JOURNAL OF

THE TRANSACTIONS

OF

The Victoria Institute,

OR

Philosophical Society of Great Britain.

EDITED BY THE HONORARY SECRETARY,
CAPT. FRANCIS W. H. PETRIE, F.R.S.L., &c.

VOL. XVIII.

LONDON:
(Published by the Institute)
INDIA: W. THACKER & Co. UNITED STATES: G. P. PUTNAM'S SONS, *N.Y*
AUSTRALIA AND NEW ZEALAND: G. ROBERTSON & Co., LIM.
CANADA: WILLARD Co., LIM., *Toronto.*
S. AFRICA: JUTA & Co., *Cape Town.*
PARIS: GALIGNANI.
1885.

ORDINARY MEETING, MAY 6, 1884.

(Specially held at the Society of Arts House.)

SIR H. BARKLY, G.C.M.G., K.C.B., F.R.S., IN THE CHAIR.

The minutes of the last meeting were read and confirmed.

The CHAIRMAN—I have now the honour of introducing Dr. Dawson,* Vice-Chancellor of McGill University, Montreal, who has kindly prepared for this Institute a statement of the results of his researches during a recent tour in Egypt and Syria in relation to the indications there manifested of the former occupation of those countries by a primitive race of man.

[Sir W. Dawson was received with much applause by the audience, which filled the large theatre of the Society of Arts in every part. He read the following paper.]

NOTES ON PREHISTORIC MAN IN EGYPT AND THE LEBANON. Sir J. W. DAWSON, K.C.M.G., LL.D., F.R.S.*

IN my recent visit to Egypt and Syria, I was very desirous to learn as much as possible respecting the traces of prehistoric men in these countries. In Egypt I was unsuccessful in obtaining any certain evidence of the existence of man earlier than the historical period; but in Northern Syria, following in the footsteps of Canon Tristram and other explorers, more satisfactory results were obtained, and which may contribute something to the facts already known.

Considerable attention has recently been given to the question of the existence of prehistoric man in Egypt, in consequence of the discovery of worked flints in various parts of the country. More especially I may refer to the papers of Sir John Lubbock, Mr. Jukes-Browne, Captain Burton, Mr. Greg, and General Pitt-Rivers, in the *Journal of the Anthropological Institute*, and that of Professor Haynes in the *Journal of the American Academy of Sciences*.

Egypt abounds in material for flint-working. Certain beds of the Eocene limestone hold numerous, and often large flint nodules, and, where these beds have been removed by denudation, the residual flints are widely scattered over the desert surfaces. There are also beds of gravel largely com-

* Dr. Dawson was knighted shortly afterwards.—ED.

posed of entire and broken specimens of these flints. That the ancient Egyptians worked the flint nodules, and used flint arrows and knives, is well known, and it is also believed that flint flakes were used in the cutting of hieroglyphics on the softer limestones. Careful examination with the lens of sculptured surfaces of limestone convinces me that the hieroglyphics were usually scratched with sharp points rather than chiselled, and splinters of flint would be very suitable for this purpose. Bauerman has described* flint picks of triangular and trapeziform shape found in the mines worked by the Egyptians at Wady Meghara, in the Sinai peninsula, and states that the marks on the stone are such as these tools would make. The manufacture has been continued to the present time, flints for muskets, and also for strike-lights, to be carried with steel and tinder of vegetable fibre in the tobacco-pouch, being still commonly made and sold. This manufacture is carried on at Assiout, and also at the village of Kadasseh, near the Gizeh pyramids.

It follows from this that the occurrence of flint chips or flakes on the surface, and especially near "ateliers," village sites, or tombs, &c., carries with it no evidence of age, except such as may be afforded by the condition or forms of the flints; and the former is somewhat invalidated by the considerations that some flints weather more rapidly than others, and that under certain conditions of exposure weathering occurs very rapidly; while the latter is of little value, as the rudest forms of flints have been used for strike-lights and other purposes in the most modern times. Nor is it remarkable that worked flints are more common on the desert surfaces than on the alluvial plain, since it is on the former that the material for their manufacture is to be found, and on the latter they are likely to have been buried by recent deposits.

The well-known locality near Helouan forms a good example of the mode of occurrence of modern flint implements. At this place the worked flints, which are mostly of the form of long, slender flakes and pointed spicules, occur on the desert surface, or only under a little drifted sand, and the locality where they are found is evidently an old village site, as it has remains of foundations and tombs, worked blocks of limestone, and numerous fragments of burned brick, which occur along with the flakes. The character of the bricks would seem to indicate that the site was inhabited in the Roman time, or later. The flakes may have been made

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* *Journal of the Geological Society*, vol. xxv.

for use on the spot, perhaps in carving stone from the neighbouring quarries; or they may have been sold in Helouan or in Memphis, as they now are in Assiout and Cairo. Arrow-heads are said to have been found at Helouan, but I saw none of these, unless, indeed, some of the pointed flakes might have been intended for this use. It is worthy of remark that the desert near Helouan is less abundantly supplied with flint nodules than most other places, so that the material may have been brought from some distance. The flakes are usually much discoloured on the surface, many of them being of a kind of flint which blackens on weathering; but some of them of a different kind of flint are comparatively fresh in appearance. The principal locality is about half a mile south-west of the present town, and apparently on the line of an old track leading from the quarries to the river. (Pl. II., Figs. 6, 7.)

A different conclusion would be warranted if such worked flints were found in old deposits, anterior to the times of Egyptian civilisation. A case of this kind seems to be furnished by the discovery, reported by General Pitt-Rivers, in the *Journal of the Anthropological Institute*,* of flint flakes in an old gravel at a place called by the natives Jebel Assart, at the mouth of the ravine of Bab-el-Molook, in which are the tombs of the kings, near Thebes. I have examined this place with some care, and am convinced of the antiquity of the gravel. It constitutes a stratified bed of considerable area, 25 feet in thickness, and with intercalated layers of sandy matter mixed with small stones. These layers are entirely different from the Nile mud, and are made up of fine *débris* of the Eocene rocks, with small stones and broken flints. They indicate more tranquil deposition, proceeding in the intervals of the gravel deposits and under water. General Pitt-Rivers refers to only one of these beds, but in the deeper sections three may be observed (Fig. 1). The whole mass has been cemented by calcareous infiltration so as to constitute a rock of some hardness. It is true it consists of the same materials now washed down the ravine by the torrents caused by winter rains, namely, partially-rounded masses of limestone and flints, whole and broken, but it must have been formed at a time when the ravine was steeper and less excavated than at present, and probably subject to more violent inundations, and when it must have carried its gravel into a larger Nile than the present, or possibly into an arm of the sea. It is, in all probability, one of the Pleistocene gravels

* No. 39, May, 1882.

of the valley, which belong to a period of subsidence indicated by similar beds in other places, and also by the raised beaches and the rocks covered with modern oysters and bored by lithodomous shells, which are seen near Cairo and at Gizeh, at the height of 200 feet above the sea.

