluation", but "now we hear a reflection and opinion about it",<sup>4b</sup> and that from the viewpoint of God himself.<sup>26</sup> The wickedness of mankind is plainly no sin of ignorance or omission; the cause of the Flood is the intentional moral evil of humanity. "A more emphatic statement of the wickedness of the human heart is hardly conceivable";<sup>27</sup> the words 'every', 'only', 'continually' in 6: 5 reinforce the pessimistic outlook of the author.

In verses 11f. a new category is employed to describe the sin. Here it is seen as a 'corruption' of the original creation. The wording of 6: 12 "And God saw the earth, and behold it was corrupt", clearly seems designed to remind the reader of 1: 31 "And God saw all that he had made, and behold it was very good".<sup>28a</sup> But two further phrases also describe more closely the nature of the sin.

First, it was 'violence' (*hamas*) 6: 11, 13), which is virtually a technical term for the oppression of the weak by the strong. It is "the violent breach of a just order";<sup>5b</sup> even when used of man's inhumanity to man, it usually has religious overtones, for it is the violation of an order laid down or guaranteed by God.<sup>29</sup> It is precisely the sin of Lamech,<sup>30</sup> who not only takes his own vengeance by slaying a man (or perhaps rather, a mere boy)<sup>31</sup> for simply wounding him, but also in so doing explicitly defies the divine order relating to vengeance with his words: "If Cain is avenged sevenfold [the divine order, 4: 15], truly Lamech seventy-sevenfold [a violation of the divine order]" (4: 24). It is also the sin of Cain, for the blood of his wronged brother utters the cry of the oppressed (*sa'aq*) to the judge<sup>32</sup> from the ground where it has been spilled. The divine order that has been violated by Cain is that "blood and life belong to God alone; wherever a man commits murder he attacks God's very own right of possession".<sup>4c</sup> This is something Cain is expected to know, though no explicit word has come from God; "man as man knows these boundaries".<sup>1b</sup> What 6: 11 has said of the generation of the Flood with a word ('violence'), 4: 8ff., 23f. has spelled out with narratives.

Secondly, the sin of Noah's generation is said to be that "all flesh had corrupted its way upon earth" (6: 12). The 'way' is not God's way (though the Hebrew could bear that meaning), but the way of flesh, that is, the natural order of existence of living creatures, the "manner of life and conduct prescribed"<sup>30</sup> to them. What is involved here is not essentially a deformation of original purity but the transgression of natural bounds; these are sins 'against nature' (Gk. *para physin*, Rom. 1: 26, though those particular sins are not necessarily implied).<sup>33</sup> Furthermore,

this transgression of limits is not confined to man; as is usual, the phrase 'all flesh' includes the animals as well as man.<sup>34</sup> Their transgression has been, as becomes clear from 9: 5, that they have forsaken their created status as man's subjects (1: 28) and as vegetarians (1: 30), and have become carnivores, preying even upon man. As so frequently in the Old Testament, man's sinfulness has blighted animals and earth;<sup>35</sup> here too they are involved in man's 'corruption' before they are overwhelmed with him in the Deluge. Although of course the emphasis lies primarily upon human sin, it is worth observing that 6: 12 depicts a world where natural laws are broken by all levels of created beings, and where consequently the ordering work of creation or cosmos has been dissolved.

In this respect the sin of the generation of the Flood climaxes the history of human sin. The first sin is essentially a revolt against the order of creation, a rejection of the life of obedience natural to a created being. The sin of Adam and Eve is not some descent to the bestial,<sup>36</sup> but an attempt at self-divinisation ("You shall be as gods", 3: 5), an assumption of autonomous existence which belongs to God alone. As such it is an unnatural crime; it is man in rebellion against manhood; it is a refusal to live within the God-given order. In Noah's time also, what is happening according to 6: 12 is that "man removes all limits in an attempt to achieve autonomous existence".<sup>37</sup> Lamech's assumption of the right of revenge (4: 23f.), which properly belongs to God (Deut. 32: 35; cf. Rom. 12: 19), and his breaking the bounds of a 'natural' revenge, a life for a life, to say nothing of the explicit divine order of revenge (4: 15), form a partial analogy;<sup>38</sup> but perhaps the most significant parallel to the sin of 'breaking the bounds', as well as to the twin sin of 'violence', is the sin of the 'sons of God' (6: 1-4), a subject which we shall not discuss here.

### III. *The Judgment*

We turn now to consider the nature of the judgment that is the Flood. It is noteworthy throughout the primeval history how the punishment for sin is not seen as some penalty chosen

at random by God, but as an almost natural consequence or out-working of sin. There is an inner connection between the sin and the punishment, and between the punishment and the sinner. This understanding of divine punishment is very plain in the narrative of chapter 3. In the first place there is the principle that the punishment fits the crime. The punishment for the crime of attempting to be independent of God is — to be independent of God. The expulsion from the garden is not some act of petulance on God's part as if He were to say, "Since you have not obeyed me, you cannot stay in my garden." It means rather: "Since you have chosen to be your own god, deciding for yourself what is good and evil, go and learn to look after yourselves in a world where the decisions have not already been made for you, and where you will have to make them for yourselves and pay the price if you make mistakes." In the second place there is the principle that the punishment fits, not only the crime, but the criminal. Each of the three protagonists of chapter 3 is treated differently. The snake is fated to be a mere reptile, no longer "the most subtle of all the animals that Yahweh God had made" (3: 1); his assaults on man, unnatural assaults since man should be his master, will ultimately fail (3: 15). The woman's punishment "struck at the deepest root of her being as wife and mother", while the man's "strikes at the innermost nerve of his life: his work, his activity, and provision for sustenance".<sup>4d</sup> The punishment of Cain, the man-slayer, is, appropriately, to be driven out from the society of men (4: 14); the punishment of the tower-builders that sought a name was to gain a name, but one that marked their disgrace and not their glory (11: 9).

This same understanding of punishment is discernible also in the Flood narrative. Most obvious is the use of the verb 'to destroy' (*hihsit*): in 6: 11f. the earth has 'destroyed' itself (RSV 'was corrupt'), God sees that it is 'destroyed' because all flesh has 'destroyed' its way; thereupon God determines (6: 13) that He will 'destroy' the earth. "The retribution will be measure for measure".<sup>28b</sup> Indeed, "what God decided to 'destroy' (13) had been virtually self-destroyed already".<sup>39</sup>

Less obvious, but perhaps even more fundamental, is the

connection between the 'breaking the bounds' by the generation of the Flood and the breaking down of the divinely established natural order of the world by the Flood. Creation as represented in Genesis 1 has been largely a matter of separation and distinction: <sup>40</sup> light is separated from darkness (1: 4), the waters from the dry land (1: 9), day from night (1: 14). All plants and animals are created according to distinct categories, each "after its kind" (1: 11, 21, 24f.). There is a fundamental concept of the binary nature of created existence: there is heaven and earth, light and darkness, day and night, upper and lower waters, sea and land, plants and trees, sun and moon, fish and birds, animals and man, male and female, sacred time and non-sacred time.

The Flood, however, represents a reversal of these principles of order. Joseph Blenkinsopp has exactly described the significance of the Flood as 'uncreation': "The world in which order first arose out of a primeval watery chaos is now reduced to the watery chaos out of which it arose — chaos-come-again".<sup>37</sup> If Genesis 1 pictures the establishing of a firmament to keep the heavenly waters from falling upon the earth except in properly regulated measure, 7: 11 depicts the "windows of heaven" as opening to annihilate this primal distinction. Likewise the distinction between the lower waters and the earth established in 1: 9 is obliterated by the breaking forth through the earth of the "fountains of the great deep" (7: 11). Significantly too "the destruction takes place in much the same order as creation":<sup>37</sup> the water first covers the earth and its high mountains, then birds, cattle, beasts, all swarming creatures, and men (7: 19ff.).<sup>41</sup>

What this *bouleversement* means in our present context is that once again the punishment fits the crime. "As man removes all limits in an attempt to achieve autonomous existence, God removes the limits placed at the beginning. The world will just not bear this limitless kind of life — it's not that kind of world."<sup>37</sup>

Yet another aspect of the Flood underlines the theme of 'uncreation'. Very obviously, the Flood is punishment by death. Though from the beginning death has been threatened as the punishment for disobedience to divine commands (2: 17), and a

movement toward death has already occurred in the limitation of the life-span (6: 4), death has not yet been used by God as a punishment. Now in Genesis 1 the creation of man has been the climax of creation; similarly too in Genesis 2 where creation has been principally a matter of the creation of man (2: 4-8), the creation of heaven and earth forming a mere subordinate clause in the narrative of the creation of man. If man is to be 'wiped out' (6: 7) by the Flood, the purpose of the creation has been undone. Yet man was made for obedient communion with God; if now "every inclination of the thoughts of man's heart" is "only evil continually" (6: 5), man has already himself stultified the purpose of creation, and death in the Flood is no more than the outworking of man's behaviour.

We may thus distinguish two perspectives on the Flood as an act of 'uncreation'. As we have seen, according to that perspective which views reality as an ordered pattern, the final effect of sin as it comes to a climax in the Flood is a confusion of the things that differ. The other perspective is to be found primarily in the narrative portions of Genesis 1-11; here a binary structure of reality is also visible, but the effect of sin in the narratives is not to confound what ought to be distinct, but rather to divide what ought to belong together. Thus in Genesis 3 it is the elemental unions that are broken by sin: man and God, man and woman, man and the soil, man and the animals. The relationship of harmony between each of these pairs has been disrupted. The communion between God and Adam has become the legal relationship of accuser and defendant (3: 9ff.); the relationship of man and woman, 'one flesh', has soured into mutual recrimination (3: 12); the bond of man ('*adam*') with the soil ('*adamah*') from which he was built has been supplanted by "an alienation that expresses itself in a silent, dogged struggle between man and soil" (3: 17ff.);<sup>4d</sup> the harmonious relationship of man with beast in which man is the acknowledged master (2: 19ff.) has become a perpetual struggle of intransigent foes (3: 15). In Genesis 4 we have another vivid illustration of the outworking of sin as viewed from this perspective: two brothers, who ought to enjoy fraternal relations, become enemies, and the ultimate act of enmity, murder, results. What now has happened in the Flood is that the most

intimate relationship of all — of man with his breath — has been broken. At his creation man is made of “dust from the ground”; then when God breathes into his nostrils the “breath of life” man becomes a living being (2: 7). At the Flood, when Yahweh determines He will “blot out man whom I have created” (6: 7), “all in whose nostrils was the breath of the spirit of life” died. The very constitution of man falls apart: at the first, body plus breath made a living man, but now that last union is broken, and creation is undone.<sup>42</sup>

#### IV. *The Mitigation*

The mitigation of the punishment of the Flood means that the ‘uncreation’ which God has worked with the Flood is not final; creation has not been permanently undone. Old unities of the natural world are restored (8: 22), and the old ordinances of creation are renewed (9: 1-7). But all is not as it was before: this is no *restitutio in integrum*, no simple return to the original state of perfection. The sin of the generation of the Flood has left a mark which has not been wiped out by the Flood. Human nature has not changed (8: 21), animal nature has not changed (9: 5). The creation ordinances remain, for this is still God’s world, but they do not remain unchanged, for this is a world where sin has become permanent.

Again man is commanded to multiply and fill the earth (9: 1; cf. 1: 28), and mankind has “not propagated itself over the earth again simply from its own initiative”,<sup>4e</sup> but the command to subdue the earth and have dominion over the animals (1: 28) has taken on a brutal aspect, which is underlined by the fact that it is expressed from the point of view of the subjective attitude of the animals themselves. They will go “in fear and dread” of man, no longer under his responsible rulership (cf. also 2: 19f.). Violence is now part of the natural order: every living thing is delivered into man’s power (9: 2); but it is not to be unrestrained violence. Even in violence there is a limit. Man may take life,



but he may not eat blood (9: 4), which is the sign of life. "Even when man slaughters and kills, he is to know that he is touching something, which, because it is life, is in a special manner God's property; and as a sign of this he is to keep his hands off the blood."<sup>43</sup>

Still also, even after the Flood, man is made as the image of God<sup>44</sup> and still in the midst of the violence of man against man which, it is taken for granted, will often enough reach the extreme of murder (9: 5), God retains his proprietorial rights in man. As God's image man was made, and an assault on the man who is God's image is an assault on God himself. The doctrine of man as the image of God had first been couched in terms of man's authority over the animals and the earth (1: 26ff.); in this world of violence where God's image is not by nature obeyed but rather assaulted, the doctrine takes on a more sombre colouring: it concerns now the authority of man over man. Not only the murdered man but also the avenger and the executioner is made in the image of God: "Whoever sheds the blood of man, by man shall his blood be shed, for God made man [the executioner also] in his own image" (9: 6).

Unnecessarily, it seems at first sight, this divine speech announcing new creation concludes (9: 7) with the words with which it began. But not really unnecessarily, for these words, "Be fruitful and multiply, bring forth abundantly on the earth and multiply in it", signify that "primarily . . . God's word to this new aeon is a word of blessing and grace".<sup>45</sup> That the divine blessing, first and last, should be signed over a world where "the imagination of man's heart is evil from his youth" — and not only over a world which God could pronounce "very good" (1: 31) — is a more striking display of the divine mercy than the salvation of Noah. A similar thought is already enshrined in 7: 21f, where in spite of human evil God vows never again to curse the earth as he has done in the Flood.

Just because the world now stands under the divine mercy, the Flood is unrepeatable. It is not that the reason for the Flood no longer exists, as if the wickedness of the generation

of the Flood was greater than that of any subsequent generation. Mankind after the Flood is not different; the Flood has not improved man.<sup>6c</sup> Genesis 8: 21 does not mean that the reason why the Flood came has become the reason why there will be no more floods. Rather, "in spite of the motivation for a flood remaining present, God binds himself to take another course of action".<sup>45</sup> Man's imagination is still sinful, and God is still grieved to the heart (? and sorry — in a way — that he has made man). If men "were to be dealt with according to their deserts, there would be a necessity for a daily deluge".<sup>46</sup>

Human life therefore is not an absolutely assured fact of reality; it exists simply by God's good favour. "Man's existence . . . lies between the poles of creation and uncreation, subject to God's providence and judgment".<sup>37</sup> But that good favour, according to the Flood narrative, is not a matter for conjecture or pleading; it is assured in the sign of the rainbow, God's bow of war now laid aside (9: 13-16). Once, in primeval time, God has experimented with uncreation, and has put it behind Him forever. Even though we may expect a dissolution through fire of the earth that now is, that will be no uncreation, but the prelude to a new heavens and a new earth (2 Pet. 3: 7-13). In spite of human sin and violence, God has committed himself to His world; the unconditional covenant of the rainbow, by which He binds only Himself, is sign of that. The story of the Flood is therefore an affirmation of the story of creation, and speaks ultimately not of divine punishment but of God's faithfulness to the works of His hands.

#### REFERENCES AND NOTES

1. Cf. C. Westermann, *Forschung am Alten Testament*, München, 1964, (a) pp. 53f; (b) p. 55.
2. Cf. R. Rendtorff, *Kerygma und Dogma*, 1961, 7, 69-78.
3. Cf. W. M. Clark, *Zeitschrift für die alttestamentliche Wissenschaft*, 1971, 83, 184-211.
4. G. von Rad, *Genesis*, Eng. trans., 1961. (a) esp. 148f; (b) p. 113; (c) p. 102; (d) p. 91; (e) p. 127; (f) p. 128; (g) p. 129.
5. G. von Rad, *Theology of the Old Testament*, 1962, vol. i, (a) 154f; (b) 157, n. 34.
6. H. Gunkel, *Genesis*, Göttingen, 1964 (reprint of 3rd ed., 1910). (a) p. 1; (b) p. 141; (c) p. 60.

