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Review.

On Certain Phenomena belonging to the Close of the Last Geological Period, and on their bearing upon the Tradition of the Flood. By Sir JOSEPH PRESTWICH, D.C.L., F.R.S., F.G.S. London: Macmillan and Co., 1895. Pp. vii-88. Price 2s. 6d.

SIR JOSEPH PRESTWICH is one of the very first of living geologists, and he is specially fitted to write on the subject of geology and the Deluge, as he has made the Quaternary formations his particular study.

The earlier geologists thought that they saw proofs of Noah's Flood in all the stratified formations, which was, of course, absurd, and brought the Scripture narrative into contempt. A better view was soon adopted. Cuvier held that the Flood was the *last* great geological change, and Buckland, in his "*Reliquiæ Diluvianæ*" (1823), maintained the opinion that all the Quaternary formations (which he called "*Diluvium*") were formed by Noah's Deluge. The progress of geology made Buckland renounce his opinion, and Hugh Miller, while holding to the truth of the Biblical Flood, was unable to produce any geological evidence of the catastrophe. Of late years a change has taken place in geological opinion. Sir Henry Howorth has proved that a great flood destroyed the Post-Glacial Mammalia, and that this deluge was the same as that which is recorded in the Book of Genesis, and Sir J. W. Dawson and the Duke of Argyll quite agree with his opinion.

Sir Joseph Prestwich commences his argument by describing the various kinds of "Drifts," as the Quaternary superficial deposits are called. Some of these are formed by river-action, and some by floating ice or by land ice, but the latest of these "drifts"—which is called the "Rubble Drift"—cannot, in his opinion, have been formed in this manner. This "drift" appears in England often in the form of a "head," and as it overlies all the Quaternary deposits it marks the close of the Post-Glacial or Palæolithic Era. It is a confused deposit, which shows that it was formed by the rush of tumultuous waters, and it contains the bones of the *elephant, lion, rhinoceros, hippopotamus*, and other extinct as well as living animals. The "Rubble Drift" also shows itself in England in the ossiferous fissures. These cracks in the limestone rocks—which are well exhibited at Plymouth—are full of masses of rubble filled with the bones of extinct animals, which are smashed and broken in an extraordinary manner.

In France the "head" of rubble is occasionally seen, but the ossiferous breccias and fissures are developed on a grand scale. Many isolated hills rise, the summits of which are full of cracks, which are packed full of the *broken* bones of extinct animals. At Santenay, in Burgundy, there is a lofty isolated hill, on the summit of which there are vast fissures, which are filled with the bones of *lions, wolves, bears, deer, antelopes, and oxen*, which animals must have ascended the mountain in vast herds to escape from a pressing danger, and must then have been drowned by the rising of the waters. The bones are all in the same state, and are all broken by being swept into the fissures by violent waters. These numerous bone-fissures were, according to our author, formed by the rocks being suddenly rent open at the time of vast floods, and were filled up with bones and rubbish swept in by the diluvial waters. Sir Joseph Prestwich also considers that the upland or high-level Loess of Northern and Central Europe is another proof of a great flood. This Loess is a pale-yellow loam, and it covers thousands of square miles in Europe like a vast mantle. It is the *latest* of all the Quaternary deposits, and is full of

land-shells and of the bones of the *mammoth*, *lion*, *hippopotamus*, *rhinoceros*, and other extinct as well as living species. Sir Henry Howorth holds that the Loess was formed by a vast outpouring of volcanic mud, which at the time of its eruption was taken up and borne along by a rush of deluge-waters; and Dupont, the veteran cave-explorer in Belgium, also looks upon the Loess as having been formed by a tremendous flood. Curiously enough, also, the Loess contains much *salt*, as though it had been thoroughly saturated by the waters of the sea. All through Belgium the valleys and plateaux are covered by two great deposits, which envelop the country in vast sheets. The lower is a thick yellow clay, with angular blocks; the upper is the usual Loess. The former of these deposits marks the commencement of the Flood; the latter shows its subsidence and close. The remains of Man and of the great Post-Glacial Mammalia are found in these deposits, showing that they were overwhelmed by the tremendous inundation.

