

MAN AND NATURE—THE ECOLOGICAL CONTROVERSY AND THE OLD TESTAMENT¹

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IT is hardly necessary for me to inform this audience that we live in a time of controversy about ecology, about the balance of the natural environment in which man lives. The subject has sprung into increasing prominence in the last decade or so, and now hardly a day passes without revelations of the danger threatened to our natural resources and our future life by toxic wastes, by ill-used pesticides, by all kinds of pollution of land, sea and air. This phenomenon is not entirely new; the industrial landscape of much of the north of England is an instance close to us at this moment, and much of it goes back to the older industrial revolution of the eighteenth and nineteenth centuries. But in recent years the problem has become much more acute, because our technology can upset the balance of nature more profoundly than the older forms of waste or exploitation did. At the same time scientific knowledge makes us more aware of the danger. Politicians are becoming more conscious of the matter, and it is likely that the control of pollution and the protection of the environment will be a main centre of social and ethical discussion in the next decades.

This present lecture, however, is not concerned primarily with the political, social and technical possibilities, though it may have some connection with them. What interests me specifically is the relation between the ecological controversy on the one hand and on the other the Jewish-Christian religious tradition, with its foundation in the Bible and particularly in the Old Testament.² It has been argued that religious currents of

¹ A lecture delivered in the John Rylands Library on Wednesday, the 19th of January 1972.

² Publications on the subject have been multiplying fast. Among those which have taken an interest in the religious aspect of it I would mention H. Montefiore, *Can Man Survive?* (Fontana, 1969); J. Black, *The Dominion of Man: the Search for Ecological Responsibility* (Edinburgh, 1970); *Man in his living Environment* (Church of England Information Office); "God in Nature and History", an

thought have in fact contributed to the origin and history of the present problem ; and, conversely, those who stand within the Jewish and Christian religious tradition may be forced by the modern ecological discussion to take a fresh look at certain aspects of their own belief and to reconsider the biblical background of it.

Now to the average intelligent person it may be far from immediately clear what the Bible has to do with the pollution of the environment. What direct connection is there between the Old Testament, of which the manuscript and early printed evidence is so richly exemplified in this distinguished library, and the undrinkability of the water of the Irwell, only a few minutes' walk away? Well, there is a theory which connects the two, and which will be basic to the discussion of this lecture. It goes as follows :

First of all, modern science ultimately rests upon a foundation provided by the Bible. The doctrine of creation, as seen especially in the Genesis story, made an essential separation between God and the world. In many religions nature, or some aspect of nature, is somehow divine or partakes in divinity ; in the biblical religion, on the contrary, nature is " de-divinized " .¹ On the other hand, though nature is something other than God, it is explicit in Genesis that nature is not anti-God ; it is not something opposed to God, something in itself evil. On the contrary, as Genesis puts it, " God saw that it was good " ; and according to Genesis the created world is a cosmos, an ordered whole. Modern science did not originate within the biblical experience, but nevertheless some basis derived from the biblical experience was necessary in order that the later scientific world-outlook might arise. It could not, according to the theory I am describing, have arisen in a world where nature was regarded either as partaking in the divine or as partaking in evil. It is

ecumenical report, basically by H. Berkhof, published in *New Directions in Faith and Order: Bristol 1967* (World Council of Churches, Geneva, 1968), pp. 7-31. This lecture was already complete when I came across J. Macquarrie, " Creation and Environment ", *Expository Times*, lxxxiii (1971-2), 4-9.

¹ The German phrase, " die Entgötterung der Natur ", expresses the idea somewhat more gracefully ; I do not know who first used it.

characteristic therefore that science arose within a Western and Christian culture; and, even though scientists commonly do not recognize it, it is from the demythologization of the world in the Book of Genesis that science ultimately in a historical sense derives.

There is another aspect to this same theory. The biblical religion, it points out, set man over nature and gave him authority, indeed encouragement, to govern and control it. In Genesis man is the crown of the creative process; he is in the image of God and thus sharply distinguished from the remainder of the creaturely world. He is told by God to "have dominion" over the animals, to "subdue" the earth. Scientific technology is the fullest development of this controlling status of mankind. It is not only a study of what goes on in nature, it is also a taking of control. Technology can thus be thought of as a sort of secular fulfilment of a basic outlook about humanity which was already expressed in Genesis.

In these respects, then, it is argued, modern science, in spite of its own frequently irreligious form, stands in some considerable harmony with the biblical and Hebraic attitude to the world. It correspondingly contrasts with the Greek attitude. Though the ancient Greeks did develop the sciences in some degree, science in its modern form could not have arisen on the soil of Greek thinking. It was the heritage of Aristotle above all that had to be shaken off at the Renaissance and Reformation before modern science could be free to progress. This point indeed contains the answer offered to one of the obvious objections which might be made against the entire theory we are considering. It might be asked: if modern science has its basis in the biblical world-view, why then did it not take its rise until many centuries after the biblical heritage in Christianity had become culturally dominant in the world? The answer commonly given is somewhat as follows: during the Middle Ages the Church in Western Europe "saw it as her duty to preserve and develop the Graeco-Roman scientific heritage, embodied in works such as those of Ptolemy of Alexandria. This was a heritage of static conceptions about nature and history".¹ It is represented, then, that the

¹ So "God in Nature and History", op. cit. p. 16.

Jewish-Christian religious tradition, at least if properly understood, is favourable towards science, while the Greek tradition is unfavourable.

