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## ARTICLE VII.

NOAH'S FLOOD IN THE LIGHT OF MODERN  
SCIENCE.

BY THE REVEREND D. GATH WHITLEY.

GEOLOGY AND THE DELUGE. By the DUKE OF ARGYLL. Glasgow. 1885.

THE MEETING PLACE OF GEOLOGY AND HISTORY. By Sir J. W. DAWSON, LL.D., F.R.S. Second Edition. London. 1895.

TRACES OF A GREAT POST-GLACIAL FLOOD. By Sir HENRY HOWORTH, F.R.S., F.G.S. *Geological Magazine*, Vols. IX., X. (1882, 1883).

LE DÉLUGE MOSAÏQUE: L'HISTOIRE ET LA GÉOLOGIE. Par L'Abbé ED. LAMBERT. Deuxième Edition. Paris. 1870.

A POSSIBLE CAUSE FOR THE ORIGIN OF THE TRADITION OF THE FLOOD. By Sir JOSEPH PRESTWICH, D.C.L., F.R.S. *Transactions of the Victoria Institute*. 1894.

SCIENTIFIC CONFIRMATIONS OF OLD TESTAMENT HISTORY. By G. FREDERICK WRIGHT, D.D., LL.D., F.G.S.A. Oberlin, Ohio. 1906.

THERE are few things more remarkable in the history of science than the variations of geological opinion concerning Noah's Flood. A century ago, the Flood was held to have been universal, and all animals on the earth were believed to have been destroyed, save those preserved in the ark. But when geology was born different views prevailed, and the Flood was supposed to have been a catastrophe of a smaller character. Cuvier<sup>1</sup> held that a great irruption of waters had devastated Northern Europe before the dawn of history, and he identified this cataclysm with Noah's Deluge. Dr. Buckland,<sup>2</sup> a few years after, further developed this opinion, and described great beds of sand and gravel (which he called

"diluvium"), which he maintained were formed by the waters of the Noachian Flood. He naturally made mistakes, for he did not distinguish between river and flood gravels, nor did he notice the action of ice. His work, however, is still valuable, and contains much sound reasoning and useful information. On the publication of Sir Charles Lyell's writings,<sup>3</sup> the belief in catastrophes declined, for men fancied that nature always worked *slowly*, and a violent catastrophe like the Deluge was considered improbable, although the "Catastrophic" school had still many able exponents in England, such as Hugh Miller, Sedgwick, and Murchison. Miller in his last work<sup>4</sup> devoted two chapters to the Noachian Deluge. He believed that it had actually occurred, but had been limited to the basins of the Caspian and Aral seas, and, soon after, Sir J. W. Dawson adopted the same theory.<sup>5</sup> The French geologists, also, had maintained that a portion of Buckland's "diluvium" was the result of Noah's Flood. Sir Henry Howorth threw new light on the question, and boldly declared<sup>6</sup> that all Siberia had been overwhelmed by a mighty flood, a theory which had been advanced before by Erman,<sup>7</sup> and by Sir Roderick Murchison.<sup>8</sup> In the *Geological Magazine*, a few years later, Sir Henry Howorth declared that the sands and clays of the Quaternary era were formed by a great flood,<sup>9</sup> and in a subsequent work<sup>10</sup> he declared that this flood was no other than the Noachian Deluge. These views were accepted by Sir J. W. Dawson, and by the Duke of Argyll, the former of these two eminent geologists declaring that Noah's Flood was the catastrophe which occurred between the two Stone ages.<sup>11</sup> Professors Wright and Claypole,<sup>12</sup> in America, put forth similar views, and later on Sir Joseph Prestwich maintained that the "rubble drift" showed a great submergence which probably occurred during the biblical Deluge.

From this summary of geological opinion, it will be manifest to all impartial readers, that there is *no necessary opposition* between geology and the Noachian Flood. If leading geologists *have* maintained in the past, and *do* maintain in the present, that the earth still bears traces of Noah's Deluge, it is plain that geology cannot declare that this Flood was impossible. Nor can these opinions be called "out of date," as some who hold them are still living, and others have only recently passed away.

Next, there is the tradition of the Deluge. Ancient cultured nations *have* held, and savage races now *do* hold, that a great flood at one time destroyed the human race.<sup>12</sup> This tradition is ancient, universal, and persistent. How did it arise? The opponents of the Deluge must answer this question. To say that it originated because of local floods is absurd, as the tradition has been held by dwellers on tablelands, where floods never occur. It is childish to call it a rain-myth, for the prevalence of the tradition among uncultured races in all climates and under all meteorological conditions refutes such an idea. Until, therefore, the opponents of Noah's Flood can furnish a rational explanation of the tradition of the Deluge, we are compelled to hold that it originated from the recollection of a great diluvial catastrophe which overwhelmed nearly all mankind save a few who escaped, and who handed down to their descendants the story of the terrible event which they had witnessed.

The scientific evidence for a great Flood since man's advent on the earth is threefold: (1) the palæontological evidence, which consists in the sudden and complete disappearance of the great mammalia of the Palæolithic period; (2) the geological evidence, which exhibits a number of beds of clay, gravel, and sand, which could have been formed only by a

great flood; (3) the anthropological evidence, which is furnished by the complete disappearance of palæolithic man.<sup>14</sup> In order that the arguments of the works reviewed may be understood, we will explain at length the character of these evidences.

1. We begin with the *palæontological* evidence. The First Stone age (or Palæolithic period) was characterized in Europe by the abundance of gigantic animals. Lions, tigers, hyænas, elephants, rhinoceroses, and hippopotamuses existed everywhere in vast numbers.<sup>15</sup> These great beasts flourished, without the slightest diminution of their numbers, right down to the very end of the Palæolithic period, then they *suddenly* and *completely* disappeared, and not a single one of them is ever found in the earliest deposit of the Second Stone age (or Neolithic period) or in *any* deposit of this era. This disappearance of the great beasts of the Palæolithic period is sudden, extensive, and complete. It is sudden; for no signs of any gradual diminution of their numbers can anywhere be discovered. It is extensive; for it is found all over Europe,<sup>16</sup> North America, and even in South America. It is complete; for not one of these great beasts is found in any later deposit. Moreover, at *no other time* since the advent of man has a fauna disappeared as it did at the end of the Palæolithic period. What caused the remarkable disappearance of these great animals? The replies given by the advocates of slow changes, and by the opponents of Noah's Flood, are most extraordinary and contradictory. Some say that the great beasts were exterminated by man, but this is absurd. To imagine that Palæolithic men, few in numbers, and armed with only rude stone weapons, could have *suddenly* and *completely* destroyed these swarming myriads of great beasts all over Europe is too ridiculous to merit a moment's consideration.<sup>17</sup>

Others hold that the great beasts perished because of a change of climate; but this is contradictory to the geological evidence, which shows that no change of climate occurred at the time when the great beasts disappeared.<sup>18</sup> Famine could not have destroyed them, for food was everywhere abundant, and a murrain could not have prevailed at the same time in every part of Europe. The time, also, in which the destruction of these animals occurred, was *too short* for invoking slow changes. We do not find them *slowly* decreasing in abundance, but they suddenly vanish in the fullness of their numbers. If this does not prove sudden extinction by a great catastrophe, then scientific evidence is absolutely worthless.