7. J. Skinner, *A Critical and Exegetical Commentary on Genesis*, Edinburgh, 1930. (a) Gen. 2; (b) pp. 159f.
8. See C. Kluckhohn, *Daedalus*, 1959, (Spring), 268–79 (271f).
9. *Gilgamesh* XI. 14, tr. J. V. Kinnier Wilson, in *Documents from Old Testament Times* (= *DOTT*), ed. D. Winton Thomas, 1958, p. 20.
10. *Ancient Near Eastern Texts* (= *ANET*), ed. J. B. Pritchard, p. 93.
11. *Gilgamesh* XI. 178–185; *DOTT*, 23; *ANET*, 95.
12. The 'evil' spoken by the mother-goddess Ishtar in the assembly of the gods (*Gilgamesh* XI. 118–121) seems in the context to be simply her agreement to the divine plans for the Deluge. It is remarkable, however, that the author of the epic feels himself to be more moral than the gods — a quite Euripidean attitude which deserves further consideration (cf. Fisher<sup>17</sup>).
- 12a. *Gilgamesh* XI. 7 *DOTT*, 20; *ANET*, 93.
13. Similarly A. R. Millard, *Tyndale Bulletin*, 1967, 18, 3–18 (11f).
14. The major portion of this text has recently been reconstructed and published by W. G. Lambert and A. R. Millard, *Atrahasis: the Babylonian Story of the Flood*, with M. Civil, *The Sumerian Flood Story*, (Oxford, 1969). (a) I, 352–359; p. 67; (b) I, 37–46; p. 45; (c) pp. 138–145; (d) pp. 14, 17f.
15. So G. Pettinato, *Orientalia*, 1968, 37, (a) 165–200; (b) 169f.
16. W. M. Clark, *Zeitschrift für die alttestamentliche Wissenschaft*, 83, 185.
17. E. Fisher, *Catholic Biblical Quarterly*, 1970, 32, 392–403; (a) 399; (b) 394f.
18. N. M. Sarna, *Understanding Genesis*, N.Y., 1966; (a) p. 50; (b) p. 53.
19. E. A. Speiser in *ANET*, 104, described the Atrahasis epic as "a large epic cycle dealing with man's sins and his consequent punishment through plagues and the deluge".
20. W. L. Morgan, *Biblica*, 1971, 52, (a) pp. 51–61; (b) p. 56; (c) p. 59.
21. The idea that 'noise' was responsible for the Flood does not appear in our fragmentary text of the Sumerian Flood story, *Civil*.<sup>14c</sup> Whether it once did is a disputed question; see <sup>15b</sup> (*pro*), and <sup>14d</sup> (*contra*). Fisher,<sup>17b</sup> goes further than consideration of the word 'noise' in his quest for the theological theme of the Sumerian Flood story, and finds in it "a searching for justice on the part of the gods, a theological affirmation that the mercy of some gods will always temper the caprice of others . . . Hence we have . . . the beginnings of a dissatisfaction with the crudities of polytheism, a conscious search for an explicitly ethical theism."
  - 21a. I, 128–131.
  22. In the case of this Maori myth, it is possible that the concept of punishment is derived from the Biblical story as told by missionaries. Enid R. Peschel, *Folklore*, 1971, 82, 116–23 (122), argues that the "Biblical structure is simply adapted to the Maori structure". The same may have happened in the case of other Flood stories.
  23. T. H. Gaster, *Myth, Legend, and Custom in the Old Testament*, 1969, (a) pp., 93, 96, 104, 109. For myths where the Flood is caused by the disturbance of a god's sleep, see pp. 109, 119; (b) pp. 82–128.
  24. J. G. Frazer, *Folklore in the Old Testament*, 1918, vol. i, 146–332. 82–128.
  25. However, Kluckhohn<sup>8</sup> claims that the Flood theme is "usually, but not always, treated as a punishment", in the 34 culture areas in which he has identified Flood myths. He does not however specify what he understands by "punishment".

26. Cf. R. A. F. MacKenzie, *Catholic Biblical Quarterly*, 1955, 17, 277-86; R. Lapointe, *Catholic Biblical Quarterly*, 1970, 32, 161-81, observing that reason, motive, and decision are the characteristic elements (p. 180).
27. T. C. Vriezen, *An Outline of Old Testament Theology*, 2nd ed., 1970, p., 415.
28. U. Cassuto, *Commentary on Genesis* (Eng. trans., Jerusalem, 1961), vol. ii, (a), p. 53, noting also the use of the term 'corrupt' or 'spoil' of the potter's work (Jer. 18: 3f); (b) p. 57.
29. H. J. Stoebe, in E. Jenni and C. Westermann, *Theologisches Handwörterbuch zum Alten Testament*, München, 1971, vol. i, p. 583b.
30. Dillman (*Genesis critically and exegetically expounded* (Eng. trans., Edinburgh, 1897), vol. i, p., 268.
31. As the word *yeled* means literally; see P. D. Miller, *Journal of Biblical Literature*, 1966, 85, 477f.
32. "What ancient German law understands by *Zeterruf*, the *vox oppressorum*, the appeal to legal protection (Gen. 18. 20; Deut. 22. 24, 27; II Kings 8. 3; Job 16. 18f.)" Von Rad.<sup>4c</sup>
33. All the same, it is curious that the only other catastrophe narrative in Genesis (ch. 19, Sodom) features sins 'against nature'. Genesis 6 and 19 are mentioned together in 2 Peter 2: 5f. as examples of a sin-punishment-deliverance theme.
34. Dillmann<sup>30</sup>, Gunkel<sup>6b</sup>, Skinner<sup>7b</sup>. The phrase occurs 13 times in the Flood narrative, 4 times in reference to animals apart from man (6: 19; 7: 15, 16; 8: 17).
35. Cf. Hosea 4: 2f.; Isaiah 1: 2-7; Jeremiah 23: 10; Romans 8: 19ff.
36. I believe I owe the point to R. Niebuhr's *The Nature and Destiny of Man* (New York, 1945), though I cannot locate the passage.
37. J. Blenkinsopp, in J. Blenkinsopp *et al.*, *The Pentateuch*, 1971, pp. 46, 47.
38. S. Gevirtz has even seen in the irregular parallelisms of Lamech's poetry a token of his pretentious breaking of all bounds! *Patterns in the Early Poetry of Israel*, Chicago, 1963, p. 25.
39. D. Kidner, *Genesis*, 1967, p. 87.
40. See P. Beauchamp, *Creation et séparation. Etude exegetique du chapitre premier de la Genese*, Paris, 1969.
41. For a parallel reversal of creation, see Job 3: 3-13, and cf. M. Fishbane, *Vetus Testamentum*, 1971, 21, 157-67.
42. The Babylonian parallel to the Flood as uncreation is to be found in *Gilgamesh* XI. 133 (*DOTT*, 22; *ANET*, 94b), where when the rain has ceased, "all of mankind had returned to clay", the substance of which man had been made according to the Atrahasis epic and the Babylonian creation epic.
43. Von Rad<sup>4f</sup>, Fisher<sup>17b</sup> has made the interesting suggestion that the right to kill animals, implicitly the prerogative of God, functions in the Hebrew story as a substitute for the gift of immortality bestowed on the hero of the Flood in the Sumerian and Babylonian versions.
44. On the subject, see further D. J. A. Clines, "The Image of God in Man", *Tyndale Bulletin*, 1967, 18, 53-103.
45. Clark, *Zeitschrift für die alttestamentliche Wissenschaft*, 83, 206, following Rendtorff, *Kerygma und Dogma*, 7, 73.
46. J. Calvin, *A Commentary on Genesis* (Eng. Trans., 1847), 1965 ptg., p. 284.

We apologise to Dr. Clines for the very considerable abridgment made in these References and Notes and particularly for the omission of the titles of articles.

COLIN RUSSELL

## Noah's Flood :

### 2 : Noah and the Neptunists

**A vastly over-simplistic view of the history of geology pictures a group of old-time Christian Neptunists fighting a losing battle with free-thinking Plutonists. Dr. Russell, Reader in the History of Science and Technology at the Open University, tells us what in fact happened and helps us to see the story in perspective.**

#### *NOAH AND THE NEPTUNISTS*

In introducing my subject I take it that my brief is to attempt to put the controversies concerning the Flood into some kind of historical perspective. I make no claim to special geological expertise and shall not carry into the fray the weapons of the modern earth scientist. But in so far as I find the history of scientific themes a topic of perpetual fascination, I am glad to share in a survey of the past in the hope that it may perhaps throw some light upon the problems of the present.

We are, of course, concerned with one of the famous interactions between science and theology and one which presented a series of changing aspects in quite a short period of time. Our first task will be to sketch the main course of events leading up to the general adoption of a uniformitarian outlook. We shall try to identify the underlying causes of these events and to see in what ways theological and other non-scientific factors played a significant part in the developments.

### 1. *Changing attitudes to the deluge*

For many centuries the Genesis story of the Flood, reinforced by numerous references elsewhere in the Bible, has exerted a powerful grip on man's imagination. Doubtless it will still continue to do so. But the scientific implications of the narrative only become plain when attempts are made to correlate features of the story with natural phenomena still observable today — the ways in which this was done led to a succession of different attitudes partly determined by the prevailing climate of scientific opinion and partly contributing to that climate.

In trying to delineate the succession of views we must emphasise two other preliminary points. First, the ideas did not follow one another in simple sequence; frequently there was overlap and generally there was controversy. Secondly, it is well to be aware of the dangers implicit in an approach like that of A. D. White in his *Warfare of Science with Theology*, first published in 1895 and recently reprinted. This contains much useful source-material but labours under the almost total inability to see events in any other light than that of the eventual rout of theology at the hands of an all-powerful science. Fortunately such Whiggish historiography has yielded ground in recent years to a more temperate and balanced approach in which the issues are seen to be far more complex than White would allow and in which the "victory of science" is seen in somewhat less simplistic terms.

What, then, was the pattern of events we have to describe?

#### 1. *The Flood as a cardinal point in the geological time scale*

Although sporadic efforts had been made in earlier ages to relate the Flood to observed natural phenomena (e.g. Tertullian held it responsible for fossil remains), the issue was not seriously joined until the late eighteenth century.

Perhaps it is as well to begin with Buffon. Having conducted

a series of experiments in which spheres of different materials and different sizes were allowed to cool, he calculated how long it must have taken for the planets in our solar system to reach habitable temperatures from an (assumed) initial white heat. He concluded our earth to be nearly 75,000 years old. Earlier writers (such as Burnet) had suggested the "days" of Genesis might be really long epochs, and Buffon wove their ideas into his own scheme of 7 long geological eras. In his *Epochs of Nature* (1778) he became the first to give clear articulation to the doctrine that the earth had its own history. Of course his figures by modern standards are absurdly out, but he had made his point.

This new historicist element in science demanded a time-scale and a time-scale needs points of reference. The most prominent of these was very soon the Deluge of Noah. We shall see some of the reasons for this in a moment, but as the Creation was pushed back ever farther into time the Flood became the focus of attention. After all *this* had taken place in historic time, and evidence for its occurrence (once you knew what to look for) was accumulating on all sides — As Richard Kirwan wrote in 1799:

Shells known to belong to shores under climates very distant from each other are in sundry places found mixed promiscuously with each other; *one sort* of them, therefore, must have been transported by an inundation; the promiscuous mixture can be accounted for on no other supposition. These appear to me the most unequivocal geologic proofs of a general deluge.

## 2. *The Flood as a major geological agent*

Attention having been focussed upon the Flood as a great crisis in history, it is not surprising that further memorials to it should be sought in the rocks. Now that geological change was becoming an acceptable assumption the Flood offered a ready-made explanation. But it did not happen all at once, and it is necessary to tread warily in retracing our steps.

The belief in the potent geological action of water became

known, not unreasonably, as Neptunism. By far the most influential of the early Neptunists was A. G. Werner, a professor of mineralogy in Saxony. Many of the rocks in this area are indeed sedimentary and their formation could be credibly interpreted in Wernerian terms.

Werner postulated an enormous mass of water covering the whole earth and containing in solution materials which would crystallise out as granite and other primitive rocks. At later stages chemical precipitation would occur, the water level would drop, land would appear and further alluvial strata would be deposited. During these events life had concurrently appeared, but volcanoes were quite recent (coal-fired, apparently!).

There were, of course, considerable difficulties attached to such views even at that time. How could one explain the steep inclinations of some strata? What about the cases where the sequence was inverted? Where did all the water go? Werner faced many of these problems but not all his answers were convincing. But his influence on geological thinking was enormous. His own literary output was small, but his ideas were rapidly disseminated through his students and disciples. Many have felt that his Neptunist philosophy exerted a powerful retarding action on geological progress. Others, however, acknowledge the greater importance of his teaching methods with the emphasis on systematic observations and practical training. By all accounts his students thought the world of him, and he did give to mineralogy one of its first major paradigms.

Having thus spoken about Werner it is important to dispel several misconceptions. He was not the first to think in Neptunist terms (one can cite de Maillet's *Telliamed* of 1748, to give but one example), nor, so far as I can tell, was he obsessed with the Deluge of Noah. But he was concerned with the primal geologic agency of water and he was the first to found an influential school to propagate (and extrapolate) his views. As d'Aubruissou observed (1819):

One can say of Werner what has been said of Linnaeus, that



his disciples have covered the earth and that from one pole to another nature has been interrogated in the name of one individual man.<sup>2</sup>

During the early years of the nineteenth century there must have been many who identified Werner's universal ocean with the Flood of Noah. Clear cases are hard to find, but one of Werner's most redoubtable champions, the Scot, Robert Jameson, felt it necessary to give an explicit denial to such an assumption. The point is that by now (1808) the whole Neptunist position was under attack and many geologists were relegating the universal ocean to the realms of mythology.

I refer, of course, to the rise of the Vulcanist (or Plutonist) viewpoint associated specially with the name of James Hutton. His *Theory of the Earth* (1795) was in many respects the foundation-stone of modern geology. For our purposes we may define the Huttonians' attitude to the Flood as a geological non-event.

### 3. *The Flood as a geological non-event*

James Hutton (1726 – 1797) was to be the man who contributed most to the downfall of the Neptunists. Oddly enough, he says very little about them, but his alternative system of geology was incompatible with much Neptunist thinking and ultimately supplanted it altogether.

Like Werner, Hutton tended to be a man of one city though his travels were more extensive and his observations more general. He was born in Edinburgh and there he returned for much of his working-life. Now it happens that Edinburgh (unlike Freiburg) is built on volcanic, not sedimentary rocks; Hutton's house was hard by Arthur's Seat! Whether for this reason or not, Hutton became convinced that the basic geological agency was not water but fire. His shrine was that of Vulcan not Neptune! There were doubtless other factors also, which predisposed him to a consideration of fire and we shall return to these later.

Hutton did not ignore the action of water. He believed that there were 2 kinds of rocks, one of which (igneous) had a volcanic origin, while the other (aqueous) was laid down by water. They had reached their present form, however, by the combined actions of high temperature and pressures. In this way Hutton accounted for such phenomena as the extrusion of granite into limestone fissures.

Hutton had thus the best of both worlds, and it is perhaps unfair of posterity to label him a Vulcanist. But his commitment to a constant series of interactions involving water and heat led him to a momentous conclusion about his time-scale. Unlike the Neptunists, he regarded the whole earth as being in a state of dynamism and thus requiring immense time. In his own words —

We have now got to the end of our reasoning; we have no data further to conclude immediately from that which actually is. But we have got enough; we have the satisfaction to find, that in nature there is wisdom, system, and consistency. For having, in the natural history of this earth, seen a succession of worlds, we may from this conclude that there is a system in nature; in like manner as, from seeing revolutions of the planets, it is concluded that there is a system by which they are intended to continue those revolutions. But if the succession of worlds is established in the system of nature, it is in vain to look for any thing higher in the origin of the earth. The result, therefore, of our present enquiry, is, that we find no vestige of a beginning — no prospect of an end.<sup>3</sup>

Not only did this attitude eliminate Noah's Flood as a cardinal point in a geological time-scale, it also raised the whole question as to whether such a time-scale could be determined. Hutton argued further that "general deluges form no part of the theory of the earth, for the purpose of this earth is evidently to maintain vegetable and animal life, not to destroy them".