Along a wady or ravine cut through the bed by the modern torrents, the ancient Egyptians have excavated tombs in the hard gravel. But, independently of this, a geologist would have little doubt as to its prehistoric age. The doubt here lies with respect to the flints. The bed is full of broken flints, as are the modern gravels carried down the ravine at present, and indeed all gravels formed by powerful torrents or surf-action in flint districts. These result from the violent impinging of stones on the flints, and therefore have all the characters of specimens broken by hand, except that they have no determinate forms. In this respect the broken flints found in these beds differ from those found at Helouan, or in the bone caves of the Lebanon, and resemble those which may be found in any bed of gravel formed by violent mechanical action. It is true, a few out of thousands of shapeless flakes might be likened to flat flakes formed by man; but the same proportion of such forms may be found in the modern *débris* of the torrents. The main point at issue in respect to these forms is the importance attached to what is termed a "bulb of percussion," produced by a sharp blow striking off a flake. That this is usually an evidence of human agency may be admitted; but since it may be produced by the action of a water-driven stone, it cannot be regarded as an infallible proof, except when sustained by other evidences of the presence of man.

The specimens figured as from this bed by General Pitt-Rivers are in no respect exceptions to this, and I dug out many similar ones from the same beds, but none which could with any certainty be assigned to human agency. I do not, of course, refer to those which he describes from tombs and from the surface, one of which is a finely-formed knife, with edges modified by pressure. Another, supposed to be for scraping or polishing shafts of spears, is like specimens of worn strike-lights from the pouches of modern Arabs. (Pl. II., Fig. 8.) The annular nodules figured by General Pitt-Rivers, which are numerous in some of the limestones, of course have no connexion with the worked flints, and the specimens which he figures from the surface, though some of them are no doubt ancient, are probably in part natural and in part from the little heaps left by Arabs and others in places where they have been shaping flints for muskets or for

strike-lights. I obtained numbers of such surface specimens, evidently of more recent date than the old gravels above referred to, and whose mode of occurrence renders it impossible to decide as to their origin or antiquity. There is no foundation in fact for the statement that flint in Egypt has been imported from a distance for the manufacture of implements. Flint nodules occur in the limestones throughout the Nile valley, and are abundant in the *débris* derived from their waste; and though flakes and chips are numerous near tombs, quarries, and village sites, they are also very abundant in the places where the flint is found. I found no large hatchets of "palæolithic" form in Egypt, but purchased a spear-like weapon of polished slate, said to have been found in a tomb, and a beautiful little polished hatchet of jade, perforated for suspension as an ornament.

I may add that the hardened gravel and silt above referred to afforded no fossils, except those in limestone pebbles, and a few irregular root-like bodies in the finer bands, and which may have been aquatic plants, and would go to confirm the conclusion that the beds were deposited under water.

The Lebanon Mountains, composed as they are principally of horizontal or slightly inclined beds of limestone of different degress of hardness, and traversed by many faults and fissures, are eminently suited for the production of caverns and rock shelters available for human residence or for sheltering animals, and such caverns accordingly abound in most parts of the range, and have, from the earliest periods, been employed for these purposes. These caverns are, with respect to their origin, of two kinds,—river caverns and sea-cliff caverns.

The former have been excavated by streams running underground along lines of fissure which they have enlarged into tunnels. A remarkable example of this kind is the Grotto of the Nahr-el-Kelb, or Dog River, the ancient Lycus, which was explored in 1873 by Messrs. Marshall, Bliss, Brigstoke, and Huxley, and found to extend for 1,256 yards, and to expand into large halls with magnificent stalactites. Another is that from which the neighbouring mountain stream of Ant Elias issues like a gigantic fountain. These water-caves may ultimately become dry, by the streams finding a lower level, either in the rock itself or in some adjacent ravine, this being, perhaps, sometimes determined by the partial falling-in or choking of the cavern itself. In the ravine of Ant Elias, in addition to the present water-cave, there is one which has become perfectly dry, and there are remains of others which have been cut into and unroofed by the further excavation of the ravine.

The second class of caverns,—those excavated by the sea,—may be seen in process of formation at many places on the coast, where the waves have cut into fissures or have undercut the harder beds. They are usually not very deep, and are often mere shelters or overhanging ledges. Such caverns are frequent on the old inland cliffs which have been subjected to erosion when the land stood at a lower level. Caverns of both these classes contain evidences of their use by man.

The remains of an ancient cavern were discovered in 1864 by the Rev. Canon Tristram in the celebrated maritime pass at the mouth of the Nahr-el-Kelb, and were thus described by him:—

"The position of this mass of bone was several feet above the height of the present roadway, but below the level of the ancient Egyptian track. The remains extend for perhaps 124 feet, and it has probably formed the flooring of an ancient cavern, the roof of which must have been cut away by Rameses to form his road or to obtain a surface for his tablet. From the position of the deposit, it would seem as though the floor of the cave had once extended to the sea-face of the cliff, and that the remaining portion was excavated by Antonine for his road, leaving only the small portion which we examined." (He then notices the fallen masses of breccia which have been thrown down on the talus formed in making the road.) "The bones are all in fragments, the remains, in all probability, of the feasts of the makers of the rude implements. Four of the teeth have belonged to an ox somewhat resembling the ox of our peat-mosses, and one of them probably to a bison. Of the others, some may probably be assigned to the red-deer or reindeer, and another to an elk."

Lartet has described the caves of this district in his geological report of the expedition of the Duc de Luynes, and Fraas has devoted some space to them in *Aus dem Orient*. The latter specifies as found in these caverns, *Ursus arctos*, *Felis spelæa*, *Rhinoceros tichorhinus*, *Bos priscus*, *Sus priscus*, and remains of *Equus*, *Cervus*, and *Capra*, an assemblage which may well be called prehistoric, even in a country whose history extends so far back as that of Syria. Lartet, however, mentions only species of stag, goat, antelope, &c., all of them believed to have been found in the Lebanon in early historic times.

I had the pleasure of visiting this place in company with Rev. Dr. Bliss, of the Beyrout College, in February last, and endeavoured, as far as possible, to supplement and perfect the observations of Canon Tristram (Pl. I., Fig. 2).

At the point in question, the present road, which is probably

nearly identical with that cut by the Romans, is about 100 feet above the sea-level, from which the bank rises in a steep slope, composed of fallen blocks of stone. The road bends inward into the cliff, which here recedes in a little cove facing the N.W., at the bottom of which was the cave. The remains of this consist of a stalagmite floor, about 18 inches in its general thickness, extending inward from the road toward the cliff about six paces, and in breadth along the road about nine paces. The roof and sides of the cave are gone, but at the back the vertical cliff presents a sort of niche with the top slightly arched, and corresponding to the back of the cave, which must have been nine yards broad and of considerable height, with an arched roof. It has evidently been a sea-cave, excavated at the bottom of a small cove or indentation in the cliff, and at a time when the sea was about 100 feet above its present level. Near the cave, the cliff rises in a series of little terraces, on which grain had been sown; and over the top runs an old road or track which seems to have been that in use when the early Assyrian and Egyptian tablets were cut on the rock, as they are evidently related to the level of this and not to that of the present road.