2. The *geological* evidence for a great diluvial catastrophe consists in the nature of the superficial deposits which mark the close of the Quaternary formation. The *earlier* beds of the Quaternary era<sup>19</sup> were formed by ice and ice-floods during the Glacial period, and have nothing to do with this discussion. The *later* Quaternary deposits were formed after the Glacial period had passed away, and it is to these beds alone that we refer. These *later* Quaternary beds consist of gravels, sands, and clays, and they are spread over vast areas in Northern and Central Europe. In England they are called "upland gravels" and "brick-earths"; in France they are known by the name of "diluvium"; in Belgium they are named "loess," "Hesbayen loam," and "Campinian sand"; in Germany they are called "loess," "lehm," and "ossiferous gravels." These deposits are found everywhere. They are spread over the tops of table-lands; they cover the summits of hills; they cross watersheds; they mantle the hill-sides; and they enwrap whole districts, like gigantic winding-sheets. They contain only modern shells and modern animals' bones,<sup>20</sup> so that the beds were formed very recently. Further, as the animals

whose bones they contain are always the same, wherever the beds occur, it follows that the beds were all formed at the *same time*. Moreover, as many of these deposits in England, France, and Germany contain man's bones<sup>21</sup> and weapons, it is certain that man was living when they were deposited. These vast deposits of gravel, clay, and sand could not have been formed by any rivers, for no rivers ever have, or ever could have, flowed over the tops of the hills and plateaux; while, as the beds are spread out in vast sheets on table-lands for hundreds of miles, it is quite certain that no action of rain or rivers could have formed them. Also, as these beds often contain great pebbles and large boulders in vast numbers, it is plain that the water which deposited them must have rushed along with terrific speed and power. Here, then, are the geological proofs of a great diluvial catastrophe.

3. The *anthropological* evidence of the occurrence of a great flood since man's creation consists in the sudden and complete disappearance of the earliest race of man, that is, of Palæolithic man.<sup>22</sup> No traces whatever of Palæolithic man are found in the succeeding Neolithic period, for the men of the two stone ages were entirely distinct. Palæolithic man was a hunter, an artist, used rough-stone weapons, and was ignorant of agriculture. Neolithic man was a herdsman, an agriculturist, used polished-stone weapons, and was not an artist. Here are two distinct races. What became of Palæolithic man? He did not die out slowly,<sup>23</sup> for no trace of him is found in the Neolithic deposits, nor did he amalgamate with the new-comers, for his peculiar industries do not occur with the later remains. The men of the Palæolithic age disappeared suddenly, because they were overwhelmed by gigantic inundations, when waters prevailed above measure upon the face of the earth. Such is the scientific evidence for a great diluvial catastrophe at the

end of the Palæolithic period. We will now examine the arguments of the authors, whose books, memoirs, and articles we are now passing under review.

The Duke of Argyll commences his argument<sup>24</sup> by giving the scientific definition of a deluge. This, he explains, is caused by a subsidence of large portions of the land. The waters of the sea rush in, and, as the land sinks beneath the level of the sea, the waters rise and destroy the terrestrial animals, and also human beings. This definition is strictly scientific, for such catastrophes must have constantly occurred in geological times, and it gets rid of the foolish idea that local and partial deluges imply a heaping up of masses of water upon certain regions on the earth's surface. The Duke next notices the various traditions of the Deluge, which, taken as a whole, he maintains, furnish strong evidence that the Flood was a real historical event.<sup>25</sup> He next explains that a great flood always forms *three* kinds of deposits,—gravel, sand, and clay. In England, he affirms, the later Quaternary gravels are found at a height of 1,400 feet above the sea, on Moel Trefaen, in North Wales. To this depth, at least, therefore, must Western Europe have been submerged, since the advent of man. But a submergence to this depth would sink every capital city in Europe beneath the sea, except Madrid and Munich. Yet the site of Munich itself must have also been submerged at this era, for the Duke says that he himself has examined enormous beds of gravel close to that city. The mud deposits of the Deluge are the brick-clays of England and Scotland, and particularly the loess of Northern and Central Germany. This last deposit, which covers the hills and lowlands in the valley of the Rhine, can be explained only as the mud deposited by the waters of a great flood. The Duke strengthens his argument by referring to the submer-

gence of Siberia at the time of the destruction of the elephants and rhinoceroses, the bones of which are so abundant in this wonderful country. He next shows that this great flood, which formed such vast accumulations of gravel, clay, and sand all over Europe, and drowned such myriads of the great animals, must have occurred since the advent of man. In proof of this, he refers to the well-known fact that many of these gravels and sands contain both the weapons and the bones of man. Such is the Duke's argument for the occurrence of a great deluge since man appeared on the earth. It is clear, logical, and scientific, and we are not aware that any attempt has been made to answer it.<sup>26</sup>

Sir William Dawson's argument<sup>27</sup> is more elaborate. After describing the earlier geological eras, he considers the question whether man existed in the Tertiary period, and answers in the negative. He then describes the earliest men, as they existed in the Palæolithic period, which he considers to be the Antediluvian era. He describes at length the weapons, dress, habits, and funeral customs of these Primeval men, and he draws a striking picture of a Palæolithic warrior, clad in skins, adorned with a hair helmet, bedecked with shell-ornaments, and armed with hatchet and spear, who might be considered as a typical representative of the earliest men. He also dwells on the high intellectual character of the Palæolithic men. This is proved by the skillful carving of their bone weapons; by their admirable sculptures;<sup>28</sup> and by their extensive system of commerce. Recent discoveries in the cave of Brassempouy in Western France<sup>29</sup> have proved that these earliest men wore garments of *cloth* as well as skins; they also wore gloves,<sup>30</sup> so that they were often elaborately dressed. The cranial capacity (which indicates the size of the brain) of these earliest men was remarkably large. The following table

of Palæolithic skulls will show this. The cranial capacity is given in cubic centimetres:—

Skull of La Truchère. Cranial capacity,	1925 c.c.
Skull of La Raymondén. Cranial capacity,	1710 c.c.
Skull of La Solutré. Cranial capacity,	1560 c.c.
Skull of Cro. Magnon. Cranial capacity,	1550 c.c.
Skull of Laugerie Haute. Cranial capacity,	1550 c.c.

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Skull of Modern Germans. Cranial capacity,	1521 c.c.
Skull of Modern Russians. Cranial capacity,	1471 c.c.