Guernsey and Jersey are covered with this Loess, which must have been formed during a subsidence of these islands; and the rock of Gibraltar is split and fractured, and the cracks are filled with rubble, earth, and the broken bones of animals, which must have climbed the rock to escape from some terrible danger. In Sicily, near Palermo, *twenty tons* of the bones of hippopotami were in six months taken from the neighbourhood of one cave; evidently here the animals had crowded together to escape the rising waters, and when they could retreat no further, because lofty precipices were behind them, they were drowned as the waters rose higher and higher. Malta contains many fissures and caverns, which are filled with the bones of *elephants* and *hippopotami*, as well as with countless remains of other animals, many of which had disappeared from the region long before the dawn of history. In Cerigo—one of the Ionian Islands—there is a hill which is called “The Hill of Bones.” It is full of cavities, and both inside and outside it contains vast quantities of bones and animal remains. Clearly here, also, vast herds of animals climbed the sides of the mountain to escape from an inundation, and, being drowned on the summit and slopes of the hill, their bones were swept into the fissures by the rushing waters. There do not appear to have been any signs of a submergence discovered in Africa or in Egypt, but in the caves of Syria, near the sea, the bones of the *reindeer* and of the *northern rhinoceros* have been found, associated with rude flint weapons, proving that Man as well as these animals lived at that period. Ainsworth also describes great beds of gravel in the Euphrates valley; and the Persian traveller, Chardin, found huge boulders on the Mesopotamian plains, and as they could not have been carried there either by glaciers or icebergs, we are compelled to conclude that they must have been borne into their present position by the rushing waters of a tremendous flood.

It may be objected that amidst these diluvial beds there are no *marine* remains. But Sir Joseph Prestwich points out that the submergence producing the Deluge was too short for these forms of life to invade the terrestrial area, while the muddy character of the tumultuous waters would also be prejudicial to these animals.

There is another proof of a great deluge at the time of the “Rubble Drift” and Loess which is very striking. It consists in the *sudden* and *complete* disappearance of the great beasts of the Post-Glacial Period. At p. 85 Sir Joseph Prestwich gives a list of the characteristic animals of the first human (or Palæolithic) era, and contrasts it with the chief animals of the second human (or Neolithic) era. The difference is most striking. Right down to the end of the Palæolithic Period there were found in Western Europe the *elephant*, the *lion*, the *rhinoceros*, the *hippopotamus*, the *hyæna*, and the *musk-ox*. But at the end of the Palæolithic

Era these animals *suddenly* vanished, and in the earliest formations of the next human epoch—the Neolithic Era—only the present meagre fauna known in Europe in the historic epoch appears. What caused the disappearance of the great beasts of the Palæolithic Period? They did not vanish slowly, but they disappeared in Europe, in Siberia, and in America, with startling *suddenness*. Man could not have exterminated them, for he was too rudely armed to have killed off these magnificent animals. Pestilence could not have prevailed *simultaneously* over whole continents, neither could a famine have devastated at the same time the whole of the Northern Hemisphere. Moreover, as Sir Joseph Prestwich points out, the bones are accumulated in enormous masses, in which young and old, herbivorous and carnivorous, animals all exhibit their bones piled up in vast accumulations. This could only have occurred by their crowding together in herds of innumerable numbers to escape the advancing inundation, and by their remains being piled confusedly together by the rush of the tumultuous waters. No great confused deposits of bones, also, occur in any later geological deposits, for everywhere after the close of the Palæolithic Period we meet with quiet deposits and a scarcity of animal remains.

The *date* of the submergence which caused this inundation is next discussed by Sir Joseph Prestwich. There are, he says, two ways by which its antiquity may be ascertained. First, by the rate of the deposition of the recent alluvium in the valleys, such as that of the Thames. But this method is doubtful and very uncertain, as in earlier times the rainfall may have been much heavier than now. Secondly, by the wearing back of the "Rubble Drift" by the sea when this deposit has been accumulated over the faces of the ancient cliffs. Our author comes to the conclusion that the "Rubble Drift" (which marks the Deluge) was deposited from 6,000 to 10,000 years ago. This strikingly agrees with the estimates of the American geologists, which prove that the Glacial Period closed from 7,000 to 10,000 years ago, and as the Diluvial Catastrophe must have been much later than the close of the Glacial Period (for the Post-Glacial Period could not have been less than several thousand years in length) we reach a time which is strikingly close to the date assigned in the Bible for the Deluge of Noah.

Such is a brief outline of this most interesting book. The arguments of the talented author are most able and striking, and his conclusion that a great submergence caused the Deluge which is recorded in the Book of Genesis, and which is also commemorated in the traditions of ancient nations and of barbarous peoples, seems to be undeniable. It is useless, in the face of the mass of evidence which can now be brought forward from geology and palæontology, to deny the reality of the Biblical Deluge. The day is gone when the Flood of Noah could be ascribed either to rain-myths or to local floods. That a great diluvial catastrophe closed the Post-Glacial Period and swept away the first (or Palæolithic) race of Man is now certain, for no other cause can explain the sudden and complete disappearance of the great beasts which existed in such extraordinary numbers in Europe and in America along with Palæolithic Man. Meanwhile all students of Holy Scripture owe a deep debt of gratitude to Sir Joseph Prestwich for the able manner in which he has marshalled the evidence on this most interesting subject.

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