Hutton's own writing came in for severe handling from his opponents, many of whom identified the Wernerian position with Biblical truth. But in 1802 Hutton's opinions were rescued from the oblivion into which they were in danger of falling on account of his own turgid and repetitive style and the diatribes of his

opponents. In that year the Edinburgh geologist John Playfair published his own *Illustrations of the Huttonian Theory*. Although dissenting from Hutton's denial of a Flood, Playfair was anxious to exonerate him from a charge of impiety:

The Author of nature has not given laws to the universe, which, like the institutions of men, carry in themselves the elements of their own destruction. He has not permitted, in his works, any symptom of infancy or of old age, or any sign by which we may estimate either their future or their past duration. He may put an end, as he no doubt gave a beginning, to the present system, at some determinate period; but we may safely conclude, that this great *catastrophe* will not be brought about by any of the laws now existing, and that it is not indicated by any thing which we perceive.

To assert, therefore, that, in the economy of the world, we see no mark, either of a beginning or an end, is very different from affirming, that the world had no beginning, and will have no end. The first is a conclusion justified by common sense, as well as sound philosophy; while the second is a presumptuous and unwarrantable assertion, for which no reason from experience or analogy can ever be assigned. Dr. Hutton might, therefore, justly complain of the uncandid criticism, which, by substituting the one of these assertions for the other, endeavoured to load his theory with the reproach of atheism and impiety.<sup>4</sup>

Playfair's lucid exposition was called forth by a desire to defend the reputation of Hutton (who died in 1797) from the mounting hostility of the Neptunists. Of these Kirwan was probably the most outspoken representative, but Jameson, de Luc and others were not slow to join battle. As Gillispie writes:

The discussion did, in fact, produce an astonishing heat, most of which was given off by the advocates of water . . . The partisans of fire were much less feverish.<sup>5</sup>

The opposition was very heterogeneous. Some fought for one motive, some for another. Theology and science were hopelessly confused together. But the opponents were united in their defence of the Flood as a major historical event and from their fulminations two other viewpoints emerged.

#### 4. *The Flood as the ultimate catastrophe*

Richard Kirwan wrote as follows:

Having, I flatter myself, established, in the preceding Essay, the credit due to Moses on mere philosophic grounds and abstracting from all theological considerations, I shall not scruple taking him as a guide as far as his testimony reaches, in tracing the circumstances of the most horrible catastrophe to which the human and all animal species, and even the terraqueous globe itself, had at any period since its origin been exposed.<sup>6</sup>

Setting aside for a moment his theological reasoning, we can see that Kirwan's Flood was *universal* and *catastrophic*. It was also the "most horrible" of all such events. But it is interesting also as an anticipation of the much more influential ideas of the French anatomist Georges Cuvier.

During the Neptunist-Vulcanist dispute the arguments had been ostensibly about mineralogy. Now, in the early nineteenth century, Cuvier was to lead a return to the study of palæontology. He was deeply impressed by his discovery that fossil-bearing strata near Paris showed real discontinuities and found it impossible to reconcile these findings with the uniformitarian progression of Hutton.

He became the foremost spokesman of the geological doctrine of catastrophes. Accepting Hutton's immense time-scale he postulated an almost rhythmic series of catastrophic upheavals intermitting with periods of relative quiescence. The last of these mighty events was the Flood of Noah.

If there is any circumstance thoroughly established in geology, it is that the crust of our globe has been subjected to a great and sudden revolution, the epoch of which cannot be dated much further back than five or six thousand years ago . . . and consequently, that the human race has only resumed a progressive state of improvement since that epoch, by forming established societies, raising monuments, collecting natural facts, and constructing systems of science and learning.<sup>7</sup>

By 1820 most popularly held geological views in Britain were of the "catastrophic" school. No little credit for this remarkable fact lies with the Oxford mineralogist, William Buckland. Deliberately intending to reconcile geology with the Mosaic record, in 1819 he began a study on "Evidences of a Recent Deluge". Two years later a discovery at Kirkdale, Yorkshire, of a large cavern with a vast number of animal bones brought Buckland post-haste to investigate. His conclusions were published in 1823 as:

*Reliquiae Diluvianae; or, Observations on the Organic Remains Contained in Caves, Fissures, and Diluvial Gravel, and on Other Geological Phenomena, Attesting the Action of an Universal Deluge.*

With immense confidence he asserted:

The grand fact of an universal deluge at no very remote period is proved on grounds so decisive and incontrovertible, that had we never heard of such an event from Scripture or any other authority, Geology of itself must have called in the assistance of some such catastrophe to explain the phenomena of diluvial action which are universally presented to us, and which are unintelligible without recourse to a deluge exerting its ravages at a period not more ancient than that announced in the Book of Genesis.<sup>8</sup>

At Cambridge, Adam Sedgwick, like many others defected from Werner to Hutton. But he agreed with Buckland on that universal catastrophe, the Deluge.

The sacred records tell us — that a few thousand years ago "the fountains of the great deep were broken up" — and that the earth's surface was submerged by the waters of a general deluge; and the investigations of geology tend to prove that the accumulations of alluvial matter have not been going on many thousand years; and that they were preceded by a great catastrophe which has left traces of its operation in the *diluvial detritus* which is spread out over all the strata of the earth.<sup>9</sup>

However, as Leroy Page has recently pointed out, it tended to be a clerical minority of geologists (including Conybeare and Kidd) who made this positive identification. For the most part

the opinion was gaining strength that the Flood was essentially a non-violent affair: not a convulsion but an inundation.

### 5. *The Flood as an extensive inundation*

The possibility that Noah's flood, although covering most if not all of the earth, had been relatively non-violent was being mooted in the eighteenth century. Partly because it avoided a collision between science and faith, and partly on simply exegetical grounds, numerous writers were advocating an inundation theory. This was the position of Chalmers, Playfair and others including the Rev. Thomas Whitaker (1819) who wrote:

The annihilation of the human race, with a few exceptions, was the object of God, and for that purpose an inundation, without these supposed convulsions, otherwise than as required for producing that inundation, was quite sufficient.<sup>10</sup>

Buckland's *Reliquiae* was critically received by William Fitton on these same grounds. More damaging attacks were made by John Fleming, a Scots Calvinist minister who wrote of the Flood in 1826:

I am not prepared to witness *in nature* any remaining marks of the catastrophe, and I find my respect for the authority of revelation heightened, when I see on the present surface *no memorials* of the event.<sup>11</sup>

### 6. *The Flood as a local phenomenon*

Here again there had been early anticipation. Thus de Luc had been roughly handled by Kirwan on this very issue — that is for suggesting the flood might not have been quite universal. De Luc had supposed that a few islands had escaped to account for the occurrence of marine remains *under* those of land animals (1809). For him, the world was the earth inhabited by man.

This indeed reflected still earlier assertions by Stillingfleet and others.

The "local flood" theory appears to have been espoused by Charles Lyell in his *Principles of Geology* of 1830. He raised the question "whether the deluge of the Scriptures was universal in reference to the whole surface of the globe, or only so with respect to that portion of it which was then inhabited by man". Agreeing with Fleming's views also he said

There are no terms employed [in Genesis] that indicate the impetuous rushing of the waters . . . on the contrary, the olive-branch, brought back by the dove, seems as clear an indication to us that the vegetation was not destroyed, as it was then to Noah that the dry land was about to appear.<sup>12</sup>

These views were, of course, but a small part of Lyell's whole uniformitarian philosophy. Going beyond the actualism of Hutton's alternate activity and rest, he supposed that the present was the key to the past and that nature had *not* been "parsimonious of time and prodigal of violence". It would take us too far from our subject either to explore more deeply into Lyell's own philosophy of science or to assess its importance in history. It is sufficient to say that, in Gillispie's phrase, *The Principles of Geology* "administered the *coup de grâce* to the deluge", — that is, as a major geological agency. Whewell delicately contrived to see in geology "a new lamp along the path to natural theology" without totally abandoning Mosaic science; Buckland wrote his *Bridgewater Treatise* without reference to the Flood; and Sedgwick, then President of the Geological Society, publicly announced his recantation of the "philosophic heresy of diluvialism".

## 2. *Factors behind changing attitudes*

The historian needs to do more than chronicle "mere" facts; he must also say *why* events turned out as they did. What factors determined the changes in scientific attitude?

### 1. *Scientific Factors*

The rôle of *scientific observation* is always crucial, whatever the detractors of science may say, and it was so here. Granted that a subject like geology presents its own particular problems (scattered locations, etc.) it remains true here, as in many less scientific areas, that observations were made without inhibition. Indeed the accumulation of data exerted pressure on Lyell and others to rethink their basic assumptions. We have already seen Werner at work in Saxony, Buckland in England and Hutton in Scotland.

One man requires special mention. That is William Smith — the father of stratigraphy. A surveyor whose work on canals took him all over England, he was the first to realize that each stratum has its own fossil record, and to show how strata in widely separated areas were related.

Geology is not perhaps a subject often associated in popular thought with laboratory *experiment*, yet several experiments had vast importance for the direction matters went. Hutton (1772) extracted salt from zeolite with hydrochloric acid and thus established an alkali present in a stony body. More important, Sir James Hall was able to show in the laboratory that *crystalline* substances can be obtained from melts (as opposed to solutions) — so debunking the argument that hexagonal granite crystals must be aqueous in origin. He also demonstrated the retention of CO<sub>2</sub> by carbonates under very high pressures and temperatures. These observations helped considerably to establish the Huttonian system of dynamics.

Then there is the question of *scientific method*. Just how do you argue from the facts? Bacon's inductive ideals were much admired and a common piece of scientific invective was to assert that your opponent's arguments were no longer truly inductive! That was how Playfair countered the Neptunists, for example.

But the basic issue is that of *scientific tradition*. This determines all else, it would seem. Facts are incorporated or rejected



by the criterion of their *relevance* for the paradigm then in dominance. Buffon, for instance, was under the spell of Newtonian physics and sought to work within that scheme. Hutton, in addition to living on an extinct volcano, had been a close associate and admirer of the Scottish chemist Joseph Black whose work on heat was so important. On the other hand Richard Kirwan was a chemist, and a mineralogist of note. As his chemistry was for a long time conceived within the phlogiston paradigm, so his geology reflected the interests of the "wet chemistry" of his day.

## 2. *Theological Factors*

May I first make 3 simple preliminary points:

1. The argument that theological opposition to any given geological axiom was great seems to have been overstated. Recent scholars have laid responsibility at the door of Lyell whose historiography in *Principles of Geology* now seems to have been deficient.
2. The question as to whether Noah's flood took place was not an issue. The debate centred round the relation between this and empirical findings of geology.
3. Many geologists were clergymen and it is over-simple to depict the church on one side of the fence and science on the other. And most non-clerical geologists possessed some kind of religious belief.

If science was under subjection to non-scientific constraints, Biblical thought was also impressed by external forces. Strongest of all, perhaps was the fear that science would lead to atheism. Thus Kirwan spoke of "various systems of atheism or infidelity" favoured by the darkness of modern geology. De Luc supposed that this was particularly true of an abandonment of a literal interpretation of the Genesis story of the Flood. Over all there lay the shadow of events in France and a fear that Revolution

elsewhere would be fostered by such a climate of religious doubt.

The eighteenth century had other legacies, too. It had witnessed the widespread acceptance of a mechanistic cosmology. The early disastrous essays in "gapmanship", where certain inexplicable astronomical data were ascribed to a God-in-the-gaps, had been replaced by Laplace's *Système du Monde* where God was an unnecessary hypothesis *in Science*. Deism had gained much ground and a God who intervened in history was an unpopular concept. The emphasis on Natural Theology was partly a rear-guard action in response to these pressures. Further, the eighteenth century had been curiously deficient in historical perception (though here we must exclude the Scottish historians and Gibbon). Right at the end of that period a historical consciousness erupted in several different areas at once, and one of them was certainly geology.

How did the geologists respond? At one extreme were those who sought in their science for specific evidence of God's intervention in nature and history, particularly in the Flood. For these interventionists it was all or nothing. John Macculloch asserted in the 1830s, that "God does exert a perpetual government over the physical world at least" and evidence for this must exist in the rocks. Similarly Chalmers opposed Lyell because uniformitarianism asserted that by laws, and laws alone, the framework of our existing economy was put together. "It is thus that they would exclude the agency of a God . . . when this agency seems most palpably and peculiarly called for". The authority of Moses as a scientific commentator was not the only issue at stake. If he were unreliable in this rôle then Christianity itself would be in peril. So thought Joseph Townsend, the author of *The Character of Moses established for Veracity as an Historian . . .* (1813). So it became vitally necessary to establish his credibility. Kirwan, at least, was satisfied. From the "correlations" he found he concluded that the chances of Moses being right as against the opposite were in a ratio of  $10^7$ : 1.

Geology thus began to assume an apologetic role for scriptures. Yet it was also from geology that scripture was being attacked.

So there arose this concern among the faithful to establish *their* geology to refute that of the opposition (a pseudo-science!). As a result, well-meaning Christians were driving themselves into a perilous situation in which scripture was acquiring a determinative role for geology. With hindsight we can see that distaster was inevitable, and, in a measure, so could some of their own number. Indeed, the numerous references to Copernicus and Galileo suggest that some at least had learned their lessons from the past. There were in fact several writers who, like Lyell, explicitly disavowed any connexion between the Bible and science. William Knight wrote scathingly of "De Luc, Kirwan and the other cosmogonists of the present day, who have done all in their power to degrade the Sacred Writings by the arguments they have brought forward in their defence".

But between these two extreme viewpoints there appears to have been a moderate consensus, intolerant of premature identification of geological theories with Scriptural truth yet reluctant to admit *no* connection between the Bible and science. For those of this persuasion the general arguments of natural theology were conclusive. Let the final word be from one of the most influential advocates of this position, Adam Sedgwick:

Geology, like every other science when well interpreted, lends its aid to natural religion. It tells us, out of its own records, that man has been but a few years a dweller on the earth; for the traces of himself and of his works are confined to the last monuments of its history. Independently of every written testimony, we therefore believe that man, with all his powers and appetencies, his marvellous structure and his fitness for the world around him, was called into being within a few thousand years of the days in which we live — not by a transmutation of species, (a theory no better than a phrensed dream), but by a provident contriving power. And thus we at once remove a stumbling block, thrown our way by those who would rid themselves of a prescient First Cause, by trying to resolve all phenomena into a succession of material actions, ascending into an eternity of past time.<sup>13</sup>

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**FREDERICK A. FILBY**

## Noah's Flood : 3 : Approaches to Reconciliation

**This paper, carefully revised by Dr. Filby, late Lecturer in the History of Science, N.E. London Polytechnic, just before his death, deals with such problems as the extent and possible physical causes of the Flood.**

Although there have been, and still are, many different views about the Genesis Flood it is possible to make some general classification of these before looking briefly at the more important.

The explanations given of the Genesis account fall into two major groups: (1) those given by writers who believe that the Biblical record was set down or in some way guided by Divine inspiration, and (2) those given by writers who reject all such conceptions.

In the world of learning today it is probably true to say that the majority would hold that the biblical account is simply an ancient Hebrew myth or legend probably borrowed from the Babylonians and arising from a local event of no historical importance. Believers in the Bible, on the other hand, are by no means surprised at this, seeing that it is but the exact fulfilment of the prophecy made by Peter (II Pet. 3: 3-6) which states that in the last days men will argue that all things have continued as they were from the beginning, such men being willingly ignorant of the destruction of the ancient world by the Flood. So **frightful**

are the full implications of the Bible teaching on the subject that it is little wonder that men should try to lose sight of it by asserting that it is a mere myth or second-hand account of a relatively small local event of no historical or spiritual significance. Believers in the Bible are not then surprised that modern views of the Flood have been fitted into those theories which effectively remove God from the first eleven chapters of Genesis, and hence from the remainder of man's reckoning. If there was . . . and is . . . a Divine judgment . . . men do not want to know.<sup>1</sup>

But let us look more closely at the view that the Genesis account is only a myth derived from the Babylonian story. If it is a myth it is not one of two or three. It is one of literally hundreds and these not merely from the lands of the Middle-East but from almost all lands. This fact is conceded by nearly every one today whether believers in Genesis or not. The most typical comment on this may be put in the words of M. André Parrot in the *Encyclopædia Britannica* (1966, Vol. 9. 456b.):-

It seems that the traditions of the flood fall into two groups to one of which belong the cuneiform (both Sumerian and Akkadian) and Hebrew narratives. These may to some extent have inspired the Greek story of Deucalion and just possibly that of Manu in Sanscrit literature. Behind them would lie a historic flood of catastrophic proportions which inundated the Tigris-Euphrates basin. To the other group belong the rest of the legends which having no necessarily factual basis are to varying degrees mythical or legendary, and are not connected with the first group.