You will notice that I bracket " Jewish " and " Christian " together as one element. Of course the civilization in which modern science grew up was a Western and Christian one, and Judaism was a minority religion in it ; for its basic conceptions of man and the world, however, Christianity went back to the Old Testament, and for all purposes of argument in this lecture Judaism and Christianity can be taken together, even though some writers may mention only one of them.

Indeed there has been a tendency to include along with Judaism and Christianity also the case of Islam ; for Islam also is a religion of the same group, with its origin on Semitic soil ; and those whose theory we are discussing seem often to make favourable mention of Muslim science, and of its part in bridging the gap between antiquity and science in its modern form.

Incidentally, the favourable mention of Muslim science in this connection is one of the curiosities of the whole theory. It is difficult to find in print an explicit statement of what is meant, but probably the usual opinion is somewhat as follows : such scientific progress as there was during the Middle Ages did not take place in Europe, where it was stifled by Aristotelianism and the Greek heritage in general. It took place in the Islamic world, and this belongs rather to the circle of revelation along with Judaism and Christianity, going back basically to the Bible in its ideas of man and nature. If this is what has been meant, however, the argument is a poor one, for the main content and attitudes of Islamic science appear to derive solidly from Greek sources.¹ Within the context of the present discussion, the case

¹ Cf. for example these two quotations from *The Legacy of Islam* (ed. Arnold and Guillaume, Oxford, 1931) : in " Science and Medicine ", p. 354, M. Meyerhof writes : " Looking back we may say that Islamic medicine and science reflected the light of the Hellenic sun, when its day had fled " ; and in " Astronomy and Mathematics ", p. 376, Carra de Vaux writes : " The Arabs are before all else the pupils of the Greeks : their science is a continuation of Greek science which it preserves, cultivates, and on a number of important points develops and perfects ". See now also F. Rosenthal, *Das Fortleben der Antike im Islam* (Zurich and Stuttgart, 1965).

of Muslim science must logically lead in a direction opposite to that in which it is commonly supposed to lead.

To return to our main topic, the interpretation which I have been expounding is one which establishes a sort of inner unity between natural science and Jewish-Christian faith, at least in its biblical form. It accepts with satisfaction the progress of science and technology, and argues that biblical religion has been an important factor in enabling man to stand over against nature and so eventually to dominate it. The conflicts between science and religion, so marked in the nineteenth century, were superficial rather than profound; they were caused largely by the failure of religious people either to understand their own biblical and theological tradition or to discern the true nature and value of the scientific progress that was being made.

It may well be asked who are the people who have in fact held and made popular this doctrine. Like a number of ideas which have become part of the stock-in-trade of current theology, it is not always easy to discover who first propounded it or to find an exposition of it which is both typical on the one hand and careful and competent on the other. Great influence was certainly exercised by three articles of M. B. Foster in 1934-6.¹ These argue that there are "un-Greek elements" in the modern theory of nature and that the peculiar character of the modern science of nature has been determined by these; the source of these un-Greek elements is the Christian doctrine of creation.² Foster's argument, however, is neither biblicistic nor anti-Greek; he does not lay stress on Hebrew thinking (cf. *Mind*, xliii, 465, n. 1), and he regards the Christian doctrine of creation as having derived a great deal from the Greek. His arguments receive considerable attention from theologians like John Baillie³ and E. L. Mascall.⁴ Baillie cites the Russian thinker Berdyaev as asserting that "Christianity alone made possible both positive science and technics"⁵ and the philosopher John Macmurray

¹ *Mind*, N.S., xliii (1934), 446-68; xliv (1935), 439-66; xlv (1936), 1-27.

² *Mind*, xliii, 448.

³ *Natural Science and the Spiritual Life* (Oxford, 1951).

⁴ *Christian Theology and Natural Science* (London, 1956); cf. pp. 94 ff.

⁵ *The Meaning of History* (London, 1936); cf. Baillie, p. 30.

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as claiming that modern science is not only “the product of Christianity” but “its most adequate expression so far”.¹ Works which later popularized this sort of position, like Alan Richardson in his *The Bible in the Age of Science* (London, 1961), are more anti-Greek.²

A full statement of our theory, in a strongly Hebraic dress, comes from Harvey Cox in his well-known book *The Secular City* (London, 1965). The Hebrew view of creation is a marked departure from previously existing world-views. “It separates nature from God and distinguishes man from nature”. This is a process whereby nature becomes, in Cox’s term, “disenchanted”; and this “allows man to perceive nature itself in a matter-of-fact way”. “This disenchantment of the natural world provides an absolute precondition for the development of natural science”.³

In any case, I believe that opinions of this type about the relation between science and Jewish-Christian faith have become very common, and can only agree with Prof. Macquarrie in his opening sentence: “It has been fashionable in recent years among some theologians to make much of the claim that Western science and technology owe their origins to biblical influences, and especially to the biblical doctrine of creation.”

Now this interpretation of which we have been speaking not only makes a connection between natural science on the one side and the biblical and Jewish-Christian tradition on the other, but also attaches a high positive value to this connection. Science and technology are highly valued within it, and the association of the Bible with them is understood to redound to the credit of the Bible. It might be unfair to suggest that this is a mere piece of apologetics, an attempt to gain for biblical religion some reflection of the prestige attaching to science; but though this was not the intention of those who framed this theory, in the result it may have had very much this effect on those who

¹ *The Clue to History* (London, 1938); cf. Baillie, p. 31.

² Cf. the account of “Greek pseudo-science”, pp. 14-16.