Thus, it appears that the earliest men of the Palæolithic age possessed larger brains than do the average modern Germans or Russians, so that Primitive man was further removed from the apes mentally than are many civilized men of the present day!<sup>21</sup>

What became of these wonderful Palæolithic men? Their beautiful carvings, their admirable sculptures, their graceful bone harpoons, and their heavy flint hatchets are entirely absent from any deposit which is later than the end of the Palæolithic period. Before the Neolithic age began, they were gone. What caused their sudden and complete disappearance? Professor Boyd Dawkins thinks<sup>22</sup> that they were driven out of Europe by the Neolithic men, and retreated through Russia and Siberia to the arctic regions, where they now live as the modern Eskimo. Unfortunately for this theory, not the slightest trace of any of their weapons or carvings exists in any part of Siberia or Russia. Professor J. A. Geikie<sup>23</sup> discusses the difficulty, but confesses that he cannot reply, or solve the problem, and Sir John Evans is equally helpless,<sup>24</sup> merely saying that, at the end of the Palæolithic period, the occupation of Europe by man ceased for a long era. Why did it cease? and what caused the cessation? Sir John Evans does not answer. Palæolithic man did not come into

contact with his successor, Neolithic man. The two races did not meet in conflict, and did not amalgamate. This is unanswerably proved, from the relics of the two races never being found mingled together. Palæolithic man in Europe was drowned by vast floods. He was swept away along with the elephant, lion, and rhinoceros, by the great flood which closed the Palæolithic period. This is the explanation of his extraordinary disappearance.

Sir William Dawson places the Noachian Deluge in the great gap between the Palæolithic and the Neolithic period, and he thus considers the Neolithic era to be the early Post-diluvian period. He discusses the biblical narrative of the Deluge at length, but his chapter on the Post-diluvian dispersion seems to have been too hastily written. His summary, however, in which the Bible narrative is correlated with geological events, is excellent.

Sir Henry Howorth's elaborate papers<sup>35</sup> form the best account that we have seen of those later Quaternary beds, which are called "flood deposits."<sup>36</sup> When a great flood sweeps across the land, it always deposits *débris* of three kinds,—sand, mud, and gravel. Sometimes it spreads out these materials in great sheets, and sometimes it piles them up in heaps. The gravel being heaviest is generally at the bottom, and the clay being the lightest, at the top. All these beds, therefore, are products of one and the same flood. Now, all over the south,<sup>37</sup> east, and center of England, there are found immense deposits of sand, clay, and gravel. They occur at all heights, and have not the least connection with the modern drainage-system of the country. The gravel beds are found on the tops of the hills, on the plateaux, on the hill-sides, and on the watersheds. They everywhere contain the bones of the *same animals*, i. e. the lion, horse, hyæna, elephant, rhinoceros,

and hippopotamus, so that it is certain that these gravels were all formed at the *same time*. In many valleys, also, these gravels contain flint implements made by man,<sup>38</sup> so the deposits must have been formed after man appeared in Western Europe. Water, of course, deposited these beds of sand, clay, and gravel; but whence was the water derived? Certainly not from rivers, for no rivers could have flowed along the tops of the hills, and across the watersheds, where we find the gravels spread out in vast sheets. As, also, these gravels often contain great boulders,<sup>39</sup> it follows that the water which deposited these gravels must have swept over the land in prodigious volume, and must have rushed along with terrific force and speed. Hence, these gravels were deposited *quickly*. The character of the position of the bones of the animals found in them proves this unanswerably. These bones occur in enormous masses, carnivorous and herbivorous animals' bones being piled up in utter confusion and in countless numbers. These animals could not have congregated thus *naturally*, and then have all tumbled into the rivers! No such incidents ever happen, and it is plain that they rushed together in fear to escape the raging floods, and were drowned in great herds by the rising waters. Some geologists, such as Professor J. A. Geikie<sup>40</sup> and Mr. Skertchley,<sup>41</sup> maintain that the floods which deposited these gravels were caused by the melting of vast ice-sheets. This, however, is contradicted by the facts, which show that, at the time of the deluge which formed the gravels, a *warm* climate prevailed. The bones of the hippopotamus and the remains of a vigorous forest vegetation of a temperate character prove clearly that the climate was not cold enough in England to allow ice-sheets to be formed. Moreover, the ice would have melted *slowly*, and the animals would

thus have had time to escape. We shall return to this subject when discussing the work of M. Lambert.

Sir Henry Howorth describes at great length<sup>42</sup> the remarkable deposit called "loess," which is the latest of all the flood-deposits, and probably also the most wonderful. This is a vast deposit of limy mud, found in France, Belgium, and Germany. It is spread out in enormous sheets, and covers hundreds of miles. It descends into the valleys, mantles the hillsides, crosses the watersheds, and covers the table-lands. In the valley of the Rhine,<sup>43</sup> it rises to a height of 1,600 feet above the sea, and it attains a greater elevation in the regions of the Danube, in Hungary, and in the Carpathian Mountains, where it covers the whole country, like a vast winding-sheet. It contains only recent shells, and sometimes in it the bones<sup>44</sup> and weapons of Primitive man have been discovered. How was the loess formed? Of course *water* alone could have spread it over such a vast extent of country. But no *rivers* could have deposited it, for rivers could never have flowed along the tops of hills, across the watersheds, and over the plateaux, where the loess is spread out in enormous sheets. The loess in France and Belgium rests on great beds of clay with angular limestone blocks, and beneath these come deposits of gravel full of rolled pebbles, which contain the bones of the *same animals*<sup>45</sup> as are found in the loess. In England, the equivalents of the loess are the brick-earths, and they also rest on beds of gravel, while in Belgium a deposit known as the "Hesbayen loam" is merely the loess under a different name. The succession, therefore, of these deposits is as follows (from the oldest to the latest): gravel, clay with blocks, and loess. But all these were deposited by the *same flood* during different stages of its rapid diluvial course. Further, as the loess often contains large boulders, it is clear that its depo-

sition was *rapid*, and that the water which deposited it rushed along with terrific speed and power. Sir Henry Howorth holds that the loess is an outpouring of volcanic mud,<sup>46</sup> which took place at the Deluge, and which the rushing waters of the Flood carried along and spread in vast sheets over mountain, hill, and table-land. Sir Joseph Prestwich, also, has stated,<sup>47</sup> that the loess was formed by a great flood, and this is also the opinion of Sir William Dawson.

M. Lambert begins his argument <sup>48</sup> by scientifically defining a deluge. This, he explains, is caused by the sinking of a large portion of the earth's surface beneath the sea-level, so that the waters of the sea rush in, and overflow the land. As an example of this, he refers to the great flood in Scinde in India, when, owing to a terrestrial depression, the sea, in a brief time, overflowed a tract of country two thousand square miles in extent.<sup>49</sup> He notices, also, the earthquake at Lisbon in 1755, and the submergence of a part of Jutland, three centuries before the Christian era. Similar deluges, on a far larger scale, must often have occurred in remote geological times.<sup>50</sup> M. Lambert writes a long chapter on the "Traditions of the Deluge," at all times and in all countries, and concludes that these stories could have arisen only from the recollection of a diluvial catastrophe. He next devotes a chapter to the religious rites, ancient coins, inscriptions, and relics, which, he maintains, commemorate Noah's Flood. A strong argument, undoubtedly, may be drawn from these archaeological witnesses, but its value may be overestimated, as it is impossible to prove any connection between many of these ceremonies and the Deluge of Noah.