A somewhat similar view was expressed by Sir James Frazer.<sup>2</sup> Many other writers however believe that even for this second group there must have been some actual historical basis and although some may be connected with a local flood the traditions of this have become merged with still more ancient tribal recollections of a yet more ancient flood . . . in fact that of Noah. The subject is too vast for discussion here, the total number of Flood legends being difficult to estimate. Dr. Richard Andree<sup>3</sup> has studied 88 drawn from the five continents and concludes that 62 are not directly descended from the Babylonian or Hebrew accounts. Egerton Sykes<sup>4</sup> lists about 70. In my book on the Flood I have

referred to 33, but I have collected over the years more than 220 world-wide references, not counting 50 in classical Greek and Roman literature or the numerous cases where the Day of the Dead is linked either with the Deluge or with a time around October-November, which is the Biblical date for the commencement of the Flood.<sup>5</sup> My own conviction from these studies is that almost all the stories go back ultimately (whatever they may have picked up in the course of time) to one historical event — the Genesis Flood. Many have been distorted by local colouring and customs, a few have become merged with local flood stories and some have been merged with the story of creation. Again a small number have been influenced by contact with Christian missionaries, or with Jewish or Arab traders. I see no reason to suppose that the Greek story of Deucalion's flood — and there are quite a number of other independent Greek references to the Flood — was derived from the Babylonian.

So far as the many accounts of the Flood are concerned it seems to me quite reasonable to believe that the descendants of Noah multiplied and spread, ultimately to Asia, Europe, Africa and America carrying with them, in ever more distorted form, the story of the Flood. The fact that almost every tribe and people possess a story of Creation and another of a subsequent Flood can surely be explained most simply by a belief that the present human race is a homogeneous community descended from a common stock, just as the Bible account of Noah and his sons informs us. The Biblical account of the Flood probably written down in some primitive form and preserved through Abraham to Moses is clearly the most detailed and accurate historical record.

I shall not deal here with the view that the Bible account is descended from the Sumerian or Akkadian, as I have discussed this previously.<sup>6</sup> Only one further comment might be made. Even M. Parrot concedes that any Flood involved in the Babylonian account must have been of "catastrophic proportions".

We must next consider the extent of the Flood as envisaged by those who do not accept that the Genesis account is either inspired or is even a primary source of information. Many have

held that a flood in the Tigris-Euphrates valley would meet the requirements. That a number of large inundations did occur in that area is a plain fact as is shown by the great silt layer at Ur, and by the various layers at Kish, Erech and Nineveh. It is probably now only of historic interest that Sir Leonard Woolley was convinced that the layer at Ur was due to Noah's Flood, having been deposited, in his view, by water more than 20 feet deep. The fact that other deposits at other centres represent different periods, even centuries apart, seems to show that the area was for some time unstable and liable to extensive flooding.

But others have felt that even apart from the Bible story there is evidence of a much wider flood than a mere marine transgression into the Mesopotamian area. Sir Henry Howorth,<sup>7</sup> it may be remembered, was not a believer in the Bible story. Yet he says:-

A very great cataclysm overwhelmed a large part of the earth's surface. A vast flood buried great numbers of animals under beds of loam and gravel, and there was a sudden change in the climate of regions like Siberia and Alaska.

With this verdict other careful geologists like Prestwich<sup>8</sup> and G. Wright<sup>9</sup> agree and give a large amount of evidence that the events there reflected were not part of the Ice Age but occurred some time later. Now it is probably true that in the three large volumes of Howorth, and in the smaller treatise of Prestwich, and the many chapters of G. Wright, these authors have here and there overstressed some part of their argument, and in a few points modern discoveries may have modified some of their conclusions, but so far as I am aware, the majority of these findings have never been disproved. We have then at least one non-believer in the Bible story (Prestwich and Wright were to some extent believers) providing evidence for his belief in a flood vastly exceeding that of a local affair in Mesopotamia.

In more recent times we have a number of others who (at least in their books) make no reference at all to any biblical Flood yet speak of very widespread floods since the end of the Glacial Period. Prof. King,<sup>10</sup> for example, speaks of the recent inundation



of vast areas of East Asia, leaving the islands and peninsulas such as Borneo and Malaya as relics. Prof. Charlesworth,<sup>11</sup> too, has much to say about movements at the end of the Quaternary Era involving millions of square kilometres of the earth's surface. That these continued into the so-called 'Recent' is certain, and such vast floods as the Flandrian cannot have been far removed in time from the beginning of the Neolithic period. How many such inundations, what area they covered and what caused them are problems for serious scientists today, quite apart from any belief in Noah's flood. But it is clear that a very widespread flood of catastrophic proportions and far exceeding the Tigris valley is by no means ruled out on geological grounds. In fact it is certain that such a flood or floods happened since the end of the Ice Age. W. B. Wright says that deposits from the so-called 'Flandrian' flood will be found to be of almost world-wide extent.

We come next to consider the views of those who believe that the Bible is in some way an inspired record. Here again we have two fundamentally different approaches. There are those who believe the story to be inspired — but that there was no (important) Flood. The second group believe that the account is the inspired record of an actual historical event, although of course recognising that its spiritual importance is paramount.

The first group argue that it does not matter whether there was a real Flood, an actual man called Noah with three real sons, Shem, Ham and Japheth, who went into an actual wooden ark. The story, they say, may have had some foundation in a local flood in the Tigris valley or it may not — it does not matter. It is, they argue, like all the other early chapters of Genesis an inspired myth, intended to teach some spiritual lesson. To quote one correspondent:-

All nations have their unwritten folklore, including tales of creation and flood. It is my view that the Babylonian and Biblical writers used folk tales as vehicles for religious lessons; their readers would recognise this fact immediately in a way we could not today. Divine inspiration after all could use fiction as a medium in the case of the parables; why should it not have used folklore if that were a suitable medium for the people of ancient Israel, especially if the

medium was already widely used and recognised? All this means that I personally am not remotely concerned whether the details of the Flood story are historical or not, any more than I would concern myself with trying to elicit the name of the Unjust Judge of the parable.

But very many believers in Divine inspiration will have none of this. That the Flood has primarily a spiritual lesson to teach, all will agree. Christ Himself said so. But to assert that its historicity does not matter is simply to bury one's head in the sand. Problems will not go away because we refuse to look at them.

What then are the views of those who believe that the Bible tells of a real historical event, sent by God as an actual judgment<sup>12</sup> on sinful men who ignored His warnings, a judgment which conveys, because it really happened, a terrible warning to all men down the ages who reject God's truth?

Let it be said at once that those who hold to such views do so, not from some old-fashioned rooted objection to the theories and speculations of the so-called 'liberal' critics, but from a deep conviction that our Lord in the Gospels is not quoting the Flood in the same way as we might quote Pilgrim's Progress, but that He is speaking in awful solemnity of coming events which will one day be as truly historically fulfilled as the events of Noah's day and the later destruction of Sodom (Luke 17: 26-36) truly belong to history.

These views may be divided into two. Some hold that the Flood covered the entire planet in one year. Some assert that the Scriptural text does not warrant such a view.

The view that the Flood was universal was naturally held by the majority of writers down the years. It was to be expected that while men had no real idea of the size of the planet, or of the complexity of life on it, no one saw any special problem. As time went on however the more thoughtful realised that some problem did exist, both in the amount of water required to flood the entire globe to a depth of several miles at one and the same

time, and in the accommodating of representatives of every one of the many species of living creatures which were being recognised, in one ship for one year.<sup>13</sup>

For a considerable time men held that the existence of fossils on the tops of hills and mountains was a proof of the universality of the Deluge. Such an explanation can still be found in various parts of the world. The Toradjas, a tribe in the Celebes who gradually mingled with and replaced the original neolithic Toalas, not only have a story of a flood that destroyed all their rice, but consider the sea-shells found in the local mountains a proof that the flood reached these heights. It is interesting to note that not only do some Mongolian groups point to fossils in mountains as a proof of a great flood, but even some Eskimo who have found whale bones in mountains regard these as proof of a flood which they say was caused by the world tilting over.

The idea that fossils in general were the result of the Deluge was held by men like Sedgwick, Faber, Chalmers, Ure, Fairholme and Young. For a time Cuvier and Buckland supported it, but ultimately changed their view. G. H. Pember, in a book which had a considerable influence in its time (mainly because of its concentration on the history of the occult) — *Earth's Earliest Ages* — holds to a universal flood, but gives no particular reason for his view, and it must be remembered that he was not a geologist.

Attempts have been made in recent years to revive some form of scientific theory for a universal deluge responsible for all or most of the geological strata. Such a theory requires at least two vast hypotheses: first that all existing geology books are in error, and second, that some huge external supply of water arrived on the planet in the 600th year of Noah.

The first hypothesis, namely that all previous ideas of geology were completely wrong was propounded by George McCready Price in a succession of books which relied mainly on pointing out a number of problems in geology, and in emphasising that in some places the usual order of strata is much disturbed or even reversed. Price's views which were thoroughly examined and

criticised by Bernard Ramm<sup>14</sup> have met with negligible interest in this country. As one Professor of Geology, (a keen Christian) said to me, "My first year students could point out the fallacies in Price". Three American writers who have followed Price's theories are Byron Nelson, *The Deluge Story in Stone*, 1931; A. Rehwinkel, *The Flood*, 1951; and H. W. Clark, *The New Diluvialism*, 1946. The view is also being taken up widely by the American Creation Research Society. These works have been followed in recent years by those of Henry Morris, John C. Whitcomb Jr., and D. W. Patten.

The first of these, *The Genesis Flood* by Morris and Whitcomb<sup>15</sup> is a beautifully produced volume of over 500 pages. The book is, one can only say kindly, neither well written nor well planned. It roams over many topics, not in any very clear order, but relies fundamentally on Price's Geology and on the hypothesis of a vast water-vapour canopy round the earth which descended as rain at the time of the Flood. The Authors wander off into discussions on evolution, micro-evolution, entropy, thermodynamics and the origin of the universe, sometimes leaving the reader bewildered as to how they arrived at such subjects in a book supposedly on the Flood. Professor J. R. van de Fliert has expressed his criticisms of this book in this **JOURNAL** (1970, **98**, No. 1.) and Dr. R. E. D. Clark, while not entirely agreeing with van de Fliert's position, has nevertheless also rejected Morris and Whitcomb. Alan Stuart, Professor Emeritus of Geology in the University of Exeter is equally downright in his rejection of Morris and Whitcomb.<sup>16</sup> But perhaps most telling is the little paragraph in the very Foreword of the book, written by Professor J. C. McCampbell, a geologist, who says:-

For the present at least, although quite ready to recognise the inadequacies of Lyellian uniformitarianism, I would prefer to hope that some other means of harmonization of religion and geology, which retains the essential structure of modern historical geology, could be found.

D. W. Patten, in a beautifully produced volume of 336 pages,<sup>17</sup> follows similar lines to those of Morris and Whitcomb, but attempts to formulate an astronomical 'model' for the cause of the Flood.

Patten again overstates the attack on uniformitarianism, failing to realise that modern geologists are quite prepared to believe in periods of vast changes which could truly be called catastrophic. He side-tracks whole sections into attacks on Darwinism, and gives long summaries of theories of the earth's original formation which many will feel are quite irrelevant to his main thesis. He also plainly subscribes to the view that many of the geological layers were put down in the Genesis Flood. On p. 161, for example, he says:-

Within one crisis year as described by this model 200,000,000 years of vague, implausible, unsatisfactory uniformitarian fabric is compressed; this includes all developments classified as 'mesozoic' and 'cenozoic'.

He goes on to speak of a yet earlier catastrophe which accounted for the palaeozoic — another 400,000,000 years in one single event. Such theories are hardly likely to encourage respect for the rest of the book.

Patten's main contention is that the cause of the Deluge must be sought in terms of astronomical events, and he outlines a theory for the close approach of a small planetary body of mass between that of Mercury and that of Mars, and accompanied by ice at very low temperatures. This body might have come within 30,000 miles of the earth, but not near enough (Roche's limit) for disintegration and capture. He concludes that the encounter might have left some millions of cubic miles of ice in space, some of which was captured by the earth (possibly causing an ice age). This might have been responsible for a slight shift in the earth's centre of gravity thus causing the Flood, and at the same time it might have destroyed the vapour canopy thus adding to the waters of the flood. Patten does not so far deal successfully with the problems of the heat of entry into our atmosphere which must be experienced by ice falling from outer space.

It will be seen that this is an ingenious if confused attempt at a reconciliation. If one leaves out of account the idea that the Flood caused two-thirds of the geological strata, that the ice-age came after the Flood and not before it, and that there was a

vapour canopy, one has left the suggestion, made long ago by the English theologian and mathematician, William Whiston<sup>18</sup> (1667-1752), that the flood was caused by some astronomical event — a possibility that should not be too lightly dismissed, although Patten himself has not found the right answer.

We come now to consider the views of those who feel that the theories so far advanced are not entirely satisfactory. Those of whom I am now speaking hold to the accuracy and inspiration of Scripture, to the necessity of interpreting its passages according to what they feel to be the true canons of Biblical exegesis, and at the same time to the careful consideration and assessment of the facts as well as the theories of geology. Among such might be mentioned Edward J. Young, *Introduction to the Old Testament*, 1949; E. F. Kevan, *New Bible Commentary*, I.V.F. 1953; Meredith G. Kline, new edition of the same work, 1970; and the splendid little commentary of Genesis in the Tyndale series by Derek Kidner, 1967.<sup>19</sup>

The majority of such writers hold that while the literal text of Genesis 6-8 could possibly be taken to refer to the entire planet in our 20th century meaning of the word 'earth', yet there are numerous passages in the Bible where such terms and others like them are quite plainly never intended to be taken in any such fashion. Some, like T. C. Michell, in the I.V.F. *Bible Dictionary* are non-committal, and conclude that "dogmatism is not reasonable either way". But many feel convinced that the Genesis account, when weighed as a whole and in the light of sound Biblical exegesis, while requiring a flood much greater than that of the Tigris valley, does not necessarily require one covering the entire earth in our modern meaning of the word.

Here, however, the idea suggested years ago by Sir J. W. Dawson is worthy of at least more than passing consideration. It has been pointed out by Charlesworth and many others that the end of the Pleistocene was indeed a time of considerable upheavals, and even in the so-called 'Recent' there have been many earth movements on a gigantic scale. It may then be that the Flood which Noah encountered was the last of a series the

earlier ones of which had devastated other regions, proving fatal to the scattered human groups, but not exterminating all other forms of life at any given time, some creatures being able then to migrate to regions unaffected. Noah's Flood would then have been responsible for the final destruction of the human species except for those in the Ark, and, but for the animal species preserved in that vessel, the world would have lost a considerable number of creatures essential for man's future life on earth. This is of course speculation, but may be worthy of consideration. The great Flandrian Transgression may be one of this series and the Genesis Flood another.

We come now to the question of the date of the Flood. Those who rely on Ussher's chronology would place it at around 2349 B.C. There are many variations around this date owing to the uncertainties concerning the chronology of the book of Judges, and of the stay of the Israelites in Egypt. There are other variations due to the different figures given by the LXX, the Samaritan Pentateuch, by Josephus, and by Africanus and others. These allow for a margin of nearly a thousand years. There is also the probability that names are omitted from the lists, as witness Cainan son of Arphaxad given (from the LXX) in Luke 3: 36 but not in the Hebrew of Gen. 11. Again, Ezra the priest gives 17 names between himself and Aaron but there were in fact about 40 generations in that span.