Whether the roof of the cavern had fallen in before the Roman road was made is uncertain; but it is clear that the floor of the cave was cut into in making the road, and at least the *débris* of its sides and roof used in forming the bank, as large masses, both of the stalagmite and of the limestone rock, lie on the slope, some of the latter holding characteristic cretaceous corals, which belong to the soft bed in which the cave was originally excavated. A large slab of the bone-breccia eight feet in length, now forms part of the parapet of the road, and would make a magnificent museum specimen. The exposed surfaces of the stalagmite, and the pieces on the bank, were carefully searched for teeth and bones and flint knives, and the specimens found will be described in the sequel.* Search was also made in the little terraces near the cave, and a few flint flakes were found, but no other signs of human occupancy. On the flat top of the cliff, over which the old track runs, nothing was seen. The cretaceous limestone has an anticlinal undulation at the locality of the caves, dipping W.S.W. at one end, and N.E. at the other.

In the same cove with Tristram's cave, a little to the south and thirty-five feet higher in the bank, another, though

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* See appended Note. Prof. Boyd Dawkins, F.R.S., has kindly undertaken their more detailed examination.

smaller, cave exists, with its roof still entire. The floor of this cave is of soft earth, and in digging in it nothing was found. Near the mouth, however, was an oval bed made of stones, lined with green rushes, on which some one had slept within a few days, furnishing an example of the recent use of this cavern.

In the next adjoining cove to the south-west of Tristram's cave, Dr. Bliss was so fortunate as to find the floor of a second cavern still richer in remains than that of Tristram's cave, from which it is distant two hundred and ten paces along the road. Its roof is entirely gone, the material having apparently been for the most part removed to form the road, though some large blocks remain. The stalagmite floor is ten paces broad, and in some places as much as four feet thick. It is somewhat softer, and of a more yellow colour, than that in the other cave, but its contents in bones and flint knives appear to be similar.

Between the two caves the road passes round a point of rock concealing the one from the other, and commanding an extensive view of the coast from Beyrout to Tripoli. At this point are the remains of a foundation of hard concrete, and near it a plain shaft of grey granite projecting from the parapet of the road, as if some monument had been erected, probably in Roman times, at this point.

It is to be observed that when these caverns were entire, and before any road was cut around the cliff, their occupants would enjoy a position difficult of approach by enemies and commanding an extensive view along the coast. There would also be easy access to the shore and to the top of the cliff, and small terraces of ground capable of occupation and even of culture, and, in any case, of sustaining trees available for shelter and fuel. No running water is known nearer than the river, but there are cavities in the rock which retain rain-water, and, if, at the time of the occupancy of the caverns, the land was a little higher than now, the flat country found at other parts of the coast may have extended around this promontory, and there may have been springs at the foot of the cliff. The ledges of rock at the foot of these cliffs abound in limpets and other shell-fish, and at the time of my visit I saw boys engaged in collecting these. If the sea had been as near at the time of the occupation of the prehistoric caves, we should have expected that their inhabitants would have availed themselves of this source of food, and that numbers of shells would have been found in their kitchen-middens. As this is not the case, we have an additional reason to suppose that the sea was then distant. If, at the period in question,

the maritime plain of this coast was much wider than at present, this would have enabled herds of horses and deer to migrate from north to south, and to find suitable pasturage, and would also have afforded fit haunts for the rhinoceros. It is evident, however, that any such condition of the coast must have been anterior to the times of Phœnician history.

It is also probable that the caves may have been occupied occasionally, or at certain seasons, rather than continuously. The bones and knives are not merely covered with stalagmitic matter, but mixed with it, indicating that the deposit was in progress when these remains were being accumulated. This would also give evidence of a more moist climate than that prevailing at present, and probably a wooded condition of the country, such as that referred to in the descriptions of Lebanon in the Old Testament, and which must have continued from the earliest times till the hills were finally denuded of their trees by the agency of man.

Though it is possible that these caves may have remained intact until the cutting of the Roman road, it seems more probable that their roofs were removed previously, and the appearance of the rock, along with the absence of any evidence of late residence, agrees with the character of the animal remains in indicating that their occupancy by man had been brought to a close anterior to the times of history, and possibly in the great submergence which closed the second continental or antediluvian period. There is, in any case, no evidence of any later occupancy than that by the early people whose *débris* is enclosed in the stalagmite.

I may remark here that the knives in these caves are made of the flint found in the immediate vicinity, and that they differ in no respect from those of the later caves and rock shelters of this region, except in perhaps being a little broader and more massive. (Pl. III.)

On the border of St. George's Bay, between the caves and Ant Elias, I observed, near the shore, and at no great elevation, a band of red loam and stones in which were a few similar flint flakes. The red earth in question is a *remanié* deposit derived from the older red earth to be noticed in the sequel, and which contains no stones or flints. The flakes contained in this *remanié* earth may have been washed out of old caverns, or from the surface of the ground at higher levels; but probably at a period historically very ancient.

The stream of Ant Elias, between Nahr-el-Kelb and Beyrout, bubbles up from the bottom of a ravine, in front of a cavern, along which its waters are carried as in a tunnel. On the

opposite or northern side of the valley, and a little higher up, is another cavern, with a high arched entrance, and about fifty feet above the bottom of the ravine (Pl. I., Fig. 3). On entering the cave it is found to be a tunnel penetrating for about fifty yards into the limestone rock, in the direction of N. 60° E., and then turning off at right angles to its former course, the strike of the cretaceous limestone being N. 60° W., with dip to the S.W. Within, its floor is much encumbered with fallen blocks, but near the entrance it presents an earthen floor with only a few stones, some of them of large size. Against the sides are masses of stalagmite, some of which rise to a height of six feet above the floor, and at the mouth is a ridge of similar stalagmite, extending beyond the mouth of the cave, and indicating that the roof formerly projected farther than it does at present. On the side of the cliff there are also the remains of an old tunnel, long since cut away, and showing only a part of one side. The stalagmite of this cave contains a few flint knives and bones, but differs in appearance from that in the Nahr-el-Kelb caves, and is less rich in remains. The earthen floor is a very rich deposit of flint knives and bones, the former very thin and well made, and accompanied by a few small cores (Pl. II.). It is possible that the stalagmite of this cave may belong to the time of the primitive people who lived in the Nahr-el-Kelb caves; and that, after their deposits had been sealed up in this material and some portions of the front of the cavern removed by erosion, it had been again occupied by a similar rude people, whose *débris* is found in the earth. But it is also possible that the stalagmite may be no older than the cave earth; and the excavations I was able to make are not sufficient fully to decide this question. The cave earth I would refer to the same age with that of certain rock-shelters discovered on the banks of the Nahr-el-Kelb, and which are stated by Lartet to contain remains only of the recent animals of the country.