M. Lambert next unfolds his geological argument, and he rightly refers to the Quaternary period, as containing those deposits which were formed by a great flood. He explains,

however, that the *earlier* deposits of the Quaternary era<sup>51</sup> belong to the Glacial period, and, as they were formed before man appeared in Europe, have nothing to do with his argument. In this way, he avoids falling into the error of Dean Buckland,<sup>52</sup> who maintained that *all* the Quaternary beds were the result of a great flood. In his four following chapters, M. Lambert describes the *later* Quaternary beds of clay, gravel, and sand, in Europe, Asia, and America, and dwells especially on the proofs that they were formed at one time and by one cause.

In France, these beds are known as "diluvium," and they are arranged in two divisions, called "diluvium gris" and "diluvium rouge." The former deposit is the oldest, but they are merely divisions of one great diluvial formation. The diluvium gris is formed of vast beds of gravel and pebbles, it fills the bottoms of the valleys, and covers the lower slopes of the hills. It is full of the bones of lions, hyænas, elephants, rhinoceroses, and hippopotamuses, and often, as in the valley of the Somme, it contains the flint implements of man. This gravel cannot have been formed by river action, such as occurs at the present day, for it contains great boulders a ton in weight, which no present rivers could carry along. The diluvium rouge is a redder deposit, of clay, pebbles, and sand. It covers hills, plateaux, and watersheds, enveloping the country like a vast winding-sheet. It rises to a height of 2,500 feet, extends into Spain, and is the exact equivalent of the loess in Germany. No rivers could have formed the diluvium rouge, as it covers the hills and plateaux where rivers could not flow. Sir A. Geikie holds<sup>53</sup> that the diluvium gris was formed during an interglacial epoch, but this is extremely doubtful. Professor J. A. Geikie thinks<sup>54</sup> that both the diluvium gris and diluvium rouge were formed by great

inundations, which occurred when the ice-sheets of the Glacial period were melting. The fossils, however, of these deposits, indicate a *warm* or temperate climate. Sir Joseph Prestwich considers the diluvium rouge to be a flood-deposit, and the equivalent of the loess in Germany.<sup>55</sup> Eminent French geologists hold the same opinion. M. D'Acy declares<sup>56</sup> that the diluvium gris, which contains the gravels and flint implements in the valley of the Somme, was formed by a great flood, and the same opinion is held by M. Tardy.<sup>57</sup> M. Belgrand, also, has proved by elaborate investigations that the Palæolithic period in France was a closely tremendous deluge, which swept over the north of France.<sup>58</sup>

In England, the deposits which answer to the French diluvium are the upland gravels, brick-earths, and loams. The *lower* gravels may be, as Sir John Evans thinks,<sup>59</sup> fluviatile, and some geologists make a distinction between low-level gravels and high-level gravels. The French geologists, however, deny this division, and prove that *all* the gravels belong to one great sheet of detritus, a conclusion, also, ably maintained by Mr. A. Tylor.<sup>60</sup> The plateau gravels of England cover uplands and cross watersheds, where no rivers could flow, and they plainly indicate the sweeping of immense bodies of water over the surface of the country. This was the opinion of Sir Roderick Murchison, who, writing on the flint-gravel of the southeast of England,<sup>61</sup> held that it was formed by tumultuous diluvial waters, which, rapidly sweeping over the surface of the country, drowned the great mammalia (i. e. the lion, elephant, hyæna, rhinoceros, and hippopotamus) living at the time. In Cornwall, also, the remarkable stanniferous detritus, known as the "stream-tin" deposits, beneath the valley alluvia, was held by Sir Henry De la Beche<sup>62</sup> to have been formed by a great flood, an opinion with which Sir

Joseph Prestwich has recently expressed his complete agreement.<sup>63</sup> The brick-earths of England rest upon the gravels, and contain the bones of the same animals, which show that all these beds were formed at the same time and by the same cause. The English brick-earths are the equivalents of the French diluvium rouge and loess, and of the Hesbayen loam in Belgium,<sup>64</sup> while the valley and upland gravels of England are the equivalents of the diluvium gris of France.

We need not pause to notice M. Lambert's review of the Diluvial or later Quaternary deposits of Belgium, Italy, Spain, and Germany, for they resemble the contemporaneous beds in England and France, and contain the bones of the same animals. In Russia these deposits are of vast extent, and we are surprised that M. Lambert does not notice the enormous deposit of black earth, or "tchernozen," which extends over a distance of seven hundred miles in Southern Russia, and which Sir Henry Howorth considers to be, like loess, a vast outpouring of volcanic mud,<sup>65</sup> which occurred at the end of the Quaternary period. This tremendous volcanic catastrophe was accompanied by tumultuous invasions of diluvial waters, during which Palæolithic man and the great animals with which he was associated were swept away. The diluvial formations of Southwestern Asia are only imperfectly known. Great beds of gravel and sand extend along the banks of the Euphrates,<sup>66</sup> but their origin is uncertain, and the same doubt attaches to the erratic blocks which are scattered over the plains of Mesopotamia. That Northern Siberia was devastated by a great flood which destroyed the elephants<sup>67</sup> and rhinoceroses which then inhabited it, and which piled up their bones in countless myriads on the icy wastes of the New Siberian Islands, has been convincingly proved by Sir Henry Howorth. It shows that this great deluge occurred since

man appeared on the earth, and that it was occasioned by the sudden drainage of a great inland sea which covered Central Asia.<sup>68</sup> More recently Mr. Stuart Glennie<sup>69</sup> has declared that the recollection of this tremendous catastrophe has given rise to the traditions of the Deluge, and to the biblical story of Noah's Flood.

In North America enormous deposits of gravel and sand extend along the course of the Mississippi, and reach to the Mexican Gulf, but M. Lambert's notice of these diluvial deposits is very brief. Professor Dana has shown<sup>70</sup> that a great flood devastated America at the close of the Glacial period, and Professor Clappole thinks<sup>71</sup> that the tremendous inundations of this era are commemorated in the Flood traditions of ancient races. The *sudden* and *complete* disappearance of the Palæolithic fauna in North America, also, implies a diluvial catastrophe.

