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War conditions having rendered it impracticable to hold an Ordinary Meeting on February 23rd, 1942, the Paper to be read on that date was circulated to subscribers and is here published, together with the written discussion elicited.

APOCALYPTIC PORTENTS IN THE LIGHT OF MODERN SCIENCE.

By R. E. D. CLARK, Esq., M.A., Ph.D.

HITHERTO the Apocalypse has been studied almost entirely from a literary and homiletic point of view.

It would seem, however, that there is something to be said in favour of a purely scientific approach, especially as this may throw light upon the much-debated question of whether apocalyptic language was ever intended to be understood in a literal* sense.

There is reason to suppose that in the past God's judgments have not all been of a miraculous nature. Many of the plagues of Egypt, for instance, clearly follow one another as cause and effect, and do not necessarily involve separate and distinct interventions by God.

If, then, many of the portents of the Apocalypse were intended to be understood literally, we should expect to find (1) that at least some of them are intelligible in terms of science, and (2) that many of these are causally related one to another. If, on the other hand, the apocalyptic judgments were never intended literally, but were parables or symbols of historical

* The word "literal" often causes confusion. In a sense, of course, no language is ever strictly literal, but refers to *appearances* only: the Nile obviously never turned to literal blood, the sun does not literally rise or set, nor can we even literally speak of "seeing an object." St. John merely describes the things he *saw* in visions, and the "literalist" expositor holds that those alive on earth would often see essentially what John saw, in so far as his visions applied to the earth. On the "literal" view, the criterion of literality in any given case is, of course, the criterion used in everyday language: if a passage makes obvious nonsense when taken literally (a lamb in heaven, a star opening a pit with a key, a dragon's tail attracting stars, etc.) it must be symbolic, but if it makes good sense it must be literal.

events, neither of these consequences are to be expected. Here, then, is a simple means whereby it should be possible to test the literality of some of the debated passages in the book of Revelation.

Causal relations between the wars, famines and pestilences of Chapter VI are clear, and need no further comment. At the sixth seal, however, we read of a huge earthquake which seems unconnected with the previous events. We have, to-day, good reason to think that periodic gigantic earthquakes, resulting in the formation of mountain ranges, are the lot of our globe. Seismic activity shows steady signs of increase, and we cannot rule out the possibility of an impending disaster. Though we cannot predict details, it is at least certain that the Apocalyptic picture of two main shocks, the second far greater than the first, together with a number of lesser shocks between them, is by no means an impossible picture.

The throwing up of a mountain range would involve numerous gigantic explosions in which dust and stones would be shot up to a great height. In the explosion of Krakatoa enormous quantities of matter are known to have been hurled upwards a dozen or more miles. If, then, the apocalyptic quake were to take place we should expect that for a while at least the sun would be darkened. It might well appear as if it were being looked at through cloth, and indeed it has taken on this appearance near local eruptions on past occasions. The light of the moon would be almost cut off, and that which reached the earth might well be of a deep red hue.*

Winds of high velocity in the stratosphere would rapidly carry the cloud of dust round the earth. On a small scale this actually happened within about a day or so in the case of Krakatoa. As an onlooker looked up into the night sky he would, therefore, observe that from one end of heaven to the other the stars in the sky were steadily extinguished as the great cloud rolled overhead. It would appear as if the whole universe was being rolled up like an ancient scroll. A large volcanic disturbance might conceivably project particles sufficiently high for luminous effects to be produced when they again fell towards the earth. In any case, large earthquakes are invariably accom-

* Owing to the greater scattering of light of sort wave lengths, the light from both sun and moon is easily reddened. Moonlight is richer in the red part of the spectrum (R. H. Baker, *Astronomy*, 1930, p. 121) and is therefore more easily reddened.

panied by luminescent phenomena, lights moving across the sky being commonly reported. Thus might there be produced an awe-inspiring spectacle strongly resembling stars dropping to earth from their places in the heavens. So soon as the dust has cleared, of course, the stars would appear once more. In the Apocalypse they are again in the sky at the sounding of the fourth trumpet (viii, 12).