Among the remains in the Ant Elias cave are bones of birds, and shells of the large Helix (*H. pomatia*) now common in the country, and still used as food. This species was not seen in the older deposits. A shell of a species of *Turbo* still common on the coast was also found.

The cavern at Ant Elias is large enough to have accommodated a considerable tribe of ancient Troglodytes, and the time during which it was so occupied need not have been very long, provided the occupants were numerous. The country at the time was no doubt wooded and well stocked with game, and the primitive people may have been prodigal

of flint knives, as abundance of material for their manufacture exists in the neighbouring limestones. They may also, as it seems likely the Belgian people of the Reindeer age were accustomed to do, have instituted *battues*, and made up quantities of pemmican or preserved meat for subsequent use with the flesh of the animals slaughtered.

Mr. West, of the Beyrout College, has promised to make further explorations in this cave, and to give particular attention to the teeth of mammals, to any objects of art other than flint knives, and to any stratification that may exist in the deposit.

Connected with the questions raised by the caverns, are the flint flakes and implements found at the Ras of Beyrout, and I believe first noticed by Mr. Chester in his report to the committee of the Palestine Exploration Fund.*

The oldest rock seen in passing from Beyrout around the point by the Lighthouse and Pigeon Island is the cretaceous limestone, which at this place is remarkably rich in large flint nodules. Upon the limestone rests a soft grey sandstone, used for building in the town, and containing in places fragments of recent shells. It is similar in its character to the modern sandstone of the Jaffa coast, and is, no doubt, of the same age. At one of the quarries a stratum of indurated deep red sand was seen to occur in the middle of the grey beds, and large sand-pipes, which traverse the grey beds perpendicularly, were filled with the same red sand, which also overlies the grey beds, and forms the surface of the highest part of the point, where it is more or less covered with loose wind-blown sand of a greyish colour. In one place, the lower grey sandstone was seen to be about forty feet in thickness, and the red sand is in some places as much as ten feet in thickness. The summit of these deposits rises as high as 250 feet above the sea-level. These sands are, probably, in great part products of the waste of the red and grey arenaceous beds of the lignitiferous zone of the Lebanon cretaceous, which occurs in the hills some distance behind. They belong to the modern or Pleistocene age, and to a time when the coast was submerged to the amount of 250 feet below its present level. At a place called the Bishop's Garden, behind Beyrout, and opposite the mouth of the ravine of the Beyrout river, there occurs a thick bed of grey and red conglomerate, capped with red sand, and which I believe to be a more inland representative of the coast deposit.

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* Quarterly Statement.

At the Ras of Beyrout the bed of red sand contains no stones or other foreign bodies, except near the surface, where it seems to have been disturbed and re-deposited by the action of the rain-water; but on its surface it holds small stones, fragments of coarse pottery, and even of glass, and flint flakes and implements, which are partly covered with blown sand (Pl. II.). Among the stones I found fragments of vesicular trap, which may have been imported for millstones, and a small piece of Egyptian granite. All these bodies are mixed together, without anything to determine their relative ages, and they are most abundant at the surface of the red sand, and immediately under the drifted sand, or where it has been removed by the wind. The flint flakes are much whitened by weathering, and evidently of great antiquity, and with them are many large and irregular flakes, probably rejected as useless. A few spear and arrow heads have been found at this place. I found only one fragment of a lance or spear, but this had evidently been worked with some skill by pressure on the edges, in the manner now employed by the American Indians (Pl. I., Fig. 1). A small flake of obsidian, with a rounded indentation at the edge, as if intended for use as a hollow scraper, was also found, and may indicate the importation of this material for the manufacture of implements.

The fact that these flint implements occur along with pottery and other city refuse, probably implies that they belong to the historic period; and the reason of their occurrence here may be that the place was occupied by native tribes who came to trade with or to attack the Phœnician colony; or that it was resorted to by such people, because of the abundance of good flint in the limestone near this place. The deposit might thus seem to connect the time of the foundation of the early Phœnician colony with that of the later flint folk. It is, however, possible that an older deposit of flints may have subsequently been buried with city refuse, which is still being carted out to this place; or, on the other hand, that the citizens of Berytus may have continued to use flint flakes and arrows at the same time with pottery, and when they were building edifices of stone.

A curious instance of this connexion was mentioned to me by Mr. Sarruf, of the Beyrout College. He had found in a grave in the Lebanon, lance-heads of bronze and copper, along with flint flakes, thus showing the continued use of the latter after the natives had obtained weapons of bronze. On the other hand, Dr. Jessup, of the American Mission, has found, near Tyre, ancient tombs excavated in the bone-breccias of older prehistoric caverns.

Thus, in the Lebanon, we appear to have evidence of ante-diluvian or post-glacial cave-dwellers, belonging to the earliest known races of men, and of later Troglodytes and flint people, who must have continued in the country till it was colonised by the Canaanites and Phœnicians, and who may have occupied the remoter glens of the mountains down to a comparatively recent time.

It is to be observed here that the present bare condition of these mountains must be quite different from their primitive state, when they must have been clothed with forests, and were probably inhabited by many kinds of game long since extinct. In this state, also, they would be much more abundantly watered than at present, and would possess a more equable, though on the whole cooler, climate.

It is also interesting to note the possible connexion of at least the later cave-dwellers of the Lebanon with some of those primitive peoples referred to by Moses in the Book of Deuteronomy, as having inhabited Palestine before its colonisation by the Canaanites and Semites.

If we endeavour, in conclusion, to sum up the later geological history of the Lebanon district, we may conclude that, like other parts of Syria, it experienced considerable elevatory movements at the close of the Eocene period, and further elevation in the Pliocene; that in the Pleistocene period it was submerged to the extent of several hundred feet, and at this time many of the ancient sea-cliffs and caverns were cut; and that in the early modern or post-glacial age it partook of the elevation which at this time seems to have affected the whole coasts of the Mediterranean. It may have been in this time of elevation, when there was probably much more land at the eastern end of the Mediterranean, that men first appeared and took possession of the country, and established themselves in the caves. These, however, they probably occupied only at those seasons when they needed such shelter, or when they resorted to the hills in pursuit of game. They may have had other stations, now submerged, in the low grounds or by the sea-coast. This state of things was closed by the great post-glacial submergence or deluge, of which we are now finding so many evidences in different parts of the world, and after this the present geographical conditions were established, and the period of history commenced. In this, the country, then wooded and tenanted by wild animals, was first occupied by rude tribes, probably of Turanian or Hamite origin, and afterwards by the more civilised Phœnicians.

NOTE ON TEETH AND BONES, AND ON FLINT IMPLEMENTS.