³ Cox, pp. 22-24. I have not been able to see the similar work of the Roman Catholic theologian J. Metz, *Theology of the World*, cited by Macquarrie, op. cit. p. 4.

accepted it.¹ In it the achievements of science and technology are very positively valued, and the relation between science and biblical faith serves to shed some reflected value upon the latter.

In the last few years, however, this rather sunny and positive account of the relation between science and biblical faith has begun to be countered by a darker and more negative one. The difference lies in whether we are looking at the achievements of science or at the dangers brought upon us by technology. If science is related to biblical faith, then the achievements of science may be made to redound to the credit of biblical faith; but by the same argument the pollution crisis and the dangers of damaging the environment can be taken as a discreditable consequence of faults and weaknesses in Jewish-Christian faith. In 1967 Lynn White, Jr., a professor of history in Los Angeles, published in the American weekly *Science* an article called "The Historical Roots of our Ecological Crisis".² He argued that the ecological crisis was unintelligible without an understanding of its religious background; and mere technological advances, he suggested, could not be expected to solve it without a revolution in religious attitudes at the same time. Christianity, he maintained, is much to blame for the existence of the present crisis. "Christianity . . . not only established a dualism of man and nature but also insisted that it is God's will that man exploit nature for his proper ends." And, again, "By destroying pagan animism, Christianity made it possible to exploit nature in a mood of indifference to the feelings of natural objects." Thus "Christianity bears a huge burden of guilt", for our science and technology are deeply "tinctured with orthodox Christian arrogance toward nature".

The difference between the argument we have already described and the position of Lynn White is one of emphasis between positive and negative. The idea of the relation between biblical faith and modern science is the same in both. But while this has generally been given a positive evaluation, White speaks

¹ Macquarrie, *op. cit.* p. 4, does consider it fair to say that the theologians concerned "were hoping . . . even to gain for it [i.e. the doctrine of creation] some reflection of the glamour that is popularly ascribed to technology".

² *Science*, 155, 10 March 1967, no. 3767, pp. 1203-7.

in terms not of praise but of blame. For him, this is Christian arrogance ; for him, the command of Genesis that man should dominate the earth is not at all a good thing. While the main theological tradition, in linking biblical faith with the rise of science, has basically claimed that the biblical tradition in this respect was entirely right, White is already looking in another direction. The connection between biblical faith and modern science and technology is a good reason why we should revolt against biblical faith. Along with some of the hippy culture, he recognizes Buddhism as a possible option ; but he himself in the end turns to St. Francis who, he maintains, “ proposed what he thought was an alternative Christian view of nature and man’s relation to it ; he tried to substitute the idea of the equality of all creatures, including man, for the idea of man’s limitless rule of creation ”.

According to this newer view, then, the ecological crisis reveals a profound fault in the Jewish-Christian religious tradition. It is likely, moreover, that this point of view will be widely influential. Lynn White’s article was widely excerpted and reprinted in magazines like *Horizon* (summer 1967). In general, many of the valuable works now being published on ecology make some comment on the relations of the subject to religion. Not all of them, however, do this in the same way. Max Nicholson maintains that “ organised religion ” is the chief obstacle standing in the way of a harmony between man and nature.¹ In this respect ancient Judaism and modern Christianity are particularly bad, for they preach “ man’s unqualified right of dominance over nature ”. One might just conceivably find in the Old Testament some limited qualifications to man’s ruthlessness ; but any such restraints “ are feeble compared with its chronic and uninhibited incitement towards aggressive, exploitative and reproductively irresponsible behavior in the human species ”. The churches, Nicholson argues, should

¹ *The Environmental Revolution* (London, 1970), pp. 264 f. It is not quite clear whether Nicholson either knows or, like Lynn White, accepts the theory we have been describing, i.e. the view that the intellectual roots of science and technology lie in the biblical religion. His thinking seems to lie rather on the level of popular ideas of the Old Testament as a crude and violent work.

have rethought the whole matter in the light of modern experience, but have abysmally failed to do so¹; “their adherents have, with few exceptions, persisted in behaving as rampant Old Testament tribes”.

Again, Jean Dorst in the foreword to his book makes a contrast between “Oriental philosophies” and “Western philosophies”, and says that the latter “emphasize the supremacy of man over the rest of creation, which exists only to serve him”; and in illustration of this he cites Genesis i. 28-29.² Dorst, however—and here, I submit, he is much more fair than Nicholson—points out that quite similar tendencies can be found in materialist philosophies, so that a failure to emphasize the protection of animals and plants is not peculiar to the religions but belongs in general to “the European philosophy whence our technical civilization was derived”.

All such arguments are likely in the next decades to form a significant challenge to Jewish and Christian religion. One more reason for this which we may add is that they follow the same lines as an older and more familiar argument, which was not about science and technology but about capitalism.³ According to this view, capitalism was engendered by Calvinistic and puritanic (i.e. highly biblical) types of religion; and, in the context of the argument, capitalism is essentially an exploitative process directed towards the means of industrial production, just as the ecological crisis derives from exploitative processes towards nature itself. Echoes of that older discussion are likely to be heard within the newer; and in both cases, it will be suggested by some, Jewish-Christian biblical faith is seen to encourage in people an irresponsible exploitative urge.

Such then is the setting of the matter in present-day discussion and, given that this is so, I propose to look at Genesis, and the Old Testament as a whole once again, and to consider

¹ It is not clear whether Nicholson has any knowledge of reports by official church bodies, such as those mentioned in n. 2, p. 9 above.