These events are vividly and plausibly described in Revelation vi. It is also worth noting that violent eruptions both here and also later on in the book would produce, in the daytime, gigantic pillars of cloud stretching far into the heavens, and remaining, as it were, poised in space. On a smaller scale such tracts produced by meteorites remain for about half an hour (*cf.* Joel ii, 30, "pillars of smoke").

Violent meteorological disturbances would follow naturally after an earthquake of the magnitude supposed. In vii, 1, 3, we are told that they will not, however, follow immediately. Later, in chapter viii, storms commence, for we read that hail and fire or lightning (together with blood, *see later*) are cast upon the earth. Large fires are caused, and one-third of the earth's surface is devastated. This third would no doubt include the tropics (there are several Old Testament prophecies of fire devouring trees and grass in Palestine in the "day of the Lord"), and it is not difficult to imagine a future state in which, as a result of the continuation of soil erosion and the resulting diminution in rainfall, much of the earth's vegetation might be only too ready for vast forest and prairie fires.

Next there follow two meteorites, or similar bodies of gigantic size, one of which strikes the sea where it explodes with devastating results, while the other apparently breaks up before it reaches the earth, and in some way poisons the fresh water supplies of the world.

In past years a very good case for taking these heavenly bodies as symbols might certainly have been made out. Throughout the seventeenth century, and until the time of Chladni immediately before the dawn of the nineteenth century, scientists were convinced that meteorites were purely mythical. Naturally, therefore, expositors tended to think that these bodies could have no more physical reality than the dragon in heaven. But we now know that the old opinion about meteorites was wrong and that at least two very large ones have fallen in historic times—perhaps three if we include the craters at Waber in

Arabia. We also know that a large number of minor planets are at this moment to be found in our solar system, and that a collision is by no means impossible. Indeed, the minor planet Hermes, which appears to be less than a mile in diameter, came within half a million miles of us in 1937, while only the year before that Adonis came within three-quarters of a million miles. These asteroids might well be described as being of the size of a mountain ; most of the known ones seem to be one or two miles in diameter.

If a minor planet were to strike the earth, the resulting catastrophe would depend upon its size, and still more so upon its relative velocity. In view of the fact that the minor planets travel round the sun in the same direction as the earth, the velocity of collision would not be large, astronomically speaking, and might well be only a very few kilometres a second. As a result, a gigantic detonation would take place. Owing to the incompressibility of water, the detonation would kill all fish over a wide area, and if the asteroid fell, say, in the Pacific ocean, it would be likely enough to destroy a third of the fish life—that is to say, all that happened to be in this ocean at the time. Ships, too, would fare no better.

It is true that, humanly speaking, the “ chances ” of a collision with an asteroid are not large ; but if this event ever did happen, it is not at all unlikely that two or more of such bodies would strike the earth within a short interval of one another.* It is noteworthy, then, that of the only two heavenly bodies which are said to fall upon the earth in the Apocalypse, one follows immediately after the other.

The second body is seen by John burning like a lamp. It may, then, be an asteroid which breaks to pieces before reaching the earth. An object of this kind would necessarily scatter matter over the earth, just as John prophesies. But a mass of small stones, containing sufficient matter to produce the effects mentioned, could only enter the earth's atmosphere from one hemisphere, so that the matter would only be deposited over, roughly, a third of the earth's surface, comprising (it might well be) a third of the land area. In both this and the former case the Apocalypse is right in not ascribing a world-wide catastrophe to a collision with a body coming from the sky.

* Adonis and Hermes, in two successive years, made the nearest known approaches to the earth of any heavenly bodies.