Prof. Dawkins has been so kind as to examine in a preliminary manner the specimens of teeth, &c., collected, and has authorised me to state that the breccia from the Pass of Nahr-el-Kelb contains remains of *Rhinoceros* (probably *R. tichorhinus*), *Cervus*, *Bos*, and *Equus*. In the earth of the probably more modern cave of Ant Elias are teeth of the hog, and of the goat or sheep, and an antler of the roe-deer. These facts are sufficient to indicate the earlier date of the Nahr-el-Kelb caverns, as stated above ; but more detailed examination of the fragments of breccia collected will, no doubt, develope other points of interest. It is to be observed here that at the Nahr-el-Kelb River, Lartet has found a rock shelter which contains remains similar to those of Ant Elias, but these have not yet been found in connexion with the old caverns at the Pass.

In the breccia of Nahr-el-Kelb there are large and small knives of the ordinary form, curved flakes roughly chipped at one side, triangular flakes chipped at the edges (Pls. II. and III.), and a flake with the point rounded, and slightly chipped as if for a scraper. There are also remains of cores, and many minute chips, indicating that implements were made on the spot. No large implements of the Palæolithic type were observed. No charcoal was noticed, but a few of the fragments of bone have a brown colour, as if from exposure to fire. Some of the flint knives are perfectly fresh on their surfaces, others are much whitened and decayed.

In Plate III. I have represented some additional flint implements worked out from the breccia of the Nahr-el-Kelb Pass. Fig. 1 is a knife or scraper partly embedded in the breccia. One side has been shaped by fine chipping, or perhaps worn by use in scraping. Fig. 2 is part of a large flake, which may originally have been a spear or lance, but has been much worn at one side by use as a knife or scraper. Fig. 3 is a flake, which has had a curved notch chipped in one end, and the upper side chipped by use. Fig. 4 is a rough one-edged knife, much worn and chipped. Fig. 5 may possibly have been the end of a spear or arrow. Besides these there was found in a mass of the breccia a fragment of a stone hammer of diorite, broken by use. It may have been a naturally smoothed stone, or may have been artificially polished. As this kind of stone is not found at the locality, it may have been brought from some distance. It was reduced to a very fragile condition by decay of its felspar. There was also found in the breccia a fragment of crystalline alabaster, which may have been employed in the manufacture of ornaments, but no carvings or ornaments were observed.

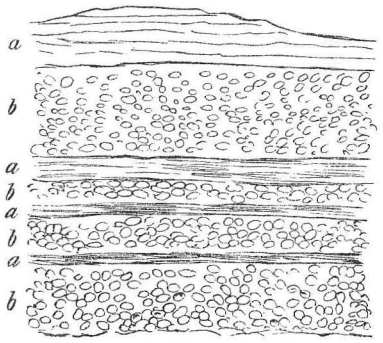


Fig. 1.—SECTION OF INDURATED GRAVEL AND SAND AT JEBEL ASSART—THEBES.

(a) Indurated Sand. (b) Gravel.

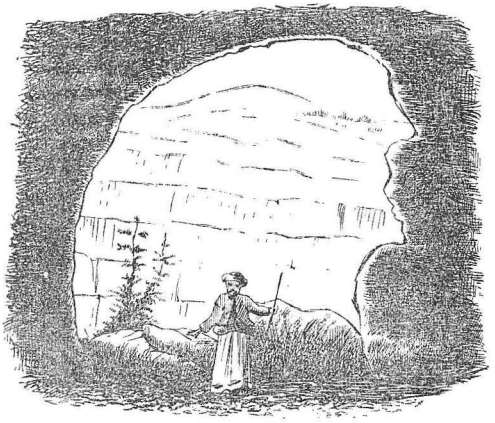


Fig. 3.—ENTRANCE OF CAVERN AT ANT ELIAS

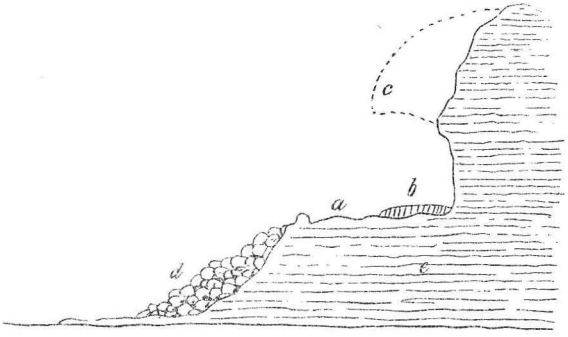
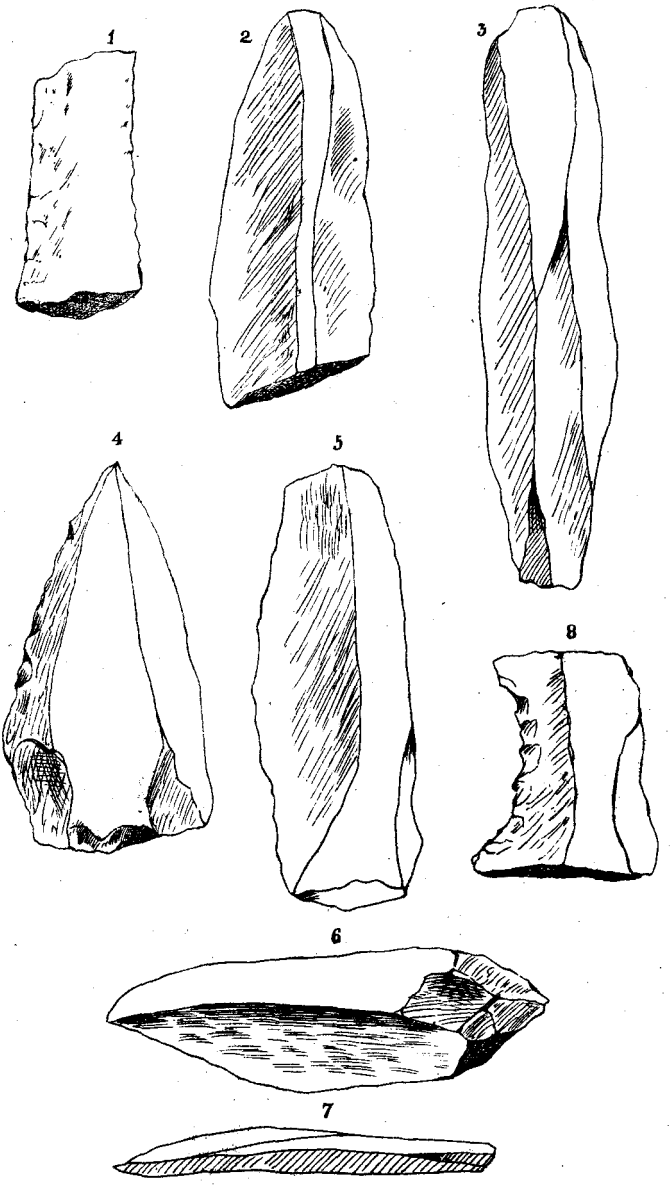
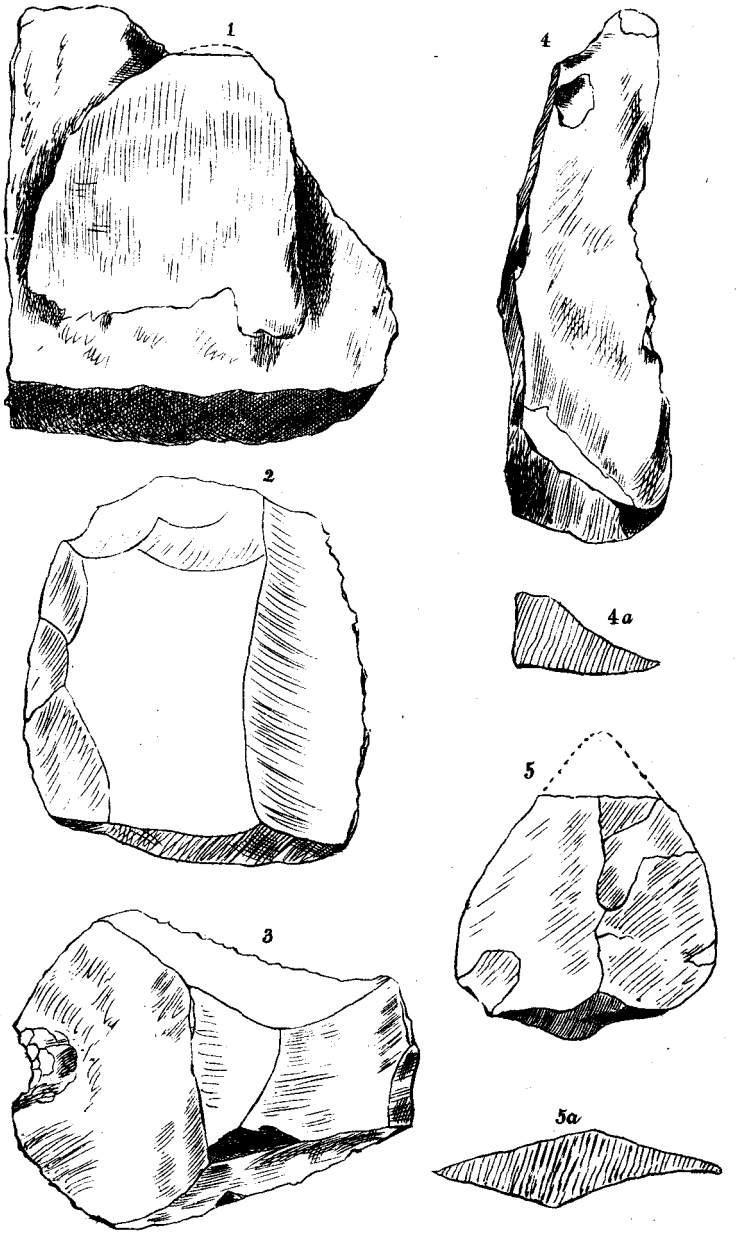