In South America the Pampas present similar evidence. Thousands of square miles of the Pampas are formed of gravel and clay, which, such able geologists as Lund, D'Oribigny, and Sir Henry Howorth<sup>72</sup> consider could have been formed only by a great flood. The gravel of Patagonia is also very remarkable. According to Darwin, it covers a tract of country eight hundred miles in extent, and contains shingle and rolled pebbles.<sup>73</sup> Dr. Moreno, who has lately surveyed this country, calls this "glacial gravel," but he shows that, after its deposition, the gravel was swept by diluvial waters, piled up in ridges, and carried over the plains into the valleys.<sup>74</sup> In the Pampas deposits we also meet with the same vast destruction of animal life as occurs in Europe at the end of the Palæolithic period. The great mammals, such as the Megatherium, Mylodon, Megalonyx, Glyptodon, Toxodon, etc., vanish *suddenly* at this time, and no change of climate

occurred. Man lived in South America at the time of this diluvial catastrophe, for his bones have been found by Lund in the caves of Brazil, mingled with those of the great mammalia before mentioned.<sup>75</sup>

M. Lambert's account of the bone-caves is imperfect, for he does not consider that beds of stalagmites frequently occur in the caves, accompanied by diluvial deposits. We must guard ourselves, however, from falling into the error of thinking that the cave deposits are later than the river gravels. The upland and river gravels can in Belgium be *traced into the caves*, and Sir Joseph Prestwich has declared that the cavern and valley deposits are synchronous.<sup>76</sup>

The other chapters of M. Lambert's excellent work deal with the Neolithic period, and meet critical objections, so they do not concern us. Since the British Association Meeting in 1880, Sir Joseph Prestwich has constantly declared that large districts of Europe have been submerged since the appearance of man. He carefully distinguishes between the different kinds of "drifts," or Quaternary deposits. Some of these were formed by ice, some by rivers, and some by the sea. There are, however, other "drifts" at the *end* of the Quaternary period, which cannot have been formed by these agencies, and which he calls "the rubble drift." These he thinks were formed by a great flood. The first of these is called the "head" or "head of rubble." It consists of a mass of angular rubble, lying on the surface of seacliffs. At Brighton, the "head" is full of the bones of elephants, rhinoceros, and hippopotomus,<sup>77</sup> and contains also angular fragments of rocks which have been transported from a distance. The "head," according to Sir Joseph Prestwich, is the *last* deposit of the Palæolithic period. It was formed during a great flood, by the waters full of rubble pouring over the

cliffs. He also considers that the flood which formed the "head" extended over most of Europe, destroying Palæolithic man, and the great animals which were associated with him,<sup>78</sup> was Noah's Deluge.

The ossiferous deposits in fissures form an extremely interesting link in the chain of evidence for the occurrence of a great diluvial catastrophe since the appearance of man upon the earth. In limestone rocks in England and in Europe, there are extensive fissures filled to the brim with earthly deposits, and containing vast masses of animals' bones, confusedly packed together. At Oreston, near Plymouth, many of these have been discovered. They traverse the rock in all directions, and are full of the bones of the lion, hyæna, elephant, rhinoceros, and hippopotamus. In 1887 in a fissure in the limestone rock at Cattedown, near Plymouth, the bones of man<sup>79</sup> were found, mingled with the remains of these animals, and this discovery proves that man was living in the west of England, at the time when a great flood filled the fissures and destroyed the great mammalia.<sup>80</sup> At Tenby, also, similar cracks, full of the bones of the same animals, have been brought to light, particularly in the Caldy Island, where the bones were so numerous that they were carried away in boat-loads.<sup>81</sup> Another remarkable case was unearthed at Windy Knoll in Derbyshire, where, in an area of twenty-five feet by eighteen feet, no fewer than 6,800 bones were counted and sorted, besides those cast aside.<sup>82</sup>

Sir Joseph Prestwich next gives instances of the ossiferous fissures in France. He describes the fissures and cave on the hill of Santenay in Burgundy. These fissures are on the *top* of the hill, and are full of the bones of animals, which must have ascended the hill in herds, to escape from some terrible danger. In Sardinia similar bone-fissures occur, and

in Sicily, near Palermo, *twenty tons*, of the bones of the hippopotamus *alone*, were in six months taken from the cave of San Ciro.<sup>88</sup>

Still more remarkable are the bone-caves and ossiferous fissures of Malta, so well described by Dr. Leith Adams.<sup>84</sup> These caves and fissures are 300 feet above the sea, and occur on the top of a barren range of hills, which slopes down to the sea-shore. No rivers flow near these caves, and none ever *could* have traversed them, and yet these caverns and fissures are *packed full* of the bones of elephants and hippopotami, *whole carcasses* of these animals having been washed into them, as well as stones, rubbish, and coarse gravel. The water that filled these caves and fissures could not have belonged to any river, but must have been derived from a vast and violent deluge. The desolate slopes of the Rock of Gibraltar, also, high above the sea, are full of chasms and caves, which are full of mud, gravel, and masses of animals' bones; but no river could ever have flowed along the upper sides of the famous Rock.<sup>86</sup> All along the shores of the Adriatic, we find great chasms and fissures in the limestone rocks, which are filled with the bones of the great extinct mammalia, and these bones are shattered and broken, but never *gnawed* or *weathered*. Admiral Smyth<sup>86</sup> gives a most interesting instance. In the Gulf of Quenaro, on the Croatian coast of the Adriatic, lie the islands of Lossin, Cheso, Osero, Canidole, and Sansego, all of which abound in the fossil bones of mammalia. In the island of Cerigo, there is a hill which is more than a mile in circumference, and is called "The Hill of Bones." It is traversed by fissures in all directions, which are packed full of the bones of animals. These ossiferous fissures and breccias are found all around the shores of the Mediterranean, they all contain the bones of the same animals, and they indicate a

great change of level, accompanied by a vast and sudden destruction of animal life.<sup>87</sup>

We may arrange the evidence for a great diluvial catastrophe, presented by the ossiferous fissures, under the following heads: (1) The fauna in all the fissures is of the *same* age, for all the bones belong to the *same* animals; (2) This fauna is that of the *later* Quaternary or Palæolithic period; (3) The fissures were not filled *before* the Palæolithic age, because they do not contain the remains of any older fauna, nor were they filled at a later era, for then a recent fauna would have been at the top, which is not the case; (4) The fissures were filled *at one time*, suddenly and quickly, from the top to the bottom, for the bones are piled in, in masses, with confused deposits of mud and rubble; (5) When the fissures were filled, man inhabited Europe, as is proved by his bones being found in the Cattedown fissure at Plymouth. Sir Joseph Prestwich thinks that,<sup>88</sup> at the time of the diluvial catastrophe, these fissures were opened by earthquake action, and, as the land rose out of the water by which it had been submerged, violent currents swept into these fissures the carcasses, limbs, and remains of the animals which had been drowned.

More than fifty years ago, a similar conclusion was arrived at by Sir Henry De la Beche.<sup>89</sup> That eminent geologist, when discussing the fissures filled with the bones of lions, elephants, and rhinoceroses, which are so numerous in the neighborhood of Plymouth, gives it as his opinion, that they had been filled by a great flood, which swept tumultuously over the country, drowned the animals, and carried their bones into the fissures. This flood, also, he considered, was the same deluge that formed the stanniferous gravels of Cornwall, which are known as the "stream-tin" deposits. This view, that a flood formed

these beds, has been put forward by Cornish geologists.<sup>90</sup>

It should, also, be carefully considered, that, in these bone-fissures, the bones of *carnivorous* and *herbivorous* animals are all found confusedly mingled together, showing that they were all destroyed at the same time. It is further to be noted, that the bones of the herbivorous animals are *not gnawed*, so that they were not killed and eaten by the stronger animals. Let us take the fissures on the top of the detached hill at Santenay in Burgundy, which we have already noticed. These chasms are full of the bones not only of lions, bears, wolves, and hyænas, but also of the remains of deer, antelopes, and wild horses, the bones of these herbivorous animals being not gnawed. What induced all these animals of different natures to ascend the hill in such multitudes? What catastrophe made herbivorous and carnivorous animals congregate together, which they never do naturally? What could it have been but a great flood which rapidly invaded the lowlands, and compelled *all* the animals to ascend the hill to escape the rising waters? Exactly the same thing happens in tropical regions in the present day, when great and violent floods occur. How great also must the flood at Santenay have been which submerged the *summit* of the lofty and detached mountain, and drowned all the animals congregated on its very top! Another remarkable case is presented by the cave of Gargas, in the Pyrenees. At the inside end of this cavern there is a vast pit, more than sixty feet in depth, and this abyss contains at its bottom whole skeletons of bears, wolves, and hyenas. These animals must have taken shelter in the cave to escape the flood, and being driven into its end by the invading waters, they fell into the pit and perished.<sup>91</sup> There are, also, in many parts of the world, vast deposits of gravel, the age and the mode of formation of which have not been clearly determined.