The matter from the new meteorite infects the water supplies of a third part of the earth, making them bitter. Here we are certainly up against a difficulty, for meteorites which have so far fallen to the earth are not capable of producing this effect. But the asteroids were apparently formed in past ages by the break-up of a planet, and concentration of certain elements may have taken place in the crust of that planet, just as many elements have been concentrated in mineral deposits on the surface of our own earth. Thus matter from an asteroid might contain a large amount of a highly poisonous metallic ore which, on being scattered, would be washed away through springs and rivers into the sea.

In order to infect the rivers, the amount of meteoric dust required would have to be very large indeed, and so we should again expect a darkening of the skies. This is exactly what is stated to occur; it is said that the daylight is shortened by a third owing to the lack of light, while on an otherwise clear night only some of the usual stars are visible, a third part of them being hidden—that is to say, presumably, the fainter ones and those far removed from the zenith.

It is worth noting how, in the case of each of these great events which affect a large area of the earth, as also in the volcanic eruption of chapter ix, we are immediately told about the darkening of the heavens. But where local or minor earthquakes are mentioned (viii, 5; xi, 13; xi, 19), no such result is said to follow. This is exactly as we should expect on scientific grounds, and the only exception (*see later*) is so easily explained that it may literally be said to “prove the rule.”



The star with the key of the bottomless pit, the locusts and the horsemen of chapter ix cannot be judged by physical standards. The last two *may* be symbols or they *may*, conceivably, refer to evil spirits who appear in this guise to “clairvoyant” people. Apparitions, with physical effects somewhat similar to those described in this chapter, are known to psychical researchers in our own day (for example, the Eleonore Zugun case).

In the vials (chapter xvi) we have presented the next and last main series of prodigies. First of all the sea is turned to blood. This mysterious blood first appeared after the sounding of the first trumpet, when hail, fire and blood were thrown upon the

earth. Then, after the burning mountain fell into the sea, a third part of the sea became blood—presumably the same third part in which the fish were killed and the ships destroyed. And now the blood at last covers the whole ocean.

Taken literally, such events appear at first sight to be fantastic. It seems obvious that an ocean of blood must be a metaphor for war and death. However, we must remember that the mysterious appearance of blood, or what looks like blood, has been recorded again and again in the pages of history. Homer (*Iliad*, 16, 459) mentions “bloody raindrops”; the Nile was turned to blood in Egypt; Eugenius IV, Paschasius Radbert and many others have told of instances of the so-called “bleeding host,” while the same thing figured in the witchcraft trials (e.g., that of Abigail Williams in the Salem trials of 1692). Red patches on the ground resembling blood, blood-like snow in the Alps, blood apparently falling from the sky (reported, for instance, by Professor Brun, of the University of Geneva, in 1880), large patches of blood-like water in the Red Sea, and countless other instances of a like kind have also been reported again and again in modern times.

These extraordinary appearances are no longer regarded with the disdainful incredulity which they once occasioned. The “bleeding host” was apparently due to *Bacillus prodigosus*, which grows very well on stale bread and manufactures a brilliantly-coloured chemical material named *prodigosine*, the chemical structure of which was unravelled in 1934. A number of other red plants have been described, and are said to have been responsible for some of the other effects—such are *Palmella sanguinea* (causing red patches on the ground); *Protococcus nicalis* (red snow); *Protococcus fluvialis* (from the sky), and the so-called “red wool” algæ responsible for red patches in the Red Sea. No doubt one of these, or some similar organism, was responsible for the change which took place in the Nile in ancient times. In addition, the purple sulphur bacteria are worth mentioning. Many varieties of these are known to bacteriologists, some of which are capable of living in air. Some species of these bacteria are quite remarkably adaptable. They have been known to thrive even in saturated salt solution, which kills nearly all forms of life, as well as at temperatures as low as freezing point or as high as 80° C.

Nature, moreover, can use red pigments for photosynthesis instead of green chlorophyll, and the replacement of green

marine plants by red ones would not therefore be impossible. Even among large plants, many tropical seaweeds are red in colour.