Fig. 2.—REMAINS OF CAVERN ON PASS OF NAHR-EL-KELB.

(a) Road. (b) Breccia. (c) Roof now removed.
(d) Talus of large stones and breccia. (e) Sea.



1, Fragment of Spear, Ras, Beyrout. 2, Knife, Do. 3, Knife, Ant Elias.
4, 5, Knives, Nahr-el-Kelb. 6, 7, Knife and Spicule, Helouan.
8, Modern Strike-light, worn on one side.



FLINTS FROM THE BRECCIA OF THE PASS OF NAHR-EL-KELB.

1, 2, 3, 4, 4*a*, Knives, or Scrapers. 5, 5*a*, Spear? or arrow?

In the cave earth at Ant Elias there are numerous and well-made flint knives (Pl. II., Figs. 2, 3). Some of these are very thin and delicate. There are also scrapers rounded and chipped at the edges, and many cores and minute flakes. A few of the fragments of bone are distinctly charred. Some of the knives and bones are encrusted with stalagmitic matter, but not in sufficient quantity to cement them together; and at the sides and front of the cave there are knives and fragments of bone enclosed in stalagmite, which is of a different colour and texture from that of Nahr-el-Kelb, and contains shells of a small *Helix*. Several specimens of the large edible *Helix* were found in the cave earth, and one shell of a small *Turbo*. No implements other than knives and scrapers were found, except a pointed instrument about four inches in length, and an inch thick at the butt, which had been roughly fashioned out of limestone.

According to Lartet (*Comptes Rendus*, 1864), Dr. Hedenborg was the first to direct attention to the Ant Elias caves, but he does not seem to have examined their contents. M. Botta was the first to notice the rock shelters near the Nahr-el-Kelb River, which Lartet himself afterwards explored, and which are obviously more modern in their contents than the breccias of the Nahr-el-Kelb Pass.

The CHAIRMAN (Sir H. Barkly, G.C.M.G., K.C.B., F.R.S.)—I have before me a list of gentlemen who may offer some remarks on the very able paper just read, and in asking them to do so I will preface my invitation by saying that I trust they will keep, as far as possible, to the subject of the paper which is a very wide one. I now call upon Professor Wiltshire.

Professor WILTSHIRE, F.L.S., F.R.A.S., F.G.S.—I did not expect to be called upon to make any remarks, and therefore have not come prepared to speak upon the subject so ably dealt with by Dr. Dawson. I have consequently, only to express my great satisfaction at having been enabled to listen to the important lecture in which the learned Professor has so eloquently brought before us the facts bearing upon this subject. Wherever we go over Europe we find some traces of our remote ancestors. I was very much struck, while on a visit to Iceland last autumn, to find in the Museum at Reykjavik implements identical in character with those that are found in different parts of Europe; but beyond saying this, I have only to express the gratification I have derived from the interesting remarks we have all listened to, and to thank Dr. Dawson for the information he has afforded us.

Mr. S. R. PATTISON, F.G.S.—I have nothing to add to the important particulars laid before us this evening by Dr. Dawson. I think, however, it is extremely fortunate for us that one who is acquainted with both hemispheres and who is also well versed in all the sciences cognate with this subject, should have chosen as a field for his latest researches a portion of the globe which is