² *Before Nature Dies* (London, 1970), pp. 18 f.

³ See, among the multitude of literature, M. Weber, *The Protestant Ethic and the Spirit of Capitalism* (1930); R. H. Tawney, *Religion and the Rise of Capitalism* (1926); K. Samuelsson, *Religion and Economic Action* (New York, 1961).

whether in this whole matter it has been rightly used. Naturally I am not so naive as to suppose that the Book of Genesis can settle our technological problems of today ; and no one, I think, supposes that it can. I am concerned with the historical question, whether the connections which have been established between the Bible and modern science or technology are the result of fair interpretation of its interests and tendencies, and whether the Bible really has in the history of ideas a connection with science and technology of the kind which I have described.

Now, to begin by stating my own opinion in general, I would submit that the whole connection set up between the Bible and modern science and technology, as described earlier in this lecture, is thoroughly faulty and needs to be entirely rethought. As we have seen, Lynn White, in blaming the Jewish-Christian tradition for the ecological crisis, predicated his assertions on the same position which theologians had argued in order to associate that tradition with the origins of modern science.¹ The theologians cannot expect to escape from the censure of Lynn White unless they abandon or revise the set of hypothetical connections in the history of ideas upon which he and they alike depend. In order to do this, one need not argue that there is no connection between the Jewish-Christian doctrine of creation, or its biblical foundations, and the rise of science or the assumptions of science. Science did in fact grow up in a Jewish-Christian world, and the doctrines and legends of that world had an enormous influence on everything that went on in that world. But to suppose that these doctrines not only influenced the rise of science but had an extremely vital and preponderating causal relation to it, seems just enormously improbable.² In saying this I am encouraged

¹ Within Lynn White's work one cannot help contrasting the generality and vagueness of his article in *Science* which, as I have said, depends upon the same general theory as many theologians hold, and the precision and carefully evidenced nature of his own expert work *Medieval Technology and Social Change* (Oxford, 1962).

² Careful theologians, aware of the weakness of the position under discussion, often have to phrase it negatively ; thus Archbishop Temple wrote : " It may be too much to argue, as some students of the subject have done, that science is a fruit of Christianity, but it may be safely asserted that it can never spontaneously grow up in regions where the ruling principle of the Universe is believed to be

by the fact that, though many theologians confidently assert such a relation, historians of science appear to be able to do much of their work without even mentioning it,¹ and most men of science, I would suspect, would be very surprised to hear that any such opinion existed at all.²

The relations between Genesis, its later interpretations in Jewish-Christian doctrine, and the origins of science and technology seem to me to be far different in character. I shall begin with some points in the interpretation of Genesis and return to the broader issues later.

Firstly, what is the image of God in man? Since the collapse of the older orthodox Christian exegesis, according to which the image consisted in the spirituality of man, his soul or his rationality, the dominant tendency has been to identify the image as being man's position of dominion over nature—which, after all, occurs in the very same passage. As God governs all, so man in the image of God governs the remainder of creation: an analogical relation.³ But I do not think that this is a probable exegesis. As I have argued elsewhere, the⁴ passage is concerned with a long-standing, and peculiarly Israelite, debate about the question of likeness between God and man; it is within that

either capricious or hostile"—see J. D. Davies, *Beginning Now* (London, 1971), p. 124. Negative arguments of this kind, or similarly the argument that ancient Indian metaphysics never produced any scientific research, do not in fact prove much.

¹ Thus H. Butterfield, who is certainly sensitive to theological questions, appears to have written his *The Origins of Modern Science*, covering the crucial period 1300-1800, without any mention of the said relation.

² Their surprise would be shared by the vast majority of adherents of the Christian and Jewish faiths, who are totally unaware of this relation; its existence is in fact very much an esoteric belief of theologians.

³ Cf. for instance "God in Nature and History", *op. cit.* p. 18: "When Gen. i. 27 says that God created man in his own image, the whole passage i. 26-28 makes it clear that what is mainly thought of is man's dominion over nature. As God is the Lord over his whole creation, so he elects man as his representative to exercise this lordship in God's name over the lower creation."

⁴ See my "The Image of God in the Book of Genesis—A Study of Terminology", in this BULLETIN, li (1968-9), 11-26, and "The Image of God in Genesis—some Linguistic and Historical Considerations", awaiting publication in the *Proceedings of the Tenth Meeting (1967) of Die Ou-Testamentiese Werkgenootskap in Suid-Afrika*.

context that the terms like "image" and "likeness" make sense. The point was not that man had a likeness to God through acting as God's representative towards the rest of created nature, but that he himself was like God. In what way he was like God is not stated; probably it was essential to the writer's position that it could not be stated. There is of course a connection between the image and the dominion over nature, but this is not such that the image consisted in the dominion. It is likely rather to be a consequential relation: *since* man is in the image of God, let him have dominion, etc. Negatively, we may note one additional point. The idea that the image consists in dominion over nature does not fit with the other two places at which the image terminology is used, namely Genesis v. 3 ("Adam had a son in his own image") and ix. 6 ("he that sheds the blood of man, by man shall his blood be shed, because in the image of God he created man"). Homicide was to be punished not because man had dominion over the animals, but because man was like God. In general, then, though man's dominion over the rest of the world is connected with his being created in the image of God, this is not the essential point of the image; and any exegesis which so interprets has the effect of laying too strong an emphasis on this dominion. The dominion over nature remains in any case a fact within the text, but it has come to be over-emphasized in that trend of exegesis which has made it identical with the image of God in man.