There is then nothing incredible in supposing that, as a result of a "sport" among the numerous minute red organisms, one will suddenly turn up which, for a while, will be able to adapt itself to conditions on earth in an extremely satisfactory manner, and thus spread to an alarming extent. In the early stages it would doubtless be carried from place to place by winds, should violent atmospheric disturbances be common, and so appear to drop from the sky ("cast upon the earth," viii, 7). Then, later on, after the first asteroid fell into the sea, it would be able to establish itself over that part of the ocean which had been made sterile, for floating plankton over a wide area would be destroyed by the sudden rise in temperature. Conditions would, in short, be ideal for the temporary establishment of a single virile organism, and if a minute red photosynthetic plant was in the process of being scattered over the earth by storms, we might almost predict that it would be the first to reach the now sterile part of the sea and establish itself, making the water red and thick with the organism.

Cases of this kind are only too well known to the biologist. Organisms which have been relatively rare for hundreds of years sometimes suddenly assume a new lease of life and multiply to an astonishing extent with little or no warning. The sudden appearance in virulent form of previously mild diseases is a case in point, while among plants the Canadian water-weed and the dreaded prickly-pear have choked the canals and waterways or devastated the countryside of vast tracts of the earth's surface.

At length, such an organism might make steady and rapid progress against the plankton in every ocean and, more slowly, against those in the rivers. Modern oceanography has shown how enormous are the fluctuations in the population of the sea from month to month and from year to year. Thus, in the northern hemisphere, the ocean phytoplankton become scarce towards the end of the summer for lack of phosphate, which is not renewed from deeper waters until December. At such a time another plant, independent or less dependent upon phosphates, might gain a foothold and thus—upsetting the balance of nature upon which marine life depends—cause the wholesale death of higher forms of life.

Already the carbon dioxide content of the air must have increased appreciably, for a large proportion of the vegetation was burnt up after the sounding of the first trumpet, and the supply will have been further augmented as a result of volcanic activity. Carbon dioxide in the air is believed to produce a "blanketing" effect—absorbing heat waves and preventing their re-radiation into space—so that it would cause a general warming of the earth (G. S. Callendar, *Quart. Jour. Roy. Meteorol. Soc.*, 1938, 64, p. 223, etc.).

A rise in temperature normally causes increased evaporation, and so a larger proportion of the earth's surface is covered with clouds which, by reflecting 80 per cent. of the incident light, shield the earth from the sun's heat. In this way the earth's temperature is kept approximately constant.

In the present case, however, the surface waters over the whole earth have become thick with a minute red plant, and this must greatly reduce evaporation. So for a time the temperature begins to rise rapidly, and the protection given by cloud becomes less than formerly. The sun, in effect, seems much hotter, and the temperature becomes unbearable for life. Imagine our surprise, then, when we read in the very next verse: "The fourth angel poured out his bowl upon the sun and it was given unto it to scorch men with fire; and men were scorched with great heat."

Before long, we cannot say how long, the red plant begins to die for lack of nutrient. Probably, too, it liberates chemical substances into the water which bring about its own death. This, at all events, is the typical history of all invading organisms which are too successful in the fight for life. So the cells burst, throwing their contents into the water, and the latter is once more free to circulate and therefore to evaporate at the usual rate.

Meanwhile, however, the average temperature of the earth has greatly increased. Nature's usual compensation comes into operation at once: water evaporates and the heavens fill with thick clouds which obscure the sun. At present the earth at any given time is about half (actually 54 per cent.) covered with clouds, but it would not require an out-of-the-way rise in temperature for this proportion to be raised to three-quarters or even a good deal more. We may take it, then, that after a considerable rise in the temperature of the world, suddenly compensated for by water evaporation, the blue sky would

disappear for a short time, and men would find themselves living under a thick blanket of cloud which shut out a great part of the daylight.