Efforts have been made to date the Flood by reference to the signs of the zodiac, or to the position in the sky of other constellations in which some of the ancients are said to have thought that they discerned the outline of a great ship but these have led to no final conclusions.<sup>20</sup>

Some attempt was made to suppose that the Flood might be placed in one of the lesser known periods of Egyptian history, such as the times of the Seventh Dynasty. These have also been abandoned.<sup>21</sup>

If we accept the suggestions of geologists that the Glacial Period ended about 10,000 B.C., if this was followed by a period

of considerable earth-movements with floods like the Flandrian at perhaps 5,000 to 6,000 B.C., and great climatic changes around 5,000 B.C., and if we then accept as reasonable a date around 3,000 B.C. for the rise of the great dynasties of Egypt and Sumeria we could easily accept a date around 4,000 + or - 1,000 B.C. for the Flood, and remembering that for the last 50 years archæologists have been bringing down the estimated dates for the first dynasty of Egypt, we are coming to dates that are not so far removed from those of the Bible especially if we use the the LXX chronology.

We come lastly to a consideration of the possible physical causes involved in such a flood. That the ultimate cause of the Genesis Flood was spiritual all Christians will agree. The question for the moment is to consider what physical means the Creator chose to employ. The Bible itself informs us that the two factors involved were torrential rain, and the breaking up of the fountains of the 'Great Deep'. The incredible fall of rain, lasting 40 days, might suggest that the earth had run into some vast dust cloud or swarm of particles which, acting as nuclei, seeded the atmosphere for the production of very heavy rain. Even so, dramatic and terrifying as this must have been, it can only have produced a relatively small depth of water if it covered a very large area, and only a matter of inches if it covered the entire globe.

Plainly the major cause was the water coming from the oceans 'the Great Deep'. A flood produced by torrential rain in the Tigris valley or one produced by the overflow of Lake Van as was once suggested<sup>22</sup> would have swept the Ark out into the Persian gulf. The fact that it evidently floated northwards to the region of Ararat shows the greater effect of the oceanic contribution.

But all beyond this is speculation. Despite Morris and Whitcomb it seems far more likely that the bulk of the flood water was here already on the earth — the 'Great Deep' as the Bible tells us — and that it did not drop out of the sky. If so we can ask what moved this great mass of water over a vast tract of land. The melting of the world's ice-cap after the Glacial Period



might have produced enough water to raise the ocean level 300 feet above its former height, but such would probably have been a slow process. If the Flood was confined to the Tigris valley a large meteorite falling into the Persian Gulf<sup>23</sup> or a submarine earthquake in the same region<sup>24</sup> might be the cause. We could even consider larger meteorites, or earthquakes, in the Indian Ocean driving even bigger waves over the entire Middle East. The rise and fall of continents due to isostasy balancing of continental mass against underlying layers might also be considered. As Merson Davies,<sup>25</sup> an expert geologist, who believed in the Bible account of the Flood but not in Price's theories, says:- "If sea-beds can rise and continents sink there is no difficulty whatever in finding enough water even for a universal flood". But again such movements are usually slow. Other suggestions have been made of a sudden slight shift in the earth's axis of rotation, due to an astral visitor coming near, or the slip of the polar ice-caps or some quicker than usual continental slip involving a small change in the earth's centre of gravity.

Only one thing emerges as certain for those who believe the Bible. Whatever the physical cause, it will never happen in that way again. We have the Divine guarantee that the earth will not experience such a catastrophe a second time. So perhaps, speaking scientifically, we have little hope of finding the cause of an unrepeatable event !

In conclusion let me attempt to bring together at least some of the views we have surveyed and offer a reconciliation to which a fairly large number would agree.

1. Noah's Flood was a real, historical event.
2. Noah's descendants carried the memory of it to the ends of the earth, but the Bible presents by far the simplest and clearest account.
3. The Bible account is a primary document in its own right.
4. The Flood was of considerable magnitude, no comparable flood having occurred since.

5. The date of this event lies between 10,000 and 3,000 B.C., with some probability that it lies nearer the 4,000 - 5,000 B.C. period than earlier.
6. Numerous causes can be suggested. None is at present satisfactory. The believer in the inspiration of the Bible would add his conviction that:
7. The Flood was a Divine judgment on a sinful race, given as a permanent lesson to mankind, and used by Christ as a solemn warning of a different but greater judgment yet to come.

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**ROBERT E. D. CLARK**

## The Black Sea and Noah's Flood

**Cores from the Black Sea, obtained in 1969, show that there has been regular sedimentation over the area for at least 20,000 years. At 5000 B.C. there is a sudden very large rise in the deposition of dead organic matter and it is suggested that this may be the result of Noah's Flood. Another possible date, perhaps less likely, is the widespread flooding of about 6800 B.C. at which time sea water from the Mediterranean first entered the Black Sea.**

The Black Sea and the Caspian Sea lie on either side of Mount Ararat and within 200 – 250 miles of it: they can hardly have escaped Noah's Flood. Not much appears to be known about the earlier history of the Caspian Sea, the level of which is now much lower than it used to be, but with regard to the Black Sea a good deal of information concerning its recent past is now coming to light.

At the present time the Black Sea is saline (about 2% salt). At a depth of 150 – 250 meters, depending on the distance from the shore, the water becomes oxygen deficient<sup>1</sup> owing to inadequate vertical mixing and biological reduction of sulphate to hydrogen sulphide occurs. The Black Sea is the largest expanse of anoxic (oxygen deficient) water in the world. There is entry of Mediter-

ranean water through the Bosphorus but this, though considerable, occurs in fits and starts rather than uniformly. The entry of sea water explains the poor vertical mixing: sea water is more saline than Black Sea water and therefore heavier, so that it sinks to the bottom and only mixes with upper layers very slowly indeed.

In the Spring of 1969 R.V. Atlantis II cruised in the Black Sea from East to West. Over 60 bottom cores were obtained, the longest 11.5 meters in length, representative of the entire length of the Sea. Samples of water at different depths were also collected and many gravity, magnetic, etc. measurements made.

The cores contain organic matter, the C-14 of which has been used to date the various levels. Calcium carbonate (calcite) is also present derived from ancient plankton but at the lower level the deposit is extremely fine and no structure is visible even with the aid of an electron microscope. There is independent evidence that carbonate in cores is often dissolved at one level and redeposited at another, and this seems to have happened in the Black Sea, thus accounting for the lack of visible structure. If the C-14 dating is based on the carbonate rather than on the organic carbon which cannot dissolve and redeposit, the datings are somewhat higher (20% +). It is considered that the organic carbon gives the more reliable dating.

All the cores show three easily visible zones (Ross *et al* gives illustrations<sup>2</sup>).

(a) The bottom layer (*lutite*), the base of which was not reached in any of the cores, consists of alternate dark and light bands with little organic matter. One core (6 meters in length) from the Eastern region of the Sea was studied in detail; it gave a date of 17,000 B.P. at the lowest part. Near the top the appearance changes suddenly at about 7000 B.P. (5000 B.C.) with the commencement of layer (b).

(b) This middle very dark (*sapropel*) zone is extremely rich in organic matter (*ca* 10–20% carbon; the lutite layer just below contains *ca* 1–3%); its carbonate content is little

changed. Two dates were obtained for the sharp start of this layer; both based on the organic carbon: 7140 (standard core, East of Sea) and 6740 (middle of Sea) (both + or - 200 years) B.P. The average thickness of the sapropel layer is 40 cm.

Under an electron microscope numerous structures resembling biological membranes are visible — an unusual feature in deep marine sediments, no doubt due to the reducing conditions. The black colour is apparently due mainly to carbon but partly to metallic sulphides also.<sup>2</sup>

At 7000 B.P. the rise of carbon content to *ca* 15% is very sudden and is followed by a slow further rise to 20%. Subsequently there is a fairly steady fall to *ca* 3% right on to the present time. The top of the middle layer is marked not by a sudden fall in carbon content but by a very marked rise in carbonate.

(c) The top zone (*coccolith ooze*) like layer (a) contains alternate dark and light layers, the carbonate content being high. The total depth of the zone varies but averages about 50 cm.: there may be as many as 50-100 distinct layers per cm. and it is clear that they have been deposited seasonally. The darker layers are richer in carbon than the lighter carbonate layers.<sup>1</sup>

All three layers are clearly visible over the whole length of the Sea, about 1,000 Km. Individual layers, often only 1 mm. thick can also be correlated over the same distance. The thickness of a given layer of sediment, however, often differs greatly.<sup>2</sup>

Why the sharp boundaries of the dark region? To find out more about it, Deuser<sup>4</sup> has determined the  $^{18}\text{O} / ^{16}\text{O}$  ratio in the carbonate. The ratio steadily falls from 17000 B.P. to around 8-9000 B.P. after which it rises up to modern times. The steepness of the rise is most marked at 7000-5000 B.P.  $^{13}\text{O} / ^{12}\text{O}$  ratios were also measured both for carbonate carbon and organic carbon, but the picture proved very complex, for example calcium

carbonate in the unusual form of aragonite (high O-13) was deposited in one layer about 6500 B.P.

The chief importance of O-18 is that in shells containing carbonate the  $^{18}\text{O} / ^{16}\text{O}$  ratio rises with increasing salinity. At the lower level of the core the proportion of O-18 is much lower than has been found in any coccoliths (planktonic organisms) deposited under marine conditions, but is typical of fresh or slightly brackish water. The evidence suggests that sea water began to enter through the Bosphorus at about 8-9000 B.P. after which, until about 3000 B.P. the Black Sea, previously fresh, reached its present salinity which apparently represents an equilibrium. This agrees with our knowledge of ancient sea levels, for it was at about that time, at the end of the last Ice Age, that the sea level rose sufficiently for the Black Sea to become connected with the Mediterranean.

But what of the black carbonaceous matter which started to be deposited so suddenly around 7000 B.P.? Though many problems remain unsolved and at this stage it would be unwise to be dogmatic, it is nevertheless tempting to link it with Noah's Flood. After the devastation the bordering land must have been covered with decaying organic matter and this would naturally and slowly find its way into bordering lakes and seas. Under the reducing conditions pertaining in the Black Sea its preservation would be ensured.

But why the continued deposition of organic material right on to the present time? It is only possible to guess at an answer. Prior to 9000 B.P. the Black Sea is generally believed to have been a fresh water lake filled with water from melting ice from the last Ice Age. If we may suppose that the Flood was caused by a catastrophic rise in sea water level (perhaps 10-20 metres, a possibility fully compatible with present knowledge of former levels<sup>5</sup>) it may, by thawing out the remaining ice, have opened up natural river drainage of the rivers feeding the Black Sea, hitherto blocked with ice, and the rivers may have ever since carried organic matter into the Sea. The cause of the marked rise of carbonate deposit at around 1000 B.C. is not known.

Ancient sea levels apparently often changed suddenly rather than slowly, as is shown by the existence of submerged beaches in stable areas where geologists believe that there has been no rise or subsidence of the sea bed.<sup>6</sup> They may readily be accounted for by supposing that large areas of the Antarctic Ice Cap broke away and slipped into the sea.<sup>7</sup> Possible causes for such slippage might be volcanic eruption with lava flow under the ice, or a strike by a meteorite. (Near the border of Wilkes Land, at 71°S 140°E there is a very large gravity anomaly and a depression in the land 2,000 meters deep below the ice.<sup>8</sup> This is believed to have been caused by a meteorite.) A complete breakaway of the ice from the underlying land in the Antarctic would raise the sea level by 60 meters or more apart, apparently, from the isostatic rise of the land mass now below the level of the sea due to the weight of the Ice Cap.

It is suggested that the sudden beginning of the sapropel layer (b, above) may have been caused by Noah's Flood which, on this view, would have to be dated around 5000 B.C.<sup>9</sup>

If this view is not correct and Noah's Flood occurred at some other date, evidence of it ought still to be obtainable from Black Sea cores. If this date is too early, there are some thin striations still undated in the sapropel layer which have not been mentioned above and might represent a sediment following a widespread inundation.

Another possible view is that the Flood occurred 6500-7000 B.C. when sea water first flowed over the sill at the Bosphorus into the Black Sea. The rise of sea level at this time was probably catastrophic. Earlier evidence on this subject has been collected by O'Connell<sup>11</sup> who draws attention to the fact that in Denmark de Geer encountered one enormously thick varve, forty times the average thickness, dated (by varve counting) 6839 B.C., which he took as the zero year of the last glacial epoch. In Finland a similar thick varve was found, the discrepancy of the dates being only 39 years. Similar varves have been found elsewhere.<sup>12</sup> There are then good reasons for thinking that a very widespread flood



occurred around 6800 B.C. But perhaps Noah lived later than that ?

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## ESSAY REVIEW

# Bogus Objectivity

**In a remarkable book, *the Cult of the Fact*, the well known rebel psychologist, Liam Hudson, Professor of Educational Sciences at Edinburgh since 1968, describes how he became disillusioned with the pseudo-scientific ideal of objectivity in psychology and philosophy. His book is of immediate relevance to Christianity and deserves to be widely known.**

Professor Hudson's *Cult of the Fact*<sup>1</sup> is an unusual book by an unusual man. It is replete with rare words; a mixture of poetry and science; an exposure of education as we know it; a condemnation of current thinking which leaves man, as man, out of account, and an exploration of the possibility of reform. The title, the "Cult of Fact", refers to the hard empirical tradition which the author holds to be cramping in style when used to crush imagination.

As ever in his writings Dr. Hudson is concise to the point of a fault (how one wishes that many a sentence had been expanded!) while his stylistic elegance is exemplified on every page. Who but he would write: "maids . . . giggling fecklessly"; "hegemony of the hard-nosed within psychology"; "we could accept involvement whole-hoggingly"; "the banana skin that awaits . . . the high-flown"?

The book starts with Rilke's sonnet on the girl and the unicorn:

This is the creature there has never been.  
They never knew it, and yet, none the less,  
they loved the way it moved, its suppleness,  
its neck, its very gaze, mild and serene.

Not there, because they loved it, it behaved  
as though it were. They always left some space.  
And in that clear unpeopled space they saved  
it lightly reared its head, with scarce a trace

of not being there. They fed it, not with corn,  
but only with the possibility  
of being.

Charming! But here, one suspects, Hudson's erudition fails him! He shares Odell Shepard's<sup>2</sup> surprise that the existence of the unicorn remained unquestioned for 2,000 years. The plain reason, surely, is that there was no reason ever to doubt it. A fine specimen thrived in Maine in the 1930s<sup>3</sup>: anatomically its horn agreed closely with ancient descriptions . . . This is by the way.

For Hudson, as for Rilke, the unicorn stands for myths which control thought. The book is concerned with myths which influence the academic world, more particularly that of Oxford and Cambridge in the departments of philosophy and psychology.

First we learn the story of how Liam Hudson, always bottom of his form at school, entered Exeter College, Oxford, as a scholar ("they may have muddled my script with some one else's"). At Oxford his teachers encouraged head on attacks on philosophical problems rather than parrotizing from books. This was fortunate, for at that time his knowledge of the latter was diminutive: not unnaturally young Hudson's contemporaries judged him a genius or a fool, but as scholar sporting long hair and unconventional garb he generally had the benefit of the doubt.

After a near miss in history, Hudson tried his hand at philosophy in which Kneale and Farrell were his tutors. The heads of the Faculty were revered and god-like. They discussed what they pleased to call moral issues which they did with reference to examples, each one competing with the rest to "achieve the greatest possible triviality", but always they "ignored morality itself. They discussed hypothetical men on hypothetical desert islands, never real gas chambers, real Jews."

Ayer was there among the giants, proclaiming that all statements if not true were "noise or exhaust"; also Austin, Strawson, Ryle and others. One and all were furious talkers, yet rarely did one of them dare to commit his words to print, fearing the "mock-serious dissection of his words that would ensue". Cheap and facile verbal destructiveness was the order of the day. We took it for granted, that "if we could pull a man's arguments to pieces, we had the implicit right to step into his shoes" and that the "rule of intelligence is the licence whereby the young devour the old". The indoctrination of the young was superbly executed. "I learnt because I was afraid of their scorn." Rebels did not do well: the system saw to that.