In Northern Africa, in the hilly portions of the desert of the Sahara, Dr. Barth found the ground, for scores of miles, covered by great sheets of gravel. This gravel crossed ridges, coated the tops of the hills and spread far and wide over the desolate, stony, plains.<sup>92</sup> In one place, on the crest of a mountain ridge, it attained an elevation 4,000 feet above the sea. How was this gravel formed? No glaciers or icebergs could have existed in the Sahara, and atmospheric disintegration is quite inadequate to produce such a result. Clearly there was a recent submergence, and a great invasion of the waters flooded the Sahara desert. In the Libyan desert, the same phenomenon occurs, as Mr. Bayard Taylor traveled day after day over plains covered by coarse gravel, near the Nile.<sup>93</sup>

That the great flood which closed the Palæolithic period was Noah's Deluge has been admitted by many leading geologists. Sir William Dawson's words are very emphatic, for, speaking on this point, he says:—

"It is decidedly probable that Noah's Flood is identical with that which destroyed the men of the Mammoth age, the Palæocœmic or Palæolithic men; and in that case the recession of the waters would probably be gradual, but intermittent, 'going and returning,' as our ancient narrator has it, but there need not have been any violent debacle."<sup>94</sup>

Sir Henry Howorth's view is, that the great flood which destroyed the mammoth, and the mighty animals associated with it, and overwhelmed Palæolithic man was Noah's Flood. As to the character of this terrible cataclysm, he says:—

"The extinction of the Mammoth in the Old World was sudden, and operated over a wide continental area, involving a widespread hecatomb in which Man, as well as other creatures perished. This destruction was caused by a flood of waters which passed over the land, drowning the animals and then burying their remains. This catastrophe forms the great break in human continuity, no less than in the records of animal life, and it is the Great Divide when history really begins."<sup>95</sup>

We will now sum up the evidence for the occurrence of a great diluvial catastrophe since the appearance of man upon the earth, in the following manner:—

1. At the end of the Palæolithic period, the great beasts\*\* which characterized that era *suddenly* and *completely* disappeared in Europe, Northern Asia, and in North and South America. This extraordinary change in the fauna of these regions constitutes a great gap between the Palæolithic and Neolithic ages. It cannot be explained by any changes in climate, for, although in Siberia, at the time of the destruction of the mammoth, there certainly *was* a change of climate, there is no proof that such an alteration occurred in Europe at the time, and it is certain that when the diluvial catastrophe occurred in North and South America, there was, in those regions, no change in the climate whatever. This disappearance of the Palæolithic mammalia cannot have been occasioned by man. Men were few and too badly armed to have killed such myriads of mighty beasts, and, moreover, their extinction took place everywhere in a short period, and in a complete manner. A great flood can alone explain this sudden extinction.

2. At this time we meet with enormous beds of gravel, sand, and clay, full everywhere of the bones of the same great mammalia, piled up and mingled together in the most extraordinary confusion. These beds extend over hundreds of miles, and cannot have been formed by rivers, because they cover hills, cross watersheds, lie on the tops of table-lands, and mantle whole surfaces of countries like gigantic winding-sheets. They are also in many places full of great boulders, which testify that the waters which deposited them must have swept over the country with terrific force and speed.

3. The fissures in limestone rocks are full to the very brim

of masses of the bones of the same animals as are found in the gravels and clays. These fissures contain the bones of herbivorous and carnivorous animals in enormous numbers, mingled confusedly together, and these bones are never gnawed, though shattered and broken. They are all in the same condition, proving that the fissures were all filled at the same time.

4. Man was present on the earth at the time of this tremendous destruction of the animals, for his bones have been found in the sands and clays and loess<sup>97</sup> in Germany. His bones, also, are buried in the Cattedown fissures at Plymouth, and his flint implements occur in great numbers in the gravels of England and France. These men were the Palæolithic men of the First Stone age. They died out suddenly and completely, for their peculiar implements of bone and stone are not found in the Neolithic age. Thus we conclude that they were overwhelmed by a tremendous inundation in which they perished.

5. There are many religious ceremonies and festivals in ancient religions, as well as coins, medals, and customs, which seem to be commemorative of a great flood. This line of evidence is precarious, and ought to be put forward carefully, but it should not be ignored, and may be further developed.<sup>98</sup>

6. The tradition of the Flood has been held by many cultured nations of antiquity, and is still held by barbarous races and savage tribes. In many of these traditions it is declared that the sin of man occasioned the catastrophe, by provoking the Divine anger. The universality of the tradition can be explained only by the occurrence of the Deluge.

7. There is the Hebrew version of the Deluge story, which is contained in the book of Genesis, and which, in poetical but accurate language, describes the cause, progress, and result

of the diluvial catastrophe. Such is the evidence, in its various branches, for a vast invasion of the waters over the habitable portions of the world since the advent of man, and we confidently ask, Where is any great physical catastrophe which is confirmed by such an imposing array of witnesses and testimonials? There are also other striking facts, immediately connected with the passing away of the Glacial period, which need to be carefully considered. Some geologists hold that the melting of the great ice-sheets which characterized the Glacial period occasioned fearful aqueous debacles, which overwhelmed vast regions of the earth's surface, at a time when man was living in both the eastern and western hemispheres.

Professor J. A. Geikie, in his most valuable work "Pre-historic Europe," describes in graphic language the terrific deluges which occurred over Northern Europe at that time, and distinctly states that the closing scene of the first human era, or Palæolithic period, was one of "torrential rivers and vast inundations."<sup>99</sup> He further states that, at the close of this period, Western Europe was untenanted by man, and that when the men of the second human era (or Neolithic men) entered Western Europe they found it *empty*, save a few Palæolithic men who may have lingered in the Pyrenees.<sup>100</sup> A most unlikely supposition, as the Pyrenees were covered with snow-fields themselves, and must have been a center from which tremendous inundations devastated the lands to the north and south. Next, Professor Geikie asks, What became of Palæolithic men amidst these aqueous convulsions? He rejects the theory that Palæolithic man migrated, and also the supposition that Palæolithic man was conquered and exterminated by Neolithic man. What then did become of Palæolithic man? Professor Geikie declares that he cannot tell.<sup>101</sup> Let the sequence of these events be thoughtfully pon-

dered by the reader. Here is Palæolithic man living when the Glacial period is slowly passing away. Then come "vast inundations," devastating floods, and aqueous catastrophes. Palæolithic man disappears, and when, on the occasion of these convulsions, Neolithic man enters Northern Europe, he finds no man there, for Palæolithic man has completely disappeared. Is not the only possible conclusion this, that Palæolithic man was *swept* away and exterminated by these terrific inundations?