Here, again, the prophecy follows exactly as we might have predicted: "The fifth angel poured out his bowl upon the throne of the beast and his kingdom was darkened." Disease ("pains and sores") naturally follow.

The drying up of the Euphrates would also, surely, be a natural result of the same rise in temperature and subsequent rapid evaporation. Other rivers which flow near the equator will also, no doubt, be dried up (*cf.* Zech. x, 11, and Is. xi, 15, for the drying up of the Nile).

Shortly after this we are told that there is another world-wide earthquake, far greater than even the former one. And in the violent atmospheric disturbances accompanying such an event, coupled with the dense blanket of cloud, we should certainly expect storms of unparalleled intensity. In particular, hailstones which to-day very rarely reach six pounds in weight would be likely to be much heavier; the apocalyptic figure of about ten times this weight seems reasonable.

In the case of the first earthquake, the effects on the heavenly bodies were immediately noticed, but this is not so on the present occasion. No mention is made of lights moving in the sky, or of the darkening of the sun, moon and stars. And the reason for this is obvious from what has gone before. If the earth is covered with a thick blanket of cloud, sun, moon and stars are invisible, and meteorites or earthquake lights are likely to be invisible.

* * *

While it cannot be claimed that *every* portent is causally related to its predecessor, it would seem that the logical sequence of many of the judgments has been established. Nor is this altogether surprising, seeing that the initial judgments (Ch. 6) are clearly interconnected.

On the other hand similes and parables in the Apocalypse, which are admitted by all to be of a symbolic character, seem to show no such causal relations—as is indeed to be expected.

The evidence here collected would therefore appear to show that much of the Apocalypse should be understood literally.

WRITTEN COMMUNICATIONS.

Rev. Principal H. S. CURR wrote: Dr. Clark's papers always overflow with interest and instruction. Whether one agrees with his contentions or otherwise, it is impossible not to derive a great deal of benefit from his powers of presenting scientific information in a way which makes it intelligible to those whose studies have lain in a different direction. The latter fact makes it impossible for me to offer any comment on the wealth of scientific detail which has been compressed into such small compass in the paper.

I am rather disposed to query Dr. Clark's general attitude to the supernatural and the natural for two reasons. The first is that one receives the impression from the paper that the natural is the criterion of the supernatural. If the prophecies in the Apocalypse cannot be shown to be in harmony with the findings of physical science, then they must be treated as symbolic. Their literal interpretation is barred. I am not sure that such a line of approach will yield the best results in dealing with the teaching and history of the Bible. The things which are impossible with men are possible with God. That saying is true of man's powers of comprehension as well as of his executive ability. Every miracle rendered in the Bible is an example, not least the moral and spiritual miracles whereby trees were made good with the result that their fruit became good despite the fact that hitherto they had been desperately evil. Are we entitled to use the natural as a yardstick for the supernatural?

My second difficulty is closely related. It centres in the fact that the supernatural is a law unto itself. If it once be admitted, there is no saying what may happen. To compare the natural and supernatural is comparable to finding points of resemblance between man and animals. Take the question of food. Both eat the fruits of the earth, but no animal can or will cook them. In the same way the supernatural resembles the natural at many points as the paper so clearly proves. That is no cause for wonder since the same First Cause is behind both. But the two are different worlds of expression like prose and poetry. Milton's prose is much admired by his students, but it is not to be mentioned in the same breath as his poetry. In the same way the supernatural by its very nature makes its investigation a thorny task. It has

been well said that Creation is God's prose and Redemption His poetry. The vastness of the difference between them must not be overlooked in the interpretation of the book which is the standard history of redemption.