And so to psychology: first at Oxford, after that at Cambridge. Psychology, for the Oxonian, was the science of behaviour which meant that stimulus was followed by response which you proved by rats in cages. 'Mind' in its ordinary sense was hardly supposed to exist at all.

In Oxford, as Hudson later learnt, the university high-ups "assumed that psychology was of its very nature a fraud or hoax" — though no whisper of this ever gravitated to students' ears. In Cambridge, on the other hand, a full century had elapsed since the Senate in its wisdom threw out the proposal to establish a psychophysics laboratory on the grounds that it would "insult religion by putting the human soul in a pair of scales" and psychology was more highly regarded. Yet it was in Cambridge that Hudson, who went there to study for his Ph.D. degree, first felt the full impact of British scientific snobbery. "The pure look down on the applied, the physical on the biological. And all

combine to look down on the social, or 'Mickey Mouse' scientists, who are scarcely scientists at all." Psychology stood low in the pecking order, but contained a pecking order within itself. The highest status is achieved by those who rise above the study of man altogether, contriving to spend their days with typewriters and secretaries, criticising to their hearts' content the ineptitudes of the experimentalists. These high up superior beings are the tough-minded who persecute the tender minded.

Working under the genial guidance of Professor Oliver Zangwill Hudson soon proved his worth, coming up in due course with his now well known distinction between *convergers* and *divergers*.

Tests on school children showed that some pupils asked, for example, to give a use for a hinge, would answer the question in what they supposed to be the correct way and would then stop talking. These are the convergers. The divergers on the other hand would go on to suggest more and more uses, probable or improbable. The convergers tend to specialise in the physical sciences, the divergers in arts subjects or biology. Speaking broadly the convergers were conventional, impersonal, rational, controlled and unemotional. Divergers, on the other hand, who matured later, tended to be emotional, unconventional, more unstable and more creative than their counterparts.

Hudson believes that hard headed convergers not only dominate the scene academically but manipulate the evidence on highly inflammable subjects in a way that they, perhaps, do not understand themselves. As an example he cites an influential paper written by Jensen<sup>4</sup> who argues that intellectual differences between people are genetic rather than environmental. Jensen's thesis, amounts to the claim that Negroes and the working class are born inferior and must remain so: their IQs cannot be raised to that of superior people by education or change of environment.

Jensen's paper covers 123 pages and he cites 159 references, most of them hackneyed. A very few, however, look challenging. Hudson considers one of the most striking of these: it concerns

what is known as *Turner's syndrome* in which the individual has 45 instead of 46 chromosomes and the easily stainable sex chromatin is missing from one of the two sex chromosomes. Jensen, citing Money,<sup>5</sup> says that such individuals report unusual difficulties with mathematics. Here, then, we have, apparently, a specific intellectual deficiency which is due to a genetic aberration, clearly identifiable under the microscope. With cases as convincing as this, why doubt that IQ depends on heredity?

Hudson looked up Money's paper — there was only one copy in Cambridge. Jensen's account of the paper was found to be utterly misleading. "There were discrepancies on almost every point of substance, and these were systematic. Each one served to sharpen the case Jensen wished to make." A whole chapter (Ch. 8, "False Science") is devoted to the case. Jensen's unicorn, like Galton's before him ("It is in the most unqualified manner that I object to pretensions of natural equality"; "The mistakes the negroes made in their own matters were so childish, stupid, and simpleton-like, as frequently to make me ashamed of my own species" etc.) is anti-egalitarianism. To this he bends science.

The example from Jensen, is typical, thinks Hudson of the way hard-nosed converger-type academic psychologists are fooling people. Despite the vast number of man-hours of research expended, psychological research "has failed to produce a coherent body of scientific law; and its fruits, unmistakably have about them an air of triviality". Even the hard-headed experimental evidence that is so often cited is apt to be coloured by prejudice and presupposition to a surprising extent. Yet this is the material put across to the public in the name of science.

In a later chapter Professor Hudson discusses mental tests. He has met nearly all the British experts in this field, he says, and reckons them generous men: yet in private many of them express themselves violently about divergers and extroverts. All the testers are convergers and their tests penalise the kind of child they especially dislike. Their scientific approaches to pupils alter the pupils they study — and for the worse. Indeed, all assessments

of others are liable to alter them in profound and harmful ways — a kind of Heisenberg principle (you cannot observe without altering what you observe) but operating in psychology. This Hudson believes is particularly obvious in such studies of sex as those of Kinsey, Masters and Johnson — all three “altered the nature of what they set out to observe”. Hudson goes on to argue persuasively that scientific psychology has become a species of shadow boxing, for “a strictly behavioristic account of human lives is an impossibility, a fraud”.

Much of the remainder of the book is concerned with further analysis of the way psychology is developing and of the possibilities of building something better, something more aligned on the one hand to science and on the other to the humanities.

Psychology should stretch continuously — as until recently it did stretch — from the creative and scholarly arts on the one hand, to the established sciences on the other ; and it should overlap generously with both (p. 157).

\* \* \*

What are the bearings of all this on Christianity? Firstly it underlines the biblical teaching that the fashions of the world pass away. The Christian who reads *The Cult of the Fact* can hardly avoid remembering the words of Scripture: “Behold I lay in Sion a chief corner stone, elect, precious: and he that believeth on him shall not be confounded” (1 Peter 2: 16). Modern philosophy and psychology, especially, illustrate the way in which one system of thought may dominate the minds of otherwise sensible men, only to be replaced by another and yet another. Today with Hudson, Chomsky, Marcuse, Laing and others in the ascendent, it seems likely that the established Weltanschauung of the psychological laboratory is due for change. With so much change, it is amazing to reflect on the stability of the foundation afforded by belief in Christianity — “shall not be confounded”.

Secondly, Hudson’s discovery of the difference between convergers and divergers has done much to undermine the self-

assertive self-satisfied ego-worship of the converger, pharisaically glad that he is not as other men. Hudson reveals the ascendancy of this attitude in modern supposedly objective science. In the nineteenth century it was put more blatantly: "I have not cared to occupy myself much with people whose gifts are below the average" said Galton.

Thirdly, from time immemorial ideas, including dangerous prejudices, have been handed down with the implication that they should be accepted on the basis of authority. The effect of the scientific revolution has sometimes been to remove the prejudices, more often to offer opportunity for their translation into the language of science. As Dingwall,<sup>6</sup> referring of course to racial prejudice, remarked in 1945, people today no longer quote Scripture or talk of the curse of Canaan (i.e. black skin) but try to support their prejudices by facts and experiments.

Indeed, Hudson's book underlines the folly of mimicking physical science, in the attempt to transfer the prestige enjoyed by the latter to the most fanciful and changeful of theories. Here of course it is not only the philosophers, psychologists and social scientists who are at fault but many theologians also. Teachings which are highly conjectural, of the kind which might be discarded overnight, have too often been acclaimed as assured results of scholarship.

In this connection Professor Hudson tells us that he knows of two brilliant students who felt themselves trapped by a particular internal examiner. Each of them knew that to pass well he would be required to show knowledge of his lecturer's recondite researches and felt that it "would be intellectually dishonest to knuckle under". One stuck to his guns answering only the questions he believed in and was given a third class, the other effecting an uneasy compromise was given a low second. In such ways conscientious men who question the views of their elders are kept out of academic life. The same situation is said to exist in the context of materialistic evolutionary biology and in theology also hard-nosed theologians insist that students should regurgitate views which are often repellent to the bible-loving Christian who



may react as did the first of Hudson's students.

Even so, as Hudson recognizes, criticism of our educational system must be conducted with caution. It is vastly better than what went before — when jobs were allocated on the basis of family connections, and it is always easier to pull down than to build. Dr. Hudson puts two strikingly similar quotations side by side, both stating persuasively that the aim of teachers is to stuff the brains of the young, to turn them into erudite apes like themselves, to stultify the holy curiosity of enquiry. One is by Einstein, the other by Hitler, “Between them they suggest a limitation of the libertarian view: that it is a mistake to equate freedom with the maximization of human talent”.

Let us wish Professor Hudson every success as he experiments with new approaches !

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1. Liam Hudson, *The Cult of the Fact*, Cape, 1972, 189 pp., £2·95.
2. *The Lore of the Unicorn*, 1939.
3. W. F. Dove, *Scientific Monthly*, 1936, 42 (1), 431–436. Early grafting together of the two swellings or buds on the skin of a goat's head results in the subsequent growth of one horn instead of the usual two.
4. A. R. Jensen, “How much can we boost I.Q. and Scholastic Achievement?” *Harvard Educational Review*, 1969, 39, 32.
5. J. Money, *Jour. Psychiatric Research*, 1964, 2, 223.
6. E. J. Dingwall, *Racial Pride and Prejudice*, 1946, p. 55.

## ESSAY REVIEW

# Independent Thinkers

**There are many people around who hold curious and unconventional views. In this Essay Review we consider some of them with special reference to Patrick Moore's book, *Can You Speak Venusian?*<sup>1</sup>**

Writing with tongue in cheek Patrick Moore, the well known TV personality has recently written a most entertaining book which describes itself in the subtitle as "Guide to the Independent Thinkers".

Let us introduce a few of the characters. In common with the members of the Society of Flat Earthists there is a Mr. Bradbury, a chiropodist, the inventor of the queerest telescope you ever saw, who claims that the twelve lunar astronauts all landed in Tibet by mistake and, to conceal their blunders, fudged their photos of Planet Earth from space. Then there is Mr. Francis who has proved that the sun is really quite cold: though it obligingly turns on the heat for us, in itself it is no hotter than the switch we use to turn on the electric fire. The sun's bright light is reflected many times from the queer lop-sided walls of the universe and we call the multiple reflections *stars*, which of course do not exist as separate objects at all.

One chapter is devoted to the strange notions of Dr. Immanuel Velikowsky, psychoanalyst from Israel, who claims that a huge explosion shook Jupiter to the core in historic times, throwing a mighty mountain into the sky: to this very day you can see

a red spot marking the place where this happened. The mountain, trailing stones behind it, looked like a comet as it hurtled excitedly through space and in Bible times it came near Earth, so accounting for the miracles of the Exodus. For some strange reason it drenched us with oil, the very same oil which in the form of petroleum, we find so useful today.

Like all respectable comets, the celestial visitor soon went away but came back again to visit us every few years: on one such occasion it came so close that it shook down the walls of Jericho. Once, on one of its meanderings, it very nearly hit Mars, had its big wagging tail chopped off and turned into the planet Venus. Mars, now pushed out of its orbit, angrily molested us in late O.T. times. On one occasion it (or are we confused with Venus?) came too close to the moon, melted its surface and formed its mountains (it was quite smooth before). It even turned the earth head over heels. You may learn all this from ancient myths (interpreted in the proper Velikowsky way) and, of course, from the contents of your own psyche: indeed, you can hardly be a psychologist at all unless you understand the inherited Venusian and Martial experiences of mankind down the ages. Knowing about your past will also enable you to face calamities in the future, so in these trying times it is more than ever important that mankind should heed Immanuel Velikowsky.<sup>2</sup>

Hans Hörbiger — his English disciple was Hans S. Bellamy who wrote books like *Moons, Myths and Man* and *The Book of Revelation is History*<sup>3</sup> — had his universe filled with chunks of ice. His WEL (*Welt Eis Lehre* or *Cosmic Ice Theory*) was so popular with the Nazis that the German Government had to issue a statement to assure people it really was possible for a non-Welite to be a good Nazi. Our moon, ice-covered of course, was captured around 11,000 B.C. which explains all mythology, miracles and prophecy (which works backwards not forwards as religious people wrongly suppose).

Mr. Erich von Daniken<sup>4</sup> and his ilk have discovered that flying saucers used to land on Earth long ago. One of them is described in detail in the Book of Ezekiel. God was an astronaut

and Jesus Christ came from Venus. The space men use Earth as a laboratory for genetical experiments and sometimes they come back to see how we are getting on. A few learned mortals have mastered their languages: Mr. Bryan of Romford, England, for instance speaks Venusian, Plutonian and Krügerian (language of planet circulating round red dwarf star Krüger 60) quite fluently. Some Venusian script adorns the dust cover of Mr. Moore's book.

No time for more! Before we dismiss these fancies as amusing nonsense let us reflect that books by Velikowsky, George Adamski (friend of the flying saucer men) and von Daniken sell in *millions* and that the more popular rubbish is obviously intended as a substitute for Christianity.

A 50-minute long BBC Horizon programme on 11 January 1973 was devoted to Velikowsky and his doings. He is now well received in American Universities and was viewed, time and time again, speaking to large audiences of young people, imploring them with the utmost earnestness to accept his theories which afford the only path to enlightenment. It is impossible, he seemed to be saying, for young people to understand the surges of unrest and fear that harass their own minds and those of others until they realise that they are re-enacting the experiences of mankind in the past when the planets ran berserk. As might well be guessed (it is confirmed to us by one who knows him) Dr. Velikowsky is unfavourably disposed towards Christianity.

A striking case of Christian travesty was described in the 50's.<sup>5</sup> A certain Mrs. Keech obtained messages from flying saucer men by automatic writing. She learned that on a certain day a tidal wave would sweep over America destroying everyone save the faithful who, if they followed instructions, would be picked up by UFOs and looked after elsewhere till it was safe to return to Earth. Groups of Keechites preached the message and advertised in the press while Mrs. Keech even indoctrinated the young till she was threatened with a madhouse if she did not desist. Near the fatal hour the Keechites waited all night for their saucers, due in the early morning, but . . . No need to continue the story. The Keechite teaching was an imitation, surely, of the doctrine

of the secret rapture of the saints as held by many Christians.

A most entertaining book Mr. Moore: we hope it will sell well. But really it was naughty of you to say that Copernicus "was immediately attacked not only by religious leaders such as Luther (which was predictable) but also . . .". In all his writings (several *yards* on library shelves) Luther never mentions the man, so historians say. And your little yarn which begins, "When the great chemist Dalton published his periodic table of the elements . . ." (p. 13) is a real howler unless, of course, he enlisted the aid of a spiritist medium and published from the Other Side. Even your Velikowsky does not all look quite right. Should not your sentence "Mars retreated again and resumed its former path" (p. 60) read something like this: "Mars, after all these adventures, was elbowed out of its nice warm orbit, now stolen by Venus, into a frostier one outside Earth where it has shivered ever since"? Chapter 8, "Down with Darwin" seems out of place, for unlike other chapters it is unrelated to astronomy; besides which we suspect that members of the EPM are not as silly as you make them out to be.

You have given us a very mixed bag. Some of the Independent Thinkers like Messrs. Bradbury and Francis and the Flat Earthists have so small a following that we may agree that no useful purpose would be served by refuting their strange beliefs. But some are heeded by vast numbers of would-be intellectuals: Velikowsky is now the rage in U.S.A. where a well-attended museum exists to propagate his views and even in England his *Worlds in Collision* has now appeared in paper back. Men like him undo much of the work of science journalists and teachers: they give the impression that all astronomers are barking up the wrong tree. Yet with so good an opportunity, you do little to explain where Velikowsky has strayed. All you say is that comets cannot turn into planets but if I were a Velikowskyite (which I am not) I would say this was a quibble about a word. Why should not a planet with a tail be called a comet if it looks like one? What's in a word anyway? Would it not have been better to tell your readers about the ancient Babylonian astronomers who recorded positions of Venus and Mars in the sky right back to

1700 B.C. (when Venus did not exist according to Velikowsky) and left their records on tablets which may be seen today? <sup>6</sup> Or some other good reason for rejecting his baloney might have been given. <sup>7</sup>

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Had his lecture been published earlier Mr. Patrick Moore might well have included Professor Freeman Dyson, FRS of the Institute of Advanced Study, Princeton, among his Independent Thinkers <sup>8</sup> (or does he think it wise to leave reputable scientists alone?). Most people are not a little worried about pollution, about the world's decreasing wealth as scarce mineral resources are being used up and about rising population and lack of food and work. Not so Professor Dyson who wants science and technology to charge ahead almost (to be to be fair, not quite) regardless — the World, the Flesh and the Devil their only enemies.