Secondly, then, turning to the subject of man's dominion, the emphasis in Genesis does not appear to lie on man's power or on his exploitative activities. There has indeed been in the modern exegetical tradition, especially when the image of God has been identified with man's dominion over the world, a tendency to dwell with some satisfaction on the *strength* of the terms employed.¹ Thus it is argued that the verb *rada* "have dominion" is used physically of the treading or trampling of the

¹ See for instance von Rad, *Genesis* (1961), p. 58; *Old Testament Theology*, i. 146; Black, *Dominion of Man*, p. 37. Black's fine book—not by an Old Testament scholar—suffers somewhat from dependence at such points on a rather narrow line of exegesis (e.g. dependence on Cassuto; Black, *op. cit.* pp. 35 f.).

wine-press; and the verb *kabaš* "subdue" means "stamp down". According to Black (p. 37), it "is elsewhere used for the military subjugation of conquered territory, and clearly implies reliance on force"; it "is a very powerful expression of man's attitude to the rest of nature, and suggests that he sees himself in a position of absolute command."

There are, however, elements which indicate that the matter is not one of simple power or exploitation. A point of general structural importance is the fact that the most obvious of all human relationships to the animals, i.e. the use of animal flesh for food, does not here come into consideration. Genesis i is explicit that in the beginning man was vegetarian, as were also the animals; the only difference was that man ate one element of the vegetation and the animals another. In the P source of the Pentateuch—the same source as Genesis i—the authority for the eating of animal flesh is quite expressly given only after the Deluge, Genesis ix. 2-3 (NEB: "Every creature that lives and moves shall be food for you; I give you them all, as once I gave you all green plants"). Similarly, it is only at this point that we hear that human domination might produce any kind of unpleasant consequences for the animal world. In ix. 1 there is repeated the command "Be fruitful and increase, and fill the earth", as in Genesis i; but here it is followed, as is not the case there, with the assertion that "the fear and terror of you shall be upon all the beasts of the earth". Thus the human "dominion" envisaged by Genesis i included no idea of using the animals for meat and no terrifying consequences for the animal world. Human exploitation of animal life is not regarded as an inevitable part of human existence, as something given and indeed encouraged by the ideal conditions of the original creation; at most, it is something that comes along later, after a deterioration in the human condition, as a kind of second-best. This fact makes a very considerable difference to the total impact of the idea of human dominion within the legends of Genesis.

All this leads us to look once again at the two verbs *rada* "have dominion" and *kabaš* "subdue", of which so many exegetes have remarked that they are "very strong". Of *rada* we should not attach much importance to the physical sense

“ tread out (the wine-press) ” (only Joel iv. 13, *bo'u r' du*) ; even granting that this is the same verb, it is quite another semantic department of it. We should not allow the physical sense to dominate over general usage just because physical senses are “ primary ”. The word means “ govern, rule, have dominion ”, and is used quite generally of kings ruling over certain areas, of masters controlling servants, of God ruling his land, ruling in the midst of his enemies, and so on. For instance, in 1 Kings v. 4 (EV iv. 24) the verb is used to express Solomon's dominion (expressly a peaceful dominion) over a wide area. The word is not at all necessarily a “ strong ” one (NEB at 1 Kings iv. 24 well renders “ he was paramount ”).

The other verb, *ḵabaš* “ subdue ”, has a better claim to be regarded as “ strong ” ; it can be said to suggest violent physical movements like trampling down. But here another difference comes in : this word is not used of the animals but only of the earth, in our passage “ fill up the earth and subdue it ”. I doubt whether more is intended here than the basic needs of settlement and agriculture : man is to fill up the earth, take possession of it, and take control of it. Basically what is intended is tilling ; it corresponds with the “ working ” or “ tilling ” of the ground in the J story, Genesis ii. 5, 15.

What then is the basic interest of Genesis in the whole matter of the animals in their relation to man? Why should the matter have attracted the concern of the writer in the first place? The most natural view, I would suggest, is that this is a paradise picture. It narrates for the beginning of the world a situation very similar to that which Isaiah xi relates for a future time, namely a period when there is peace in the animal world, peace between animal and man, no eating of animal flesh either by man or by animal, and the whole idyllic scene presided over by man. Man's “ dominion ” therefore contains no markedly exploitative aspect ; it approximates to the well-known Oriental idea of the Shepherd King. The corresponding element in the J story is the point at which God brings the animals (as partners!) to the first man “ to see what he would call them ” (ii. 19).

We can thus expect that exegetes will in the future tend to reduce their emphasis on the “ strength ” of the terminology for

man's dominion over nature in Genesis. Such a tendency is already visible in the fine commentary of C. Westermann, now appearing in the series *Biblischer Kommentar*. He points out that the use of *rada* "have dominion, govern" in i. 26 can be compared with what is said in i. 16 about the sun and moon, which are to "govern" the day and night (a different Hebrew word indeed, but there is no reason to suppose that this makes much difference).¹ Westermann writes that this is *herrschen, beherrschen* in the wider sense, as found in German when one speaks *von einer die Landschaft beherrschenden Höhe* ("of a high point dominating the landscape") or *von vorherrschenden Einflüssen* ("of predominating influences"). The sense "govern" is *uneigentlich*, not the proper one; there is no idea of exploitation, and man would lose his "royal" position in the realm of living things if the animals were to him an object of use or of prey.