Mr. ALBERT O. HUDSON wrote: The opening remarks include a contradiction in terms. If apocalyptic language is to be understood literally, it ceases to be apocalyptic! The speaker appears to ignore the fact that the Book of Revelation was deliberately framed in the form of an elaborate apocalyptic with at least one application to its own day—that of the early persecuted Christian Church—and that this course was adopted in order to give instruction and consolation to those believers who understood the inner meaning of the symbols, under the noses, so to speak, of Roman pagan persecutors who did not understand the imagery. This end was achieved by basing the main framework of Revelation upon allusions to Old Testament history and prophecy, with which the Christians were thoroughly familiar. In our day over four hundred such allusions have been identified. The second and greater application of this apocalyptic work is founded upon the same allusions and describes the conflict between good and evil through the centuries until its consummation in the triumphant establishment of the Kingdom of God upon earth, and the reconciliation of "whosoever will." The speaker's picture of a capricious, malicious God hurling celestial thunderbolts upon the creation of His own hands and reducing it to a desolate shambles is reminiscent of Middle Ages theology, but by no means worthy of modern serious Christian scholarship. The title of the paper is hardly a happy one—there are many apocalyptic portents to be found in the Old Testament as well as in the Gospels; the paper deals merely with a very small portion of the imagery of the Apocalypse, and that in a speculative manner which is hardly to be associated with serious Bible study or with modern science. What has modern science to say, for example, about the "highly poisonous metallic ore" which "might" be precipitated over the earth by the fall of an asteroid and poison the fresh water springs and rivers? In what way is the progress of the Divine Plan for humanity to be advanced by this wholesale vitiation of their essential means of continued existence?

Serious students of the Book of Revelation will hardly give this paper further thought. Non-Christians and sceptics are not likely to be favourably impressed by this presentation of the character and the purposes of the Creator. The astronomical information imparted is of interest, but as a serious exposition of the future plans of One Who said "I have no pleasure in the death of him that dieth; wherefore turn yourselves, and live ye", it contributes little to our understanding of an important section in the Word of God.

Mr. W. E. LESLIE wrote: When Dr. Clark refers to "the much debated question of whether Apocalyptic language was ever intended to be understood in a literal sense" he is probably referring only to the use of such language in The Apocalypse. But "Apocalyptic language" is characteristic of an extensive literature going back at least to the Book of Daniel and continuing after the close of the N. T. Canon.

Every writer must employ the vocabulary and grammar of his day. Otherwise those who received his writings would be unable to understand them. This applies also to the use of idioms and figures of speech. "Apocalyptic language" may be called an idiom. Those of us who hold that The Apocalypse was inspired may suppose that God used this idiom in the visions given to John. These expressions, so strange to us, were familiar to the first readers. Prudence surely suggests that we should at least commence by seeking to understand them as the first readers understood them.

Take a single illustration. At the end of ch. viii John sees first a star, and then a mountain fall. Then he sees a star which had previously fallen. Dr. Clark takes the first star and the mountain "literally," but he cannot so take the second star because it is said "there was given to him the key . . ." We thus have two modes of interpretation in one brief context. But more—the fact that we have here the idiom also used in 1 Enoch xviii, 13 (*ἴδον ἐπὶ τὰ ἀστέρας ὡς ὄρα μεγάλα καιόμενα*), and xxi, 3 (*ἐκεῖ τεθέομαι ἐπὶ τῶν ἀστέρων . . . ἐρριμμένους ἐν αὐτῷ ὁμοίους ὄρεσιν μεγάλοις καὶ ἐν πυρὶ καιόμενοις*), is ignored, whereas it should be the starting point of an attempt to understand the idiom.

Col. A. H. VAN STRAUBENZEE wrote: In Exodus xxxiv, 10, God tells us He will do marvels such as have not been done in all the earth, nor in any nation. Some of these marvels are doubtless what we find revealed in the Apocalypse.

God is now silent, but still acting in grace, and speaking to man through His written Word. He will then be acting in judgment and wrath, and the supernatural things will probably be well understood by those then on earth, who have to experience them.