from many other circumstances so deeply interesting to us, while it is also a matter of special good fortune for this Institute that its members have had the opportunity of hearing the results of Dr. Dawson's investigations brought before them in so interesting a manner. There are some of the prepossessions of the scientific mind that have been a little displaced by the facts just laid before us. There has long been a notion that if we were to explore the East we should find an absence of evidence of the palæolithic period—of the old flint implement period—and that during the time that was going on in the western part of Europe there was a civilisation existing in the East from which our own barbarism was, as it were, a degenerate offshoot. This has, however, been entirely displaced; and it is now quite clear that the East presents the same phenomena of a rude palæolithic age as are found in the West; consequently one can no longer raise arguments on the old assumption. What we have now learned also settles another negative, namely, with regard to the old gravels—older than the breccia of the Lebanon caves or any of our caves,—the gravel that fills the valley which General Pitt Rivers has described, we may now, perhaps, regard it as proved (although with the modesty of a true scientist, Dr. Dawson reserves to himself the right to await and consider further evidence on the subject) that the flints found there are not of human manufacture. The conclusion is that there is nothing in the case in point that ought to disturb the received chronology of the West; so that we therefore have a confirmation of the fact that the great mammalian epoch of the Pleistocene period was developed there as well as here. There are two great stages of that period —namely, the one exhibiting extinct animals, and the other or reindeer stage, as shown especially in the south of France and in our own country,—periods of which we have heard something from the Rev. J. M. Mello in his interesting account of the Cresswell caves, and as to which we may be permitted to entertain a hope that further researches in the same direction will enable us to correlate the facts so as to form a system of chronology which may be of service with regard to those spots left vacant in historical records. There is ample room and verge enough in the written record to allow for the occurrence of those facts of which we have heard to-night, within the historic period. I think the Institute owes a deep debt of gratitude to Dr. Dawson for having so kindly prepared for it so valuable a paper containing the stores of information he has been enabled to obtain in the East, because his facts not only come as the results of observation made in the ordinary way, but are rendered the more valuable as coming from one who, both on the American continent and this, has had abundant means which he has well used of informing himself and others on this important subject.

Professor Warington W. Smyth, M.A., F.R.S., F.G.S.—I regret very much that, through my own fault, I have heard very imperfectly the interesting paper read to us this evening, and that therefore I am unable to respond as I should like to do to the invitation proffered to me that I should speak in regard to the numerous and curious matters that have been brought

before us by the learned Vice-Chancellor of McGill University. Dr. Dawson has the advantage of being, in a certain sense, a comparatively young geologist, although an experienced man in his own country; and he has, further, had the opportunity of visiting those Eastern districts of which he has spoken something like a quarter of a century after the appearance of the remarkable volume published by M. Boucher de Perthes, which led to a resumption of the search for the relics of ancient man both in the caves and in the gravels. first iu France and then, following up the French investigations, throughout the whole world. I had the disadvantage of travelling in many of those countries in which research has now been made, before M. Boucher de Perthes had revived the interest felt in this subject. There was a time, long before the discussion of his discoveries, a time known to us by the labours of Cuvier, and especially by the late Dean Buckland, when it was ascertained that the relics found in the caverns of various parts of Europe were among the most interesting facts a geologist could possibly have to consider. But a period of torpor succeeded, and for many years together our geologists and naturalists did not appear to interest themselves in the further search for information on this subject, even in those parts of our own country which had given rise to such interesting discussions years before. At that period, therefore, we learned nothing of the flint implements which now excite so much interest, and paid very little attention to those ancient arts that were exhibited in the cutting of stones in various ways, or to those other topics which, unfortunately, I have so indiscriminately gathered from the lecture of this evening. I at any rate feel this ; from what has been brought before us it is evident that, although some of Dr. Dawson's statements are a little startling, while others may seem rather difficult of acceptance without further discussion, and others, again, may be said to be somewhat puzzling to those who would like to find their explanation, yet of this we are all assured, that the learned Professor is a man of so much experience in geology, and has shown in so many of his books a disposition to battle fairly with the facts and inferences belonging to this subject, that we may safely trust what he has stated to be the truth as far as he has been able to look into it.

Professor T. Rupert Jones, F.R.S., F.G.S. (a Visitor).—I must add my thanks to those of other speakers for the remarkably interesting paper the learned Doctor has laid before us. I regard the clearness with which he has developed all his facts and inferences as indeed admirable. He has certainly given us so much valuable matter in so short a time that I have no doubt many persons who are not very well competent to follow the details, because they are not quite such geologists as himself, may, perhaps, have lost something of his remarkably able exposition; and I hope, therefore, it will soon be printed, so that all may be able more fully to understand and appreciate it. May I be allowed to suggest one or two points on which we might ask for some illustration? I am sure Dr. Dawson will allow me, as an old friend, to offer such criticism as I am able; and, as he himself has found it necessary to abbreviate his paper, so will I endeavour to compress into a few

words what I have to say. I would, in the first place, remark that there is in the British Museum a very remarkable flint implement which has been brought from Egypt. It is, probably, not prehistoric; but it is, nevertheless, of very respectable antiquity. I allude to a very fine dagger-shaped flint, with the handle still in its place; and, what is more, it has remnants of the sheath on it. The only comparable specimen I know of is that illustrated and described by Christy and others as found in Mexico, where it was at one time, no doubt, an honoured if not revered sacrificial knife. Dr. Dawson has brought before us to-night the mode in which implements are made of flint, and has shown how men having similar means and intentions, and aiming at similar ends, must necessarily, out of the same materials, arrive at similar results. This, doubtless, has been the case all over the world. Flint is very common, and occurs in every lime-stone. It is not peculiar to any place, and is as common in the Egyptian limestone as elsewhere. Wherever flint is found it has been made into flint implements, and these have always been made in the same way, because it always breaks in the same way. But with regard to this old gravel of sand-stone, flint, and calcareous sand of the Nile Valley, I would ask Dr. Dawson to think over the point he has stated in relation to the number of flint chips which occur with bulbs of percussion, and those which occur without such bulbs. He is too far away from the place now to collect statistics; nevertheless, they will be necessary to enable us to arrive at a conclusion as to whether, under his mode of putting it, nature has made many bulbed flints. I do not think it likely that many can have been accidentally produced; because it requires a continued succession of blows in a particular line, on one continuous edge, to produce bulbed flakes. Nature may knock boulders together by thousands and millions, but she can very seldom repeat her blows in exactly the same way upon the same edge, one block coming down upon another, and the upper stones knocking one edge of the suffering block, so that flakes are regularly driven off with bulbed faces. Frost does not act so unless there are little fossils or faults in the flint that might enable it thus to cause a bulb. I was under the impression that General Pitt-Rivers found something more than a simple flake, and I think it would be well worth the while of those who have heard Dr. Dawson's paper, to do what he has recommended, and read General Pitt-Rivers' memoir, so that they may judge for themselves. There are some very good observations on the method of flint implement-making in a Report on the manufacture of gun-flints by Mr. Skertchly. There are some other remarks I should like to make: I think it not impossible that man may have lived in Egypt in those very remote times when there were only islands in what now forms the Egyptian area, and when the river ran among them. There is no reason why this should not have been the case; and if this were so, there can be no reason why there should not be artificially-made flint-flakes in those ancient water-courses. They are undoubtedly old. Of course, geologically speaking, the period referred to may be regarded as only yesterday or last evening, which would signify a few hundreds