It is of course possible to argue that the Genesis account of creation has had an influence on the growth of science and technology not through its own original meaning but through the interpretations which have been placed upon it. It would then be possible that, even if the original sense as I suggest laid little stress upon exploitation, nevertheless the general effect of the passage in the history of ideas had been one which encouraged ideas of human force and exploitation. This may or may not be so; I have not been able to carry out a study of the ways in which Genesis in this regard has been used over a period of many centuries. But I would point out this fact: that until comparatively modern times the dominant Christian theological exegesis was one which connected the image of God in man with man's immortal soul, his reason, his spirituality; something of this is already present as early as the Apocryphal Wisdom of Solomon ii. 23. Under this sort of interpretation the relation of man to the rest of nature, and especially the animal world, tended to be thought of not as the practical question of control, technology and exploitation, but as the *superiority* of the rational being, with his immortal soul, over that which is soulless and mortal.

¹ Westermann, *Genesis*, pp. 219 f., 183.

As I have already suggested, it was only in fairly modern times, with a loss of conviction in the traditional exegesis (largely because historical study made it seem now quite unlikely that the Hebrew Genesis was concerned with rationality and the immortal soul) that an exegesis which laid great emphasis on the dominion of man over nature became prevalent. We must therefore doubt whether the Genesis passage, under the interpretation which it enjoyed for most of its historical life, can have had so great an effect in encouraging man in practical measures of exploitation and domination.

Moreover, the major Old Testament creation stories show little interest in the origins of technology. This is striking, because considerable elements of technological legend are quite common in stories of the beginnings of mankind. Something of the kind is no doubt mirrored in the idea of the successive ages, the Golden, Silver, Bronze and Iron. A particularly good example is furnished by the Phoenician legends transmitted to us by the Greek writer Philo of Byblos.¹ He said that he got his material from the Phoenician Sanchuniathon, who had lived about the time of the Trojan Wars—very roughly, in other words, about the time of the earliest Old Testament writings. This estimate may well be a wild one, but nevertheless the material seems to be well comparable with that of the Old Testament. This story—which in its present form may indeed be much distorted—combines the genre of theogony with that of what we may term technogony: it begins with genealogies and matings in the world of the gods but eventually comes down to a more human and practical level, telling of who first discovered food from trees, the making of fire by the rubbing of sticks, the making of rafts and boats, the use of animal skins for clothing, the working of iron, the making of brick walls, and so on.

It is easy to show that this kind of technological story of human origins existed in the biblical world, for a fragment of one is found in the tale of Cain and Abel, the similarity of which

¹ Greek text in F. Jacoby, *Die Fragmente der griechischen Historiker*, Dritter Teil, C II, no. 790, pp. 802-24. For a useful discussion see F. Løkkegaard, "Some Comments on the Sanchuniathon Tradition", *Studia Theologica*, viii (1954), 51-76.

to Philo of Byblos has often been remarked.¹ This tale, though now set as sequel to the story of Adam and Eve, may in an earlier stage have been part of an independent story of human origins. Right at the start it notes the occupational difference between Cain and Abel, and later it goes on to tell a story of human discovery, saying who was the first to live in tents and keep cattle, the first to have musical instruments, and the first to use bronze and iron ; also it tells who founded the first city. Thus the genre of the technologically-interested legend of origins is found in fragments in the Old Testament, and it certainly was well known in the environment ; but in the central biblical stories of creation and human origins it is scarcely represented at all. There is little interest in the development of tools and weapons ; nothing of this kind figures in the depiction of the central personages like Abraham.² Nimrod the "mighty hunter", possibly also a fragment from an early technogony, is in the present Genesis characteristically a peripheral figure, lacking any real connection with the story. The prosperity of Isaac as a farmer is reported (Gen. xxvi. 12), but there is no interest in his agricultural methods ; the matter belongs rather to the blessing of God which was upon him.

Something similar can be said about the depiction of God. For this purpose the Bible uses only to a limited extent images from the life of the craftsman and artisan. It forms a contrast with both the Near Eastern environment, in which artisan deities like the Ugaritic K-th-r w-H-s-s are well known, and the situation in Greece, where the conception of God as a great designer and artificer was highly developed.

The place where the Old Testament takes an interest in technology is not within the creation stories and historical literature, but in the wisdom literature. Here, and notably in Job, quite a lot is said about the exploitation of the riches of

¹ E.g. Skinner, *Genesis*, p. 123.

² There is an amusing contrast in a quaint story found in the *Book of Jubilees* (a sort of later rewriting of Genesis), xi. 23-24. In Ur of the Chaldees at sowing-time much trouble was caused by ravens, which devoured the seed, and Abraham (!) instructed the carpenters how to integrate a seed-box with the plough, so that the seed was immediately covered with earth and made safe from the ravens. This is a totally different atmosphere from that of Genesis.

the earth, the mining for precious stones, the possibilities of and the limits of exploration by land and sea. It is in Ecclesiastes, one of the later products of this literature, that we find a writer facing the problems for faith that arise when the world process, "all that happens under the sun", is contemplated. It is Solomon, the legendary patron of this strain in Israelite thought, who is credited (1 Kings v. 13; E.V. iv. 33) with discourse about trees, about animals and birds, reptiles and fishes. The fact that this sort of proto-scientific interest is cultivated in the wisdom current of literature, rather than elsewhere, is significant.¹ Of all the Old Testament material, it is this which expresses a realization of an international and even inter-religious culture. The sort of scientific and technological interests that it reveals are *not* explicitly derived from the specific revelation of God to Israel.