Space travel needs to be vastly extended till it costs no more to reach Jupiter than to fly the Atlantic. An armamentarium of micro-organisms must be developed to deal, among other things, with space sewage problems and on earth to scavenge minerals and oust the mining companies who uglify our earth.

Next we must learn the trick of making eggs which will hatch into machines (instead of animals) and which in their turn will lay more eggs. Fed with computer programmes instead of bread and butter these will “build cities, plant gardens, construct electric power generating facilities, launch space-ships or raise chickens”.

After this it will be time to start to colonize space. We must redesign the skin of the leaves of plants so that trees can grow on comets and if we can persuade the leaves to grow little convex mirrors to focus light on the photosynthetic gadgets in their cells (it should not prove unduly difficult) — why then they will flourish in orbits far outside those of Jupiter and Saturn without feeling chilly. Having no gravity to restrain their growth, comet trees will “grow out for hundreds of miles” and “men will live and take their ease among the tree trunks [where man] . . . will find

himself returning to the arboreal existence of his ancestors”.

No need to feel downhearted, even, when all the comets have been used up! What are the big planets for but to be broken up into little ones? Dyson even has ideas on how to do it. So why not a merry ring of earths all round the sun? . . . and bridges and trade between them? All so simple if you only know how so long as you are prepared to wait patiently 'till long after you are dead for the fulfilment of your vision.

Meanwhile in this life, says Dyson, you must do all you can to resist the World (“meaning scarcity of material goods” etc.), the Flesh (“meaning the defects in man’s physiology” etc.) and the Devil (“meaning the irrational forces in man’s psychological nature which distort . . . the feeble voice of reason”) lest they hinder these pipe dreams coming true in the year 2000 + + + A.D.

“Glorious things of thee are spoken / Zion city of our God” sings the Christian. Dyson, clever fellow, has invented a heavenly Jerusalem to please those technologists who would prefer to leave God out.

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1. Patrick Moore, *Can You Speak Venusian? A Guide to the Independent Thinkers*, Davis and Charles, 1972, 176 pp., £2.75.
2. *passim*. *Pensee, Student Academic Freedom Forum*. The Spring and Fall issues of 1972 are devoted to criticisms of Veloikowski with replies by him. Nine further issues are promised before the end of 1974. Published by Penseé, P.O. Box 414, Portland, Oregon 97207; 2 dollars per issue or \$10 for the next nine issues.
3. Half a dozen of these books were published by Faber and Faber over the years 1942–9.
4. See THIS JOURNAL, 99, 156–8.
5. L. Festinger, H. W. Rücken and S. Schachter, *When Prophecy Fails*, Univ. of Minnesota Press, 1956.
6. See for example A. Pannekoek, *A History of Astronomy*, 1961, Ch. 6.
7. If Mars and Venus had travelled in highly elliptical orbits only a few thousand years ago their orbits could not have become nearly circular by now. Recent dating of the lunar rocks shows them to have been molten a few aeons ago, not a mere few thousand years, etc.
8. Freeman J. Dyson, *The World, the Flesh and the Devil* (Third J. D. Bernal Lecture), Birkbeck College, 1972, 15 pp., £0.25 (post free).

**DR. MASCALL'S GIFFORD LECTURES**

E. L. Mascall, *The Openness of Being*, Darton, Longman and Todd, 1971, 278 pp., £3·50.

Dr. Mascall has had little to say about natural theology for a quarter of a century but as a condition of acceptance of the Gifford Lectureship (for 1970-71) he now returns to the fray.

In the Foreward the Author explains that although most philosophers in this country now make a parade of their positivist or empirical attitude, he himself still prefers the Thomist metaphysical approach. However, in his view natural theology, far from seeking to provide a proof of God's existence in the manner of the Schoolmen, ought to content itself with attempting to evoke the sense of God.

In his earlier lectures Dr. Mascall discusses such topics as language, process theology, the traditional proofs of God's existence, and the views of present day continental Thomist theologians. In these lectures, which are replete with erudition, he makes a number of important points.

On the subject of language, Dr. Mascall is sure that the field needs rescuing from the professional linguists who tend to forget that the function of language is to communicate thought, holding instead that it is either a set of labels attached to facts, or a set of noises emitted by humans in response to stimuli.

In dealing with the cosmological argument, the Author distinguishes between the argument, "There must be a God because the world exists" and "There must be a God because the world shows signs of having been planned" (which is basically the teleological argument). The Author's interest is strictly confined to the first of these.

In philosophy, Dr. Mascall rejects idealism in all its forms



on the ground that if one places the object of knowledge entirely within the mind, one can never get outside the mind. The Idealist, he says, locks himself up in his own prison and throws away the key.

Dr. Mascall frequently stresses the need, in discussions about natural theology, to keep distinct the two questions, "Is there a God" and "What is God like?". Otherwise he says we shall fall into the fallacy of implicitly assuming a minimal definition of God in arguing for His existence and a much more ample definition in discussing His nature. There can be no harm, he says, in adopting different definitions of God in different arguments for the existence of God but only if we are aware of what we are doing.

Dr. Mascall struggles hard to follow his own maxim but despite his protests I am not sure that he succeeds or, indeed, that any one can. Aquinas makes the jump at the end of each of his Five Ways from the thing proved to that which everyone understands to be God. And Mascall too, when opportunity knocks, without warning absorbs great drafts of Christian doctrine as in Chapter 7 where he proceeds far beyond the point proved, that God is personal. Or again, Chapter 9 has all the appearance of a preamble to the Christian doctrine of grace, revelation and incarnation. The fact seems inescapable that all argument for the existence of God depends for its initial movement on a more than bare idea of what He is like.

In the last Chapter (Chapter 10) the Author upholds the traditional doctrine of the changelessness of God in opposition to the views of the process theologians. He argues that if God is not, like His creatures, entangled in the time process, He has "a vastly greater scope for His compassion and his power" than if He "could attend to only one moment at a time. Thus, in emphasising the timelessness of God, we are not conceiving him as remote but quite the opposite" (p. 171) — but here his arguments are far from convincing. As others have shown, the motion of an impassible God above the time frame owes more to a Greek idea than to a Hebrew or Christian one. Here as else-

where Dr. Mascall seems to be shaping his idea of God to make it mate with his metaphysics.

The task of natural theology, as Dr. Mascall conceives it, is "to locate precisely the point or points at which the natural empirical order impinges upon the transcendent and supernatural and opens it . . . What is really important is to understand that the actual order is not just closed in upon itself" (p. 216). The key which unlocks the door is, for him, the belief that God's being is the ground of all finite existences. The title of the book, *The Openness of Being*, refers to the radical dependence of finite beings upon God which leaves the creature open to receive fresh influences of creative power. This concept of openness of being, which is the capacity of finite beings for infinite development by the Creator, enables Dr. Mascall to reconcile the cosmological argument with an evolutionary view of the world. His reconciliation with evolution differs radically from that of the process theologians some of whom, seemingly, wish God to evolve with His creatures.

Mascall is an extraordinarily readable writer. Few philosophical theologians alive today are capable of tackling the subject as well as he. Not that the book is light reading, by any means !

ALAN WILLINGALE

### FULLNESS OF TIME

F. D. Coggan, *Word and World*, Hodder and Stoughton,  
160 pp. 1971. £1.75.

The main part of this pleasantly written, scholarly and helpful book by the Archbishop of York tells the story of the various translations and versions of the Bible and the influence they have exerted from ancient times to the present day.

The most unusual feature of the book is the first chapter which is a commentary on St. Paul's teaching that Jesus, the incarnate Word, came into the world "in the fullness of time." The point is illustrated with reference to (1) the *pax Romana* (Cf. Milton *On the Morning of Christ's Nativity*). (2) Greek, not Latin, was the common language of the time over the entire empire so that missionary work was facilitated. (3) *Enui* (*taedium vitae*) had settled upon contemporary society: men were wearied with unsatisfying gods, cults, myths and philosophies. (4) For a long time there had been no prophets in Israel (Cf. the Maccabee brothers who stored away the altar stones at Jerusalem "in a fitting place on the temple hill, until a prophet should arise who could be consulted about them" 1 Macc. 4: 46.) The Jews thought that the coming of another prophet could not be long delayed. (5) The completion of the Septuagint had made the Old Testament with its prophecies of the Messiah generally known and many widely dispersed synagogues had been established throughout the Empire. (See also this **JOURNAL**, J. H. Rose, 1939, **71**, 23 - 37: only at this period in history was the Mediterranean free of pirates.)

The circulation of the Bible is now greater than ever and Dr. Coggan welcomes in particular the changed attitude of the Vatican. (Bull of Pius VII, 1817; the circulation of the Scriptures is "an abominable device by which the very foundations of religion are undermined," the duty of the See of Rome is "to employ all means for the purpose of detecting and rooting out such a pestilence in every way." Cf. the *Documents of Vatican II*, published, 1966, "Easy access to sacred Scripture should be provided for all the Christian faithful" etc.)

## ART

H. R. Rookmaaker, *Modern Art and the Death of a Culture*, Inter-Varsity Press, 1970, 256 pp., PB, 75 p., £1.25.

In school text-books of history the Renaissance is usually dated from the fall of Constantinople and the consequent influx into Western Europe of scholars who brought the Greek classics

with them. This, the child is told, led to the rejection of the Medieval notion that human life was essentially a preparation for the hereafter, and the substitution of the conception of human life on earth as interesting and delightful in itself. The suggestion is that this was a Good Thing !

This would not meet with unqualified acceptance by the author of this book. But neither, on the other hand, does he regard the Renaissance as a Bad Thing, particularly as it brought the Reformation with it. He reminds us that in the Middle Ages, and even in the Apostolic age, there was a false mysticism and asceticism which by no means accorded with the New Testament conception of the Christian life. It regarded the material world, and all our interests in it and our enjoyments of it, as bad. The Apostles fought against this in their letters, and he adds "But as most 'Christian' mystics depreciate the Bible for a more subjective experience, this argument often fails to reach them."

Rookmaaker is Professor of the History of Art at the Free University of Amsterdam, but he could not have written this book without a considerable knowledge of theology. He writes as a committed Christian, and we can be grateful to the Inter-Varsity Press for publishing the book. He begins with the later Middle Ages. The Christian art of this period aimed at being something more than imaginative portraiture — let alone decoration. It was loaded with religious meaning. The broad theme of his exposition is that this Christian art was followed, in the 17th and 18th centuries, by a humanist art which glorified Man, and then in the later 19th and the 20th centuries by a post-humanist art which saw Man no longer as dignified but as absurd. It held a mirror up to a Nature which it regarded as chaotic and meaningless. There is a clear connection between the Existentialist's pessimistic diagnosis of the human situation and some of the leading trends in modern art. Many of the pictures indicate — if indeed they can be said to indicate anything — that life is absurd and that we just have to learn to accept the absurdity and live with it. If a man paints a picture by throwing paint at it, the picture will be a mess, but that is just what life is ! The value of the

book for me is the high-lighting of the inevitable degeneration that followed the dismissal of God from Man's thought-world.

“Every day we come nearer to the situation of the early Christians. Every time we read Peter's letters we can understand what he was saying better. For his letters were sent to Christians who were a small minority. We cannot now expect people to follow our rules, our insights, our morals automatically. We shall be more and more pilgrims and strangers in the world. . . . . But for that very reason, these are exciting times. God has called us to bear witness to Him at a critical point of history.”

F. H. CLEOBURY

## RABBINICS

Chaim Pearl, *The Medieval Jewish Mind*, Valentine Mitchell and Co., 1971, £2·80.

This pleasingly written book gives an outline of the theology of Isaac Arama (c. 1420 – 1495), the great medieval master of homiletics to whom Jewish preachers turn even today. Arama is chiefly known for his massive commentary on the Pentateuch, *Akedath Yitzhak*, which gives the normative standpoint of Judaism on most questions. Although the author, in common with most Western rabbis, does not accept many of the traditional views, he cites the Six Day War as evidence that God has not walked out of history.

The book should prove a useful reference source for those who wish to understand Judaism. Apart from this, Jewish comments are sometimes thought provoking — for example, Arama wonders why it is that in Genesis 1 the usual refrain “and God saw that it was good” is omitted after the creation of man, and he offers explanations.

**SCIENCE AND RELIGION**

R. E. D. Clark, *Science and Christianity: a Partnership*, Pacific Press Publishing Association, Mountain View, California; British Agent, Stanborough Press Ltd., Alma Park, Grantham, Lincs., PB, 1972, 192 pp., 2·25 dollars or £0·90.

(Members may order direct from the Editor, £1 post free. Any profits will be donated to the Victoria Institute.)

The Editor of *Faith and Thought* has here added another to his series of illuminating and valuable writings on Science and Religion. He is a writer to whom British Christian leaders have paid all too little attention. The reviewer is not alone in this view for one of the best intellects amongst Cambridge dons between the World Wars (himself an author) indicated the same in no uncertain terms. Dr. Clark's mind has that touch of genius which is able effortlessly to clarify the difficult areas of both science and religion without either distorting or oversimplifying. From the time of his first book *Conscious and Unconscious Sin* — a title which was greeted with some amusement by the more volatile undergraduates of the day, though it was a challenging contribution on an obscure subject — he has constantly made valuable additions to the literature. A rather wider-deserved circulation has been given to his later books: *The Universe: Plan or Accident?*, *Scientific Rationalism and the Christian Faith*, *Darwin: Before and After*, and *The Christian Stake in Science*. It is to be hoped that the present pearl will not be overlooked on account of its publication in the U.S.A. and its distribution by an insufficiently known agency in this country.

The book has a good deal to offer to anyone concerned to help perplexed young people — especially in the faculties of science and medicine. Its essential aim is not (as at first might be assumed) to demonstrate the resemblance of the position of the scientist, with his kind of faith, to that of the faith of the Christian. Nor is it to prove the essential rationality of the Christian's approach to his data when discussing the validity of the Bible's revelation. The real thrust is to show that, once given the revealed data, God asks from each man no more of an intellectual activity

than his mind is equipped to give. The Christian's psychological approach to the 'proofs', or rather the confirmations, of the Being and activities of God in the world is virtually the same as that of scientists approaching their data.

Certainly any scientist, living as he does in a glass house, should not throw stones. His attitudes and reasoning concerning the unseen things of science are no different or superior. For should he be unwise enough to jibe concerning the intangibilities of the things of the Spirit, he should promptly be challenged to prove beyond doubt the actual existence of atoms, ions or whatever basic unit of the world's elements he cares to choose. The author's *primary* interest throughout the book is in the normal intellectual demand on the Christian and the God-given provision which is available and sufficient to meet it. The various points made are amply illustrated from both science and religion. In fact there is such an *embarras de riches* and so much of interest in some of the chapters that there may be a danger of the reader's losing the main thread of the argument.

To summarize, it is asked in the first section of the book whether Christian faith is still possible in a sophisticated and technological age such as that of to-day. The answer is that the scientists themselves are virtually in much the same position as the Christian intellectually if they are to sustain the onward march and control of science. They often come — when there is a new advance — to a position which is not unlike that of spiritual 'conversion' and its exhilarating effects. The Bible itself assumes that the human mind will be applied in a straightforward way whether in the direction of scientific inspiration and discovery or (once given the data of revelation) in the direction of theological inspiration and discovery. To imagine that science is an insuperable obstacle to becoming a Christian, or that Christianity is a hindrance to true scientific development, is to misunderstand both science and Christianity.

The plain facts of history suggest that Western Science owes a great deal more than it realises to Christianity. At certain junctures the latter has inspired the progress of science and

liberated it from bondage to misconceptions. The author also makes it clear that science is not to be regarded simply as the accumulation from time to time of additional fragments from research, rather it is "a creative exploration into the unknown". Similarly, the Christian religion is not the accumulation of fragmentary prophetic insights or embellished fables, it is a creative exploration, under the guidance of the Holy Spirit, into the experience of God's revelation. The latter presents itself to the mind as 'the truth' in a form to which a man's reason may, if he is willing, fully respond. Whilst in the spiritual realm the Holy Spirit's work accompanies and actualises the response, the mind at its own level carries through its normal functions.