In Central Asia, also, we have lately discovered that these convulsions occurred at the *same time*. In this vast region the Glacial period prevailed, and enormous glaciers descended from the flanks of the Thian Shan, Kara Koram, Kuenlun, and Himalaya Mountains, filling up valleys where no glaciers now exist. As this Ice age in Central Asia passed away it left behind it immense sheets of water both in Western and Eastern Turkestan. These inland Mediterraneans were either dried up or drained off *suddenly*, the latter view being the opinion advocated by Sir Henry Howorth. Great beds of gravel are found in India in places where neither fluvial nor glacial action can have formed them, but we need further evidence before deciding on their origin. The whole question of the length and character of the Glacial period is not yet fully decided, and it is to be regretted that we are not yet in possession of precise accounts as to the geological characteristics of Asia Minor and Mesopotamia. Of course we refer to the *later* deposits, those which are of a superficial (Quaternary) age.

The theory of Professor Wright is stated with great clearness and power in the work the title of which stands at the head of this article, and which forms the Stone Lectures delivered at Princeton in 1904. The earlier chapters deal with the Sojourn of the Israelites in Egypt, the Exodus, and the

Physical preparation of Palestine for the home of the chosen people. They are admirable, but we are here only concerned with the six chapters of his book which discuss the Noachian Deluge. The special points to which we draw attention in noticing Dr. Wright's book are: (1) the credibility of the Flood; (2) the scientific cause of the Flood; (3) the geological date of the Flood. As to the first, the geologist knows perfectly well that great submergences have occurred in geological times, and that a vast continent which connected Great Britain with the regions around the North Pole during Tertiary times was entirely submerged at a later period. Dr. Wright shows that in Quaternary times (when man had appeared on the earth) there was a general instability of the earth's crust. This is proved by the raised beaches, ancient shorelines, and submarine forests, which exist all around the coasts of Europe and America. Whole tracts of land in Asia and Africa are covered with recent *marine* shells, showing that the sea rolled its waves over them at a date since the advent of man upon the earth. The view, therefore, that the Flood of Noah was caused by a submergence is, geologically speaking, most credible.

Speculating on the geological cause of the great flood in Quaternary times, which he holds to have been the Deluge of Noah, Sir Henry Howorth has put forward the following theories: In North America it was caused by the elevation of the Rocky Mountains, and in South America it was produced by the rapid rising of the main portion of the chain of the Andes.<sup>102</sup> In Central Asia at that time there existed a vast inland sea, and the sudden drainage of this Asiatic Mediterranean occasioned a tremendous deluge over the northern and western portions of Asia.

Professor Wright connects the Deluge of Noah with the

Glacial period in the following manner: During the Glacial period, enormous ice-sheets covered North America and Northern Europe to an extent of about six million square miles. The weight of these vast deserts of ice, which in many places were many thousands of feet thick, caused the earth—which is a semi-plastic body—in many places to sink, and when the ice melted, and the water was returned to the ocean, equilibrium was restored and the land rose again. At the same time the melting of the ice-sheets occasioned vast local floods, which in many places swept man away. The bursting also of glacial lakes in North America, such as Lakes Agassiz and Bonneville, caused tremendous deluges, which united to form a perfect Flood period. This was closed by a great depression, which was the final catastrophe. The waters of the ocean were let in over Central Asia, and when the region rose again, and was drained, the present dry and cold climate of Central and Northern Asia was established. The distribution of the loess in Central Asia—which Dr. Wright describes at length—is the result of this great diluvial catastrophe.

As to the date of this Flood period, which came at the close of the great Ice age, Dr. Wright shows that it could not have been more than from 7,000 to 10,000 years ago. A variety of proofs in Europe and in North America shows that the close of the Glacial period occurred at a very recent date. Rivers have cut only very shallow channels in glacial deposits; lakes formed in glacial clays are but slightly filled up by inflowing streams, and the marks of the old glaciers on the rocks are as fresh as if made yesterday. Dr. Wright is to be heartily congratulated on his able and convincing demonstration of the credibility, cause, and date of the Noachian Deluge.

And now, what have the opponents of the biblical Flood to

say to this long chain of facts and evidences? They may well be challenged to make reply. They cannot ignore the matter any longer; they cannot evade the question by vague statements about "deluge myths." They must meet the case. They must explain the *sudden* disappearance of the great Palæolithic mammalia, and they must say how the enormous beds of gravel and sand which have been described, were formed. They must explain how Palæolithic man disappeared so suddenly, and how the fissures were filled with shattered bones from top to bottom. Their reply to these questions will be awaited with great interest. Meanwhile the devout student of the Bible may thankfully rejoice in the knowledge that fresh light has been thrown on the firmly established truth that science, rightly interpreted, powerfully testifies to the truth of the written Word of God.

## NOTES.

<sup>1</sup> Essay on the Theory of the Earth.

<sup>2</sup> In his *Reliquiæ Diluvianæ*.

<sup>3</sup> Particularly his "Principles of Geology" (first published in 1830).

<sup>4</sup> Testimony of the Rocks, Lect. vii.

<sup>5</sup> In his work *Archæia* (published in 1860).

<sup>6</sup> Proc. Brit. Assoc., 1860.

<sup>7</sup> Travels in Siberia, Vol. II, p. 380.

<sup>8</sup> Geology of Russia and of the Ural Mountains, Vol. I. chap. xix.

<sup>9</sup> Geological Magazine, 1881, 1882.

<sup>10</sup> The Mammoth and the Flood.

<sup>11</sup> The Historical Deluge, etc.

<sup>12</sup> Wright's Ice Age in North America, p. 350.

<sup>13</sup> It is also generally held that this flood was a punishment for man's sin.

<sup>14</sup> That is, the earliest race of men.

<sup>15</sup> The number of these beasts was amazing. At Yarnton the remains of *fifty* elephants were found in one gravel pit. Cart-loads of bones were taken from the Oreston fissures; whilst the piles of bones found when Kent's Hole (Torquay) was first entered were so astonishing that tunnels had to be driven through absolute walls of bones.

<sup>16</sup> That is, in England, France, Belgium, Germany, and Russia.

"Let it be remembered, also, that Neolithic man, armed with *better weapons*, was quite unable to exterminate any of the beasts of the Later Stone age.

"No change occurred in the vegetation at that time.

"Such as the boulder-clay, etc.

"The *extinct* animals found in Europe in these beds are few, the others are still living elsewhere; such as the lion, rhinoceros, etc.

"Such as the loess in Germany.