If in fact Hebrew culture contained unique insights, even *in nuce*, which were later to bear fruit in the form of science and technology, one would have expected at least some minimal distinctiveness in point of science and technology to have attached to the material life of ancient Israel.² I do not, however, know of any way at all in which such distinctiveness could be argued, whether we look for our facts to archaeology or turn to the Bible's own account of the matter. The material and technical culture was, so far as I know, absolutely continuous with that of Israel's neighbours.³ True, the position which we are discussing did not assert that science and technology were

¹ The other place where we could locate a sort of proto-scientific interest in Israel would be outside of the canonical Old Testament, i.e. in the apocalyptic literature, with its astronomical speculations. Note the parallel with the passage from Jubilees cited above, p. 25, n. 2. For a stimulating recent study of apocalyptic thought in relation to modern theological problems, see K. Koch, *The Rediscovery of Apocalyptic* (London, 1972).

² Cf. also Macquarrie, p. 5: "The Hebrews themselves held to a doctrine of creation for several centuries, but they developed no science worth mentioning."

³ The building which most interested the biblical Israelites, i.e. the Solomonic temple, was expressly of Phoenician craftsmanship. The story is interested in its patterns and dimensions because of the religious significance of the entire building; such interest as there is in the methods of construction used is entirely religiously, and not at all technologically, motivated.

already present in biblical Israel, but only that biblical Israel formed the ideas upon which their later rise was dependent. Nevertheless it is striking if one has to admit that these ideas, which were to be so essential to scientific progress two millennia later, had absolutely no such effect in their own time. The fact that this was so militates, in spite of all possible qualification, against the hypothesis of an integral relation between biblical thought and the rise of science; and the same is true of the doctrine of creation in its developed Christian form.

What then are the intellectual antecedents of modern science? I would not consider myself competent to offer a scholarly opinion about such a complicated matter, but some sort of generalization must be ventured. Basically I would be against all attempts to explain a complicated modern process by setting it against two or three simple and remote models such as " biblical thought " or " Greek thought ". I would see the rise of science in the image of a " take-off ", where the most relevant forces and pressures are not the ones at the beginning of the process but those nearer the critical point; the important decisions then would be those made from the latter part of the Middle Ages onward.¹ But if it were insisted that one must specify the analogue of science in remote antiquity and the source from which it has developed, I personally do not doubt that the basic intellectual ancestry of modern science must be found in Greek science. In spite of the enormous differences between Greek science and modern science, and in spite of the revolution against Greek science through which modern science came to birth, it seems to me that there is an undeniable continuity on the level of history of ideas. Important concepts and aspects of method are carried over, and essential social characteristics, such as a widely

¹ It is interesting that the strong points of Lynn White's original article lie in the Middle Ages, which are his own special period. In the same regard, he rightly observes that the area in which modern science arose is not coterminous with Christendom. Modern science, he rightly sees, belongs to the West, and many centuries of Christianity in the Greek East did not generate it there. But does this not only lead to the conclusion that the decisive factors in the rise or non-rise of science are something other than the presence or absence of the Jewish-Christian doctrine of creation?

enquiring spirit and a freedom of thought and discussion, are held in common.

As I have already said, this does not mean that there is no connection between the Jewish-Christian doctrine of creation and the rise of science. The crisis of Greek science and the rise of modern science were intricately linked with the crisis of medieval religion and the birth of Protestantism and modern liberalism and humanism. Such things as openness to new ideas, and freedom for research and criticism of tradition, which are essential to the health of science, were in the history of thought deeply connected with the religious development. It does not follow from this that in terms of *content* the religious tradition furnished essential presuppositions for science. The argument that many early scientists were clergymen or were devoted students of the Bible and theology seems to me to be nugatory. This was true of the educated man in general in those times. Moreover, the ideas then entertained about a subject like the Old Testament view of reality were worlds apart from the conceptions of modern scholarship; and the linkage alleged between Hebrew thought and science is something that depends entirely on a modern, and not on the traditional, view of the interests and perceptions of the Old Testament.

The interpretation of the Old Testament in this whole matter depends to a high degree not on what it itself says but upon what is imagined to be in contrast with it. As I said at the beginning of this lecture, it is commonly held that in other religions than the biblical nature was understood to be in some way divine. Hebrew faith uniquely broke through this barrier and enabled men to see nature for what it is. According to some accounts, the history-centred character of Hebrew faith enabled it to escape from bondage to nature.¹ Because this picture of the ancient religions provides the background to the Old Testament

¹ See Cox, *op. cit.* pp. 22 f.; "God in Nature and History", pp. 9 f. Note in the latter, p. 9, the statement that "For the primitive and ancient religions of the Middle East, God or the gods are mainly revealed in nature. Nature is the external aspect of divine reality." But do we know that this is so? Cf. also the schematic assertion, *ibid.*, p. 10: "In the ancient religions, history is naturalized; in Israel nature is historicized." Contrast with this B. Albrektson, *History and the Gods* (Lund, 1967).