Dr. Clark's final claim is that true Religion and true science (as mankind should understand them) have never been in rivalry. They both came from the same Fount and both seek to follow the facts respectively of the Book of the Spirit and the Book of Nature. They are both to be regarded as God-given partners for the guidance of mankind. None saw this more clearly, more simply and with more childlike trust in God than some of the greatest British Scientists. Of these, Robert Boyle and Michael Faraday were outstanding.

DOUGLAS JOHNSON

(Reprinted, with permission from *In the Service of Medicine*.)

Denis Alexander, *Beyond Science*, Lion Publishing,  
1972, 222 pp., £1.95.

This is an interesting new book on science and religion; it is written by a scientist (Dr. Alexander researches on the chemistry of nerves), is factually sound and is obviously the product of extensive reading.

The book consists of five rather long chapters which are suitably broken up by sub-headings. The first chapter ("Science



in the Seventies ") is an exhaustive list of all the terrible possibilities (perhaps only in the minds of S.F. writers ?) inherent in genetic engineering. Drugs and their potentialities come in for a good deal of attention too. The general conclusion is that mankind is becoming frightened of science and that, even where no fear is overtly present, there is a feeling abroad that science leaves something out. "The scientific world view makes you feel as if you have been conned. There's something missing," to quote the words of a student. It puts you in a box and nails the lid down.

Illustrative of the new thinking is the controversial idea that memory is chemical. The worm, taught its trick by conditioning, is chopped up and fed to its fellows who eat trick and all. Will children in Brave New World eat teaching-food ? (An amusing aside — the best way to teach students is to feed them on the chopped up brains of their professors.)

Chapter 2 ("Mechanism and Meaning") deals (a little long windedly ?) *inter alia* with complementarity. B. K. Skinner at Keele, asked if he is interested in the professor chairing his meeting, can only say, "I am interested in the noises coming from your mouth" and so confuses complementary descriptions of man. MacKay's views are expounded with strong approval. Scientific explanations come in for some attention: thus the Freudian theory that the mind has three parts (here renamed *go-go*, *super-go-go* and *ado*) is cited as an untestable model into which facts of any kind whatsoever can be made to fit.

Chapter 3, "The God that Failed," discusses our tendency to think that theories, be they scientific or political, tell us all we need to know about their subject matter. Many topics come up in this chapter but the logic of their arrangement seemed to the Reviewer a little difficult to disentangle. The god that failed seems to be science or the theories in which men have put their trust, though this does not seem to be very clearly stated.

There are good arguments in the two closing chapters ("Back to Square One" and "The New Creation"). Kindly humanists,

we are reminded, like to think of criminals as sick folk rather than as offenders, which elicits the comment, "There can be nothing more degrading to a man than treating him as mentally sick rather than as a morally responsible free agent," with the reminder that sickness is often incurable and that the humanist's attitude may condemn the criminal to a life-time of guilt feelings over the fact that he had the sickness in the first place. When, on the other hand, crime is regarded as sin, it can be punished and/or forgiven and the guilt removed.

There are comments, too, on the tendency to euphemize Christian language to increase its numinous and mystical quality — for example God is being spoken of as the "ground of our being." Such jargon, thinks the author, far from clarifying thought and aiding communication, often acts in the reverse sense. The case is cited of a boy who, after cutting up worms, wondered if God was something like the earth he found inside them.

These chapters expound traditional Christian views in an appealing way but without the use of traditional Christian jargon. The analogies used are helpful; for example the Christian church is compared to a pilot scale industrial plant in which God applies on a limited scale the principles that will hold in the age to come. The evidences for Christianity, thinks the writer, are so strong that refusal to consider them may be castigated as "wishful non-thinking".

This is an excellent book to put into the hands of science-oriented young people. Older readers, however, will probably feel critical at times. The general impression created is that far too little trouble has been taken in its compilation, especially in the matter of the continuity of thought. There are no precise references and though there is a bibliography it is carelessly compiled. The school boy, reading the book, might be given the impression that David Hume's *Enquiry Concerning Human Understanding* was first published by the Oxford University Press in 1961 and that Nietzsche's *Zarathustra* made its debut as a Penguin. Books quoted from in the text are not always to be found in the Bibliography. The index is too incomplete to be

useful and the headings too cryptic to help much in finding one's way around. It is disconcerting to see the usual copyright mark at the beginning of the book when the author and publishers seem to be completely oblivious of copyright laws: in no single case is acknowledgement made for permission to quote from modern authors.

Some of the discussion and information, though interesting, does not seem to lead anywhere and sometimes the more positive statements seem a trifle superficial. It is easy to say that in Theism God is not only the Creator but the sustainer of the Universe, but the ordinary reader will want to know more of what this implies. Does God sustain the disease producing virus? It is easy to say that in the Bible the word *soul* stands for the whole man, and not for something extra added to his body. This may be so but the matter ought not to be left there: though the word *soul* may be misapplied in common parlance, the *idea* of the something-extra-soul has biblical warrant. Does not St. Paul speak of inhabiting an earthly tabernacle which will be dissolved at death? A good deal is said about the possibility that memory is physically stored in the brain, but there is little to indicate whether the author thinks this is where memory resides and the possibility that memory survives death is not taken up at all (did not Dives remember his relatives left behind on earth?). Psychical research is ignored, perhaps wisely, for in some quarters it generates heat under the collar.

These criticisms notwithstanding, the book deserves every success.

R. Hooykaas, *Religion and the Rise of Modern Science*,  
Scottish Academic Press and Chatto and Windus, 1972  
162 pp., £2.25.

Professor Hooykaas of the University of Utrecht is well known as a historian of science and as the author of an important work on uniformitarianism.

The present book, a write up of his Gunning Lectures (given in Edinburgh, 1969), is a fine production: indeed it would be difficult to praise it too highly. Every page is interesting, stimulating, pithy and well written while the book as a whole is viatical, well documented and convincing.

Greek views on cosmogony are contrasted with biblical views in Chapter 1; Chapter 2 deals with the history of the relationship of reason and experience; Chapter 3 with the relation between art and nature; Chapter 4 with the rise of the experimental method and Chapter 5 with the positive influence of Protestantism, and especially Puritanism, on the growth of science. Francis Bacon, on whom Professor Hooykaas is an authority, is quoted frequently and to good effect. But a mere list of contents conveys little of the brilliance of the writing!

We select a few points only:

(1) Hooykaas shows that the extreme literality of biblical interpretation current in some quarters today has little historic protestant backing (p. 114). Despite his firm belief in the inspiration of the Bible, Calvin doubted if adders stop their ears (Ps. 55: 4) and he said that the waters above the firmament are not oceans but quite obviously clouds.

(2) The following passage from A. S. White's *History of the Warfare of Science with Theology* has been quoted times without number. "Calvin took the lead [against Copernicanism] in his *Commentary on Genesis*, by condemning all who asserted that the earth is not at the centre of the universe. He clinched the matter by the usual reference to the first verse of the ninety-third Psalm, and asked, 'Who will venture to place the authority of Copernicus above that of the Holy Spirit.'" It appears that White did not bother to consult Calvin himself but borrowed the quotation from F. W. Farrar's *History of Interpretation* (1886); the rest he invented. The alleged quotation from Calvin is imaginary: Calvin, ever a strong supporter of science, did not refer to Copernicus at all. Luther too did not oppose Copernicus in any published work: in the very early days (1539) when rumours of Copernicus's

ideas were circulating, he *may* have said privately "Joshua told the sun to stand still not the earth," but this was only recorded as a memory 27 years later (1566). Of the Reformers only Melancthon held to traditional ideas (p. 121 - 2) yet even he was on very friendly terms with Copernicus's followers. On the other hand, Catholic opposition to the new ideas was strongly pronounced.

(3) The close connection between Puritanism and early science is denied by those in whom antipuritan feelings linger: their view is only reconcilable with facts if the definition of Puritanism is narrowed to a small group of independents: in fact there were strong puritan elements in the Church of England at the time. The issue is not whether Puritanism created many first class scientists: it is whether it created a spiritual climate favourable to the cultivation and freedom of science (143). Hooykaas shows convincingly that it did. The Marxist view that the growth of science was the result of development in contemporary industry and navigation is countered by the fact that in the 16th - 17th centuries there was great interest in botany and zoology, sciences which were not of economic utility at that time. Most 16th century botanists were Protestants both in England and abroad (99).

(4) Hooykaas makes us hear again the trumpet blown by Francis Bacon in the war against the sins of laziness, despair, pride, ignorance, academic verbosity and impracticality which had held man in bondage for millenia. By understanding and developing science, Bacon called upon mankind *first of all* to glorify God in heaven: he realised that only in so far as men did this would the fall-out benefit them.

Norwood Russell Hanson, *What I do not believe and other Essays*, edited by Stephen Toulmin and H. Woolf, D. Reidel Pub. Co., Dordrecht, Holland, 1971, 390 pp.

Professor Hanson, an enthusiastic flier grooming for an attack on the speed record for piston-engined airplanes, was killed in a flying accident in 1967. In this volume the Editors have collected

a selection of his papers, some unpublished and some published but difficultly accessible. They are mostly concerned with technical philosophy and the bearings of science upon philosophical thought, but one section covers Professor Hanson's researches on the theory of flight.

Many have enjoyed Hanson's stimulating books (*Patterns of Discovery*, 1958; *The Concept of the Positron*, 1962) which have had considerable impact. Few, however, will know of his views on religion, originally published in *The American Rationalist* and *Continuum*. These papers are here reprinted (Part 5, pp. 303-331).

Hanson tells us that at one time he believed in God but he became a "reluctant disbeliever" from the time that his reason told him that "there is no good reason to believe in God."

The level of argument that follows is very low indeed. For nearly thirty pages Hanson meanders on with much repetition, revealing no understanding at all as to why many people *do* believe in God, and confusing the issue in every possible way. His chief concern is not to refute theologians but agnostics who ought, in his view, to declare themselves atheists. The following is typical:

Any descriptive account of natural phenomena which seems at first to require God's existence for its explanation, turns out always to be scientifically explicable *via* some alternative account requiring no supernatural reference whatsoever . . . Most things which once needed God's intervention, for man's comprehension of their existence — e.g. lightning and thunder, good fortune, life and death, difference in species, the flight of birds and the disappearance of dinosaurs — all these are now more profitably discussed in terms untinted with the supernatural. Since an appeal to God, and to his divine will, constitutes a terminus to all further inquiry the alternative appeals have been much more effective . . . 'God exists' has never been factually established. What *is* clear is that it has not! Because, if it ever has been, it would be as irrational and benighted of one to deny the existence of God, as it would be to deny the existence of fire, and of life and death. But this is not so. (p. 331-2)

It is odd that remarks of this kind can be left by an informed writer without reference to classical arguments, e.g.

(1) The chain argument. Investigation of a chain suspended in the sky shows each new link to be supported by all below it, but no one

doubts that the whole must be supported.

(2) Fire, life and death are observables: God is not. *If God is conceived as a Hypothesis, analogy with atoms would be more appropriate.*

No less than three times over Hanson compares belief in God with belief in unicorns! "Science now possesses the best factual grounds for denying precisely this" [existence of monsters and unicorns], he says. No details as to how science has performed this feat are forthcoming and to find a supposed "proof" not hopelessly out of date would be quite a feat. Unicorns (if not the monster of Loch Ness!) are real enough (see p. 187). The statement is as irresponsible as the statement that evidence for the existence of God is lacking. What *is* interesting is the fact that highly intellectually trained men of Hanson's calibre can talk such nonsense.

Perhaps an enterprising Christian publisher might usefully republish Hanson's essays (together, perhaps with Bertrand Russell's, *Why I am not a Christian* and a few others). Young intellectuals, noting the foolishness and vacuity of the arguments might react the other way!

L. Pearce Williams (Ed.), *The Selected Correspondence of Michael Faraday*, C.U.P., 2 vols, 1971, 1,079 pp., £21.

These magnificent volumes, produced in the best tradition of the Cambridge University Press, contain 814 letters from Faraday's correspondence, many of them published here for the first time. The Editor and his helpers have found letters in around 50 places. (But how curious, seeing that the Cambridge Press produced the volumes and extensive use was made of the letters in the Trinity College library, that the Faraday letters in the Cambridge University Library have apparently been overlooked!)

The indexing is exceptionally well done: allusions in letters are often obscure until the index is consulted, though some notes are appended here and there.

Inevitably after the long lapse of time most of the more interesting letters have been published before, but there is plenty of new (as well as old) material here. There are fine letters of Faraday to his young Quaker friend, Ben Abbott and two replies, mentions of troubles with nitrogen chloride, attempts to prove that bangers made with fulminating silver (sold in all the chemists' shops!) are not fireworks because they will not ignite gunpowder (the unfortunate vendors were fined just the same!), correspondence with Daubeny of Oxford about volcanos under the sea (strange ideas here — and Faraday's critical judgment stands out a mile above that of his correspondent!), discussion of the possibility of chemical warfare using burning sulphur (discussed by Faraday in a surprisingly nonchalant way!) and so on.

There are some delightful remarks too; "I feel hungry for a little chemistry" says Faraday after he has had too large a dose of physics; bromine he refers to as a "disagreeable inmate" of his laboratory; we are told of the theory advanced by Dr. Prout that hydrogen selenide (of all things!) "might be the cause of Influenza."

Regarding Spiritualists Faraday asks why they are "shouting out for scientific men? . . . if they are so much wiser than scientific men as to form a sure judgment when the latter are wrong, why do they want to fall back on them?" He thinks it can only be because they "secretly doubt."

There are a few passages on religion, notably in letters to A. de la Rive. The following (new) is of especial interest.

It is my belief that you can understand more of the power of God than what can be gained by the study only of his material works. Yet how wonderful they are. I think yours is just the mind to revel amongst them as the evidences in natural things of his eternal power and Godhead and though I do not like when speaking of them in a common lecture to deal irreverently with religion by drawing it in at second hand, I think it is impossible to forget who has ordered them.



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Metcalfe Blake & Co., Chartered Accountants.

AGM, Editorial and Accounts of the Victoria Institute	100
IN THE NEWS	
Noah's Blood	107
Empiricists and Rationalists	109
The Second Law and the Universe	110
Chirality and Symmetry	114
Suicides in Ireland	116
Aggression and Psychosomatic Disease	117
Science and Power	119
Holy Lotus Feet	122
An End to Hazel Twigs?	123
'In the News' Updated	125
SYMPOSIUM ON NOAH'S FLOOD	
1. D. J. A. Clines, M.A., <i>Lecturer, Department of Biblical Studies, University of Sheffield, The Theology of the Flood Narrative</i>	128
2. Colin A. Russell, B.Sc., Ph.D., F.R.I.C., <i>Reader in the History of Science and Technology, Open University, Noah and the Neptunists</i>	143
3. Frederick A. Filby, M.A., Ph.D., <i>late Senior Lecturer in the History of Science, N.E. London Polytechnic, Approaches to Reconciliation</i>	159
4. Robert E. D. Clark, <i>Editor, Faith and Thought, The Black Sea and Noah's Flood</i>	174
ESSAY REVIEWS	
Bogus Objectivity — Professor Liam Hudson on <i>The Cult of the Fact</i>	180
Independent Thinkers — Patrick Moore's <i>Can you Speak Venusian?</i> (and Freeman Dyson's <i>The World the Flesh and the Devil</i> )	188
Short Reviews	
Dr. Mascall's <i>Gifford Lectures</i> by Alan Willingale	194
F. D. Cogan (Abp), <i>World and Word</i>	196
H. R. Rookmaaker, <i>Modern Art and the Death of a Culture</i> by Dr. F. H. Cleobury, Ph.D.	197
Chaim Pearl, <i>The Medieval Jewish Mind</i>	199
R. E. D. Clark, <i>Science and Christianity</i> , by Dr. Douglas Johnson	200
Denis Alexander, <i>Beyond Science</i>	202
R. Hooykaas, <i>Religion and the Rise of Modern Science</i>	205
N. R. Hanson, <i>What I do not Believe</i>	207
Faraday's <i>Selected Correspondence</i>	209