"See this powerfully urged by Sir Henry Howorth in *The Mammoth and the Flood*, pp. 250-257.

"M. Quatrefages states that the two races amalgamated. See *Human Species*, chaps. xxvi., xxii. But all geological evidence is against this notion.

"Geology and the Deluge, pp. 5, 6.

"He refers to M. Lenormant's work, *The Beginnings of History*, Vol. i., where an excellent summary of these traditions will be found.

"The Duke of Argyll restated his argument at length in *The Nineteenth Century*, Jan., 1891; see also his *Address to the Edinburgh Geological Society*, 1881.

"The Meeting Place of Geology and History.

"These include carvings of men and animals.

"See *Bulletin de la Société d'Anthropologie de Paris*, No. 9, Nov.-Dec., 1894.

"Professor W. B. Dawkins figures a representation of a glove found in a French tavern in his *Early Man in Britain*, p. 211.

"It is true that there are small skulls also found in the Palæolithic age, but their brains were as large as the ancient civilized Peruvians.

"Cave Hunting, pp. 353-359; *Early Man in Britain*, pp. 233-242.

"Prehistoric Europe, pp. 547, 548.

"Address to the British Association at Toronto, 1897.

"Geological Magazine, Vols. ix., x. (1882, 1883).

"Another good account of these deposits may be found in *Memoirs of the Geological Survey of England and Wales, London and the Thames Valley*, by W. Whitaker, 1889.

"Except Cornwall.

"Sir J. Evans describes these flint implements from the valleys of the Thames, Ouse, Cam, Lark, Medway, etc., in his *Ancient Stone Implements of Great Britain*, chap. xxlii.

"Whitaker's *Geology of London and the Thames Valley*, pp. 280, 290, 370, 449.

"The Great Ice Age, p. 534; *Prehistoric Europe*, pp. 543, 140, 141.

"Geology of the Fenland in *Memoirs of the Geological Survey of Great Britain*.

"Geological Magazine, Vol. ix. pp. 9-18, and pp. 69-80.

"See Sir C. Lyell's *Antiquity of Man*, pp. 326-341.

"As at Eguisheim on the Rhine, and in the cave of Neanderthal.

- “ That is, the lion, horse, hyæna, elephant, and rhinoceros.
  - “ Geological Magazine, Vol. ix. p. 72.
  - “ On certain Phenomena belonging to the last Geological Period, pp. 40-42.
  - “ In *Le Déluge Mosaïque*.
  - “ This inundation is described in Lyell's *Principles of Geology*, Vol. II. p. 100.
  - “ The submergence of the Wealden Continent is a case in point, See Mantell's *Wonders of Geology*, Vol. I. p. 444.
  - “ Such as the boulder-clay.
  - “ In *Reliquiæ Diluvianæ* (1823).
  - “ *Text-book of Geology*, p. 898.
  - “ *Prehistoric Europe*, p. 153.
  - “ *Geology*, Vol. II. p. 7.
  - “ *Le limon des Plateaux du Nord de la France*, 1878.
  - “ *Bull. Soc. Géol. de France*, Vol. VI. pp. 401, 402.
  - “ See his magnificent work entitled *La Seine aux âges anté-historiques*.
  - “ *Ancient Stone Implements of Great Britain*, chap. xxv.
  - “ *Quarterly Journal of the Geological Society*, Vol. xxv. (1869).
  - “ *Ibid.*, Vol. vii. pp. 349-398.
  - “ *Geology of Cornwall, Devon, and West Somerset*, pp. 400, 407, 416.
  - “ *Quarterly Journal of the Geological Society* (1892), p. 342.
  - “ This is fully admitted by Sir A. Geikie (*Text-Book of Geology*, p. 898), and by Joseph Prestwich (*Geology*, Vol. II. p. 7).
  - “ *Geological Magazine*, Vol. ix. p. 74.
  - “ See Ainsworth's *Researches in Assyria*, p. 93.
  - “ i.e. mammoths.
  - “ *Proc. Brit. Assoc.*, 1869.
  - “ *Contemporary Review*, 1892.
  - “ *Manual of Geology*, p. 553.
  - “ *Wright's Ice Age of North America*, p. 388.
  - “ *The Mammoth and the Flood*, pp. 352-354.
  - “ *Voyage of the Beagle*, chap. viii.
  - “ *Geographical Journal*, Sept. and Oct., 1890.
  - “ See *Prehistoric America*, by the Marquis de Nadaillac, p. 25.
  - “ *Geology*, Vol. II. p. 488.
  - “ Sir Roderick Murchison held that this deposit was formed by a great flood. *Journal of Royal Geological Society*, Vol. vii. p. 365.
  - “ See the work under review, and also in another work entitled *On Certain Geological Phenomena, and on the Tradition of the Flood*.
  - “ There were skulls and bones belonging to fourteen human beings.
  - “ See *Transactions of the Devonshire Association for 1887*.
  - “ *Quarterly Journal of the Geological Society*, Vol. XLVIII. p. 304.
- The bones from Caldy were those of the lion, hyæna, elephant, and hippopotamus.

<sup>88</sup> Early Man in Britain, by W. Boyd Dawkins, p. 188.

<sup>89</sup> Prestwich, on the Tradition of the Flood, pp. 50, 51.

<sup>90</sup> Adams, A Naturalist in the Nile Valley and Malta, pp. 161-238.

<sup>91</sup> Quarterly Journals of the Geological Society, Vols. II. and XXXIV.

<sup>92</sup> The Mediterranean, by Admiral Smyth, p. 41.

<sup>93</sup> The bones in these fissures are exactly the same as those in the fissures in England and France, viz. elephant, lion, horse, rhinoceros, etc.

<sup>94</sup> Prestwich, The Tradition of the Flood, p. 66.

<sup>95</sup> The Geology of Cornwall, Devon, and West Somerset, pp. 410, 412, 416.

<sup>96</sup> See Carue and Boase in Proc. Roy. Corn. Geol. Soc., Vol. IV.

<sup>97</sup> See Matériaux pour l'Histoire de l'Homme, Vol. XIX. p. 119; also Oubliettes de Gargas, by M. M. Gaudry and Boule.

<sup>98</sup> Barth's Travels in Africa.

<sup>99</sup> A Journey to Central Africa, pp. 189, 191.

<sup>100</sup> The Meeting Place of Geology and History, p. 155.

<sup>101</sup> The Mammoth and the Flood, p. 256.

<sup>102</sup> The animals especially referred to are, the lion, hyæna, horse, elephant, rhinoceros, and hippopotamus. Smaller and *present* European mammals escaped.

<sup>103</sup> At Cannstatt and Eguisheim and in the Cave of Neanderthal.

<sup>104</sup> This argument was noticed by Jacob Bryant in his Mythology. And it has been developed by Rev. G. S. Faber in his Origin of Pagan Idolatry.

<sup>105</sup> Prehistoric Europe, p. 543.

<sup>106</sup> *Ibid.*, p. 554.

<sup>107</sup> *Ibid.*, p. 547.

<sup>108</sup> The Mammoth and the Flood, p. 324.