In the Book of Revelation, the symbols used are usually explained as to what they represent, while marvels, not so explained, may appear now to men as fantastic will be then found literally true. Accordingly I agree with the lecturer in his closing sentence—that much of the Apocalypse should be understood (or better believed) literally as true.

AUTHOR'S REPLY.

I am grateful for Principal Curr's words of appreciation. His criticisms raise important issues.

(1) I entirely agree that the natural is not the criterion of the supernatural and I have slightly altered the wording of my paper in order to avoid giving this impression. If we could find no natural connection between the prophesied events we should simply have no evidence either way as to whether they were intended literally. But if we find such connections, the literal view is rendered probable since Divine intervention upon the natural world would presumably initiate a series of natural causes and effects.

(2) I do not see in what way the natural can be said to resemble the supernatural nor do I understand how there can be a "first cause" in the supernatural realm. The supernatural is surely the mental or creative realm which is not ultimately subject to causality. As Mozley pointed out long ago (*Eight Lectures on Miracles*, Lect. 6) the use of the word "law" in connection with the supernatural is open to serious objection. (See also F. R. Tennant *Miracle and its Philosophical Presuppositions*, 1925, p. 27.) Principal Curr seems to assume that the physical events of the Apocalypse must necessarily be miraculous. Possibly he is right, but I see no reason for the assumption. Those who feel the weight of the ethical objections

raised by Mr. Hudson will probably prefer to believe the opposite. In this connection it is worth drawing attention to the extremely interesting views of H. H. Farmer (*The World and God*, 1935. See G. H. C. McGregor's *New Testament Basis of Pacifism*, 1936, chapter 5, for an excellent summary), who argues that the "wrath of God" is necessarily impersonal.

I note that Mr. Hudson assumes that the word "Apocalyptic" itself implies symbolism. This is not so (see standard dictionaries). In any case all agree that the Apocalypse employs numerous symbols and I entirely accept Mr. Hudson's statement that their particular form is sometimes dictated by the need for tact in view of the contemporary persecutions. The number 666 is a clear case in point. The reason why I "appear to ignore" such facts in my paper is, of course, that they are not relevant to my subject. But these facts do not favour Mr. Hudson's views on the Apocalypse: it is easy to see why St. John should use symbols when referring to the Roman Empire, to the imperial city or to Nero, but there was surely no such need in referring to future events. The Roman authorities would not have been greatly incensed at learning that the sky would be darkened, rivers would evaporate and asteroids would fall from heaven at the end of the age.

The Apocalypse, as Mr. Hudson roughly points out, often refers to the Old Testament, but there are many resemblances to the undoubtedly literal (See J. & J. B. E. Garstang. *The Story of Jericho*, 1940) plagues of Egypt as well as to the symbolic passages. Mr. Hudson seems to ignore the former.

I agree that my paper is speculative, but it is hardly more so than that view which sees in the Revelation a "conflict between good and evil through the ages." Taking the latter view, independent students can rarely if ever agree as to the events which the various prophecies were intended to foretell (J. Tyso, *An Enquiry after Prophetic Truth*, 1831). So serious is this difficulty that many modern writers have abandoned the attempt and deny that the book prophesied any future events (R. H. Charles, *Commentary*, 1920; H. L. Goudge, *The Apocalypse and the Present Age*, 1935; A. L. Maycock, *The Apocalypse*, 1941, etc.). The view I have put forward will I believe remove ambiguities of this kind.