and delineates the opposition against which books like Genesis are supposed to have been written, it becomes decisive in interpretation. But can this picture of a world of nature-religions be valid? Does the evidence from ancient texts support it? The picture of the ancient religions, against which the Hebrew contribution has been set, seems to depend excessively on purely theological and philosophical analysis of what it *must* have been like, too little on expert historical analysis of what it *was* like.¹ Unquestionably aspects of the ancient religions (or of some of them—in this they differ from one another) can be understood as suggesting that divinity was in nature or that nature was in harmony with the divine. But it seems to me very hard to interpret all the variety of the mythological texts as if they in fact added up to a declaration of harmony between nature and the divine. Still less can I understand it when the very same characterization is applied to Greek science; and Foster's generally careful philosophical analysis in the articles mentioned seems to be complemented by a much wilder sort of generalization when he writes that the attitude of the Greek scientists was "an intellectualized form of nature worship", a statement cited with apparent approval by Baillie.² Whatever seems to be theoretically likely or probable, hard evidence does not seem to have been produced to show what sort of connection there was between nature elements in ancient mythologies on the one hand and the way in which the ancient peoples in practice perceived nature. In particular, it is not clear that cultures which had advanced nature-religions or advanced mythologies were thereby necessarily

¹ In this much must depend on the discussions of specialists, such as Assyriologists, on the function of myths within ancient cultures. A key position is held, for instance, by the ideas of Th. Jacobsen. On this see G. S. Kirk, *Myth: its Meaning and Functions in Ancient and Other Cultures* (Cambridge, 1970), especially pp. 84-118. W. G. Lambert, in his *Babylonian Wisdom Literature*, pp. 1-20, suggests that already in Akkadian myths the gods have ceased to be aspects of nature; see Kirk, *op. cit.* pp. 119 f.

² Baillie, p. 31; I have not seen the original source. Foster's definition of paganism as "the failure to distinguish God from nature" seems to me schematic and dogmatic and poorly related to the facts of ancient religion (*Mind*, xliv. 442); and cf. his assertion that "the identification of God with Nature finds its earliest expression in the deification of natural powers which is characteristic of the Greek polytheistic religion" (*Mind*, xliii. 456).

inhibited from making remarkable technological advances. The ancient Egyptians, in whose religion the animal realm was particularly closely associated with the divine, were able to advance to the building of the pyramids in a very brief space of time. If some of the pictures of ancient religion which have been painted are accurate, I do not see how the pyramids could have been built.¹ The illustration is not an idle one, for the experiences of technology in the form of mining and similar activities as mentioned in the Old Testament most probably go back to Egyptian initiatives.

We return then to the modern ecological controversy from which we began. If my arguments are correct, there is much less direct connection between biblical faith and modern science than has been recently believed in some theological currents. The Jewish-Christian doctrine of creation is therefore much less responsible for the ecological crisis than is suggested by arguments such as those of Lynn White. On the contrary, the biblical foundations of that doctrine would tend in the opposite direction, away from a licence to exploit and towards a duty to respect and to protect. I do not say this out of a wish to avoid responsibility for what has been done wrongly ; but if one is to speak of responsibility, one has the duty to see that it is fairly adjudged. My original interest in this subject was not kindled by the present ecological discussion, but rather by my own doubts about the theological argument which linked the Bible to the rise of modern science. This argument needs to be entirely rethought for the sake of truth, whatever its relation to the ecological controversy. But, as far as one must speak of responsibility and guilt, I would say that the great modern exploitation of nature has taken place under the reign of a liberal humanism in which man no longer conceives of himself as being under a creator, and in which therefore his place of dominance in the universe and his right to dispose of nature for his own ends is, unlike the situation in the Bible, unlimited.

¹ This objection could be advanced for instance against the argument of Berdyaev, cited by Baillie, p. 30, to the effect that so long as man was in communion with nature and based his life upon mythology, he could not have built railways or invented the telephone.

This leads me in conclusion to mention certain insights of the Bible which are likely to be relevant to our present situation. I do not justify these by building a chain in the history of ideas between the Bible and modern science, nor do I expect to wring from the Bible answers to questions of which the writers were entirely unaware; I merely point to them as things that are relevant.

Firstly, I would remind you of the insistence of the Genesis creation story that all that was created was good. This point is strongly emphasized, and seems to have a considerable distinctiveness about it. I would have thought that a conviction of the goodness of the created world would be a powerful motive for all sorts of action to control and limit the exploitation and pollution of it.

Secondly, the world of the Genesis creation story is an ordered world. The story is built upon a process of separation and ordering; it is interested in different levels of created being, in different functions and different species. I do not suggest that the scientific principle of order derived from Genesis; but there is something here in common between the two, and it is something which enables the reader of the Bible to view with a sense of community the researches of science, the achievements of technological control, and the work of the accompanying social planning.

Thirdly, the whole framework of Genesis i is intended to suggest that man is man when he is in his place within nature. His dominion over nature is given little definition; but, in general, its content is less exploitation and more leadership, a sort of primary liturgical place. That man's dominion or eminence should from now on increasingly be applied to the task of conserving and caring for the natural resources of God's world, by using man's own scientific, technical and planning powers to limit and control what these same powers, if left unlimited, would perpetrate, is entirely consonant with the tendency of the Old Testament.

Fourthly, such insights on incipient science and technology as the Old Testament offered lie primarily in the Wisdom literature. The activities described are something in which the

biblical men delight, something which they respect and admire ; they recognize that they are a part of God's world, a part which extends out into far vistas of mystery which the men of that time could not penetrate. They recognized that world of techniques, but they also did not try to claim it for their own ; it was international and extended beyond Israel. They could associate with it, freely and happily ; they did not feel constrained to justify it by deriving it from their own inner religious tradition, or to magnify their own religious tradition by representing it as the source of these insights. Is not this something of a good example for the Jewish-Christian idea of creation, as it associates itself with the world of science in our own time?