Mr. Hudson's further remarks about a "capricious, malicious God

hurling celestial thunderbolts upon the creation of His own hands and reducing it to a desolate shambles" have a curiously pre-war flavour about them. The disastrous world-wide erosion which has occurred in very recent years must almost inevitably mean that agriculture will soon be able to support only a fraction of the present world population. Man has recently added a million square miles to the world's deserts and millions more are on the way (G. V. Jacks and R. O. Whyte, *The Rape of the Earth*, 1939). Only an immediate world-wide campaign to save the land can save man from impending disaster. But now in almost every nation we see the energies of mankind misdirected by war—fighting, as it were, upon a sinking ship instead of manning the pumps. A coming "wholesale vitiation of man's essential means of continued existence" seems inevitable even apart from the effects of war. If "modern serious Christian scholarship" is blind, not merely to Bible prophecies but to the fact that God is already allowing large parts of the earth to become a "desolate shambles" in our day, it is surely clear that such "scholarship" is unworthy of respect. Even secular thinkers (e.g., H. G. Wells, *The Fate of Homo Sapiens*, 1939) can see that civilisation is all but doomed to a catastrophic decline. There is no space to digress on what the Divine plan in allowing judgment may be, but our failure to understand a plan is no reason for supposing that no such plan exists.

However, from his general tone, I suspect that Mr. Hudson is not very sure of his ground for, in order to refute me, he finds it necessary to accuse me of believing in God Who is both "capricious" and "takes pleasure in the death of him that dieth." Needless to say I do not subscribe to either of these propositions.

I agree with Mr. Leslie that in attempting to interpret the Apocalypse prudence commands that we should ask ourselves how the first readers would have understood the book. I have been at some pains to do so and I should never have proceeded with my paper had not the results been favourable.

Out of about a score of possible relevant symbols I could find only *one* which was not understood literally by early Christians, and on that I could find no information. Early Christian writings were, in fact, often more literal than the modern futurist: some writers (e.g., Lactantius) say that the words "those days shall be

shortened" mean that the days will literally contain fewer than 24 hours; others (Greek Apocalypse of Daniel, Sibylline literature) suppose that the woman of the Apocalypse will be a literal woman living in Rome, while many others speak of plagues of weird physical monsters (the "beast," etc.) living on the earth in the last day (W. Bousset, *The Antichrist Legend*, 1896). Literal views were held for centuries and were not finally disposed of until about the time of Joachim (12th century). But is the matter worth pursuing? The literal mindedness of early Christians is surely sufficiently notorious to students. One modern authority (A. Robertson, *Regnum Dei*, 1901, p. 134) frankly confesses that Greek theologians were forced to oppose literalism in order to establish their own position, for if things could be understood literally it was not necessary "to have a skilled class to interpret them"!

Opponents of literalism often quote Elliott to the effect that "the futurist scheme . . . was first . . . propounded about the year 1585 by the Jesuit Ribera" (E. B. Elliott, *Horae Apocalypae*, vol. 4, p. 597, 5th edition, 1862). This assertion is untrue. Ribera's work, which Elliott had never seen, is very rare, but according to Bousset it consists only of a valuable digest of the views of the early Christian writers.

The case of the two stars to which Mr. Leslie draws attention is practically the only apparent inconsistency to which literalism gives rise. It can, I think, be justified (R. Govett, *The Apocalypse Expounded by Scripture*, 1865, vol. 2, p. 373). Ambiguities and similar inconsistencies abound on any other detailed scheme of interpretation.

My thanks are due to Col. van Straubenzee for pointing out the relevance of Exodus xxxiv.

One more point and I have done. As this goes to print I have just come across a remarkable passage by the well-known biochemist Professor J. B. S. Haldane (*Daedalus or Science and the Future*, 1924, p. 61). Haldane suggests that one day an organism, bred in the laboratory and of "intense purple" colour, which he calls *Porphyrococcus*, may escape into the sea making it purple. Here is a sentence from his "prophecy": "For two months the tropical Atlantic set to a jelly, with disastrous results to the weather of Europe."

It is interesting to note that the red unicellular organism *Goniaulax catenellia*, which is exceedingly poisonous, sometimes occurs in the sea especially round the coasts of Japan. At the present time it has spread widely over the West coast of the American continent giving the surf a red colour and has caused death both to birds, animals and men (*Science News Letter*, June 6th, 1942).