of thousands of years ago; and I should like to ask Dr. Dawson to favour us with a comparison of dates as between the period when Egypt lay at a different level than now, and that when the Syrian caves were at a high level. Can he say whether they were coincident? If so the Lebanon hill district has been raised up subsequently. But whether this be so or not it seems to me to be a kind of discrepancy to use the word "antediluvian." Geologists do not allow such a word as it is used in the ordinary sense. There have doubtless been deluges — and those enormous deluges; in fact, it is shown that there was a geological period in which there were so many deluges, one after another—it may be a few years apart, or it may be hundreds of years—which affected all the peoples in perhaps every part of the world; and it is probable that when the remnants of those peoples came together in the course of time, and had, every one of them a traditional deluge to speak of, this may have been the origin of the idea of a great universal deluge such as has been commonly understood.* The geologist puts these diluvial times down as having occurred in the post-glacial period after the great ice era,—the period when one or both polar parts of the world were gradually relieved of the enormous ice-fields which had previously existed, as the ice melted and disappeared with deluge after deluge, the seasons becoming hotter, the effect of the successive floods and movements of the land was to cut off one people from another and create human isolations on a grand scale, leaving remnants of the antediluvian peoples, which became the ancestors of the different nations now found in various parts of the world. It would be very interesting to know how long after the post-glacial period the elevation occurred which brought up the Syrian hills from the level which occupied the place where the Mediterranean is now. I merely say this because it would bring the matter more closely home to us to be enabled to have something like comparative data of which we could speak. But something of this sort we have already, for we can point to the evidences of those upheavals—some of which formed the land occupying the area of the existing North Sea, when there was one great continuous valley from the Rhine to the Norwegian area, and when the land was so high that the North Sea Valley and, doubtless, the English Channel were inland valleys. At that time men inhabited England—how long ago we know not; but among geologists I may mention Prestwich, of Oxford, and the Rev. Osmond Fisher, of Cambridge, the former of whom considered that it must have been at least ten thousand years, while the latter thinks it must have been more. I hope Dr. Dawson will think over these remarks, and if he can find time to offer a few words in reply I should be glad if he would do so.

Colonel J. Herschel, R.E., F.R.S., F.R.A.S., having said a few words,

Mr. W. St. Chad Boscawen.—Although unable to speak upon this subject from the geologist's point of view, I may state that I have examined the caves that have been described by Professor Dawson, and that I spent some

* This subject is specially treated in Sir J. W. Dawson's reply.

time at the mouth of the Nahr-el Kelb. I visited it four or five times, and I am able to endorse a good deal that has been said with regard to the remains there. There is one point I think I may throw a little light upon—namely, as to the late existence and use of stone implements in Syria. In the year 1879, when travelling in Northern Syria, I obtained, while in the neighbourhood of Aleppo, from some people in the adjacent villages who had been digging a quantity of soil from one of the numerous mounds on the plain for the purpose of making an addition to a mill-dam, a number of stone implements. Among them was a very fine green-stone axe, which is now exhibited in the Museum at Oxford. I also obtained at the same time a number of flint implements. The axe I have referred to showed signs of having been used as a sacrificial implement. It exhibited a peculiar method of grinding which I had never seen before, one edge being ground to a sharper angle than the other,—one being the curve of a circle, while the other was a sharp angle. The implement also seemed to me to bear traces of having been decorated. In Beyrout I obtained several flint implements, and some other implements of a black stone, which were curved as if the back part were used for polishing and the other for cutting. The existence of such stones throughout the north part of the Orontes valley and about Aleppo is well known. I saw half a basketful of various stone implements in the house of a German gentleman. In the ruins of Carchemish, also, some had been found by a German who had been there before me. But there was one curious fact which seemed to me to indicate an old historic period, —I allude to pieces of sculpture standing among the ruins of Carchemish, and representing some figures of gods, one of which held a large battle-axe in its hand, the axe being lashed to the handle, as the strapping of the marking of a band used for the purpose of tying the handle to the stone is distinctly shown. It may also be remembered that in one of the lists of tribute to Thotmes the Third, mention is made of axes of green stone forming part of the tribute which the Hittite kings and princes of Egypt presented to that monarch ; so that the use of stone axes is clearly brought down to an historic period. As to the custom of cave-dwelling in Syria, we know that in the interior it always has been and still continues to be a mode of dwelling in the East; but it is for the geologist to say how far that can be carried back. It is a singular fact that the earliest known sign for a dwelling of any kind in the cuneiform inscriptions—is the figure of a cave. I have no authority to speak as a geologist, as I hardly know one stone from another ; but I have thought that the points I have mentioned, as bearing on other branches of study, might be deemed of interest.

Mr. D. Howard, V.-P. Inst. Chemistry.—I regard the paper we have heard to-night as an exceedingly interesting one ; but have no desire to take up the time of the meeting by making many comments thereon. It appears to me that Dr. Dawson has thoroughly studied the customs of those whose habitations we have been considering, and has not only kept a good look out in all directions whence attacks might be likely to come, but has cautiously guarded himself against them. It is very pleasant, apart from the great interest of his

paper, to find so difficult a subject handled in so masterly a manner, and to note that he has been content to study and present the facts as they really are, without evincing the too common desire to prove some pre-conceived theory as having been ascertained and settled by the discovery of flint implements. I cannot but believe that the more we talk of flint implements in this spirit, the more truth shall we elicit, and the more shall we find that the phantoms created by them have no tangible existence. There is one point that strikes me as very interesting, and that is the singular verification of the flint implements of sacrifice spoken of in Egyptian history, furnished by the evidence of the Egyptian specimens now in the British Museum. It is well known that to this day flint implements are used for sacrificial purposes in the South Sea Islands. One of my brothers has in his possession an axe which has been used within the memory of living men for human sacrifice, and I consider it to be a curious survival of an ancient sacrificial custom, when we find that in Egypt they used sacrificial knives for purposes of embalmment. It may also have been that the Egyptian surgeons who knew a good deal, had discovered that a clean-cutting surface was a very good thing for operations in hot climates. But the fact that throughout the world flint knives have been used for sacrificial purposes, is a strong evidence of the survival of an ancient custom. As a general rule it may be taken that anything connected with sacrifice is also connected with the early history of the human race. The singular aversion to eating the horse among European races seems to me to be a survival of the time when it was a proof of Odin worship to eat horseflesh. The horse-sacrifice was one of the prominent features of the Aryan system of worship, and I think it most interesting to find in these things the evidence of the long survival of ancient observances.

J. Rae, Esq., M.D., LL.D., F.R.S.—I came here to-night with a good deal of pleasure as I expected to hear much that was valuable, and I am extremely gratified by what I have listened to. I cannot, however, offer much in the shape of addition to the information already furnished. My only acquaintance with people using stone implements is with the Esquimaux, and I doubt whether the form in which they work up the stones they employ as implements at the present day, is altogether like that found in the caves and gravels of this and other countries. They are generally very skilfully made, and probably they have acquired a greater power of fashioning them neatly or of finishing them off; but they cannot have learned how to do this from any other people, in the case at any rate of one or two implements, for they are made by a people who never came in contact with those of any other nation than themselves. The way in which they work up one or two implements that are made of green-stone is something wonderful, considering the materials they have. I have a woman's knife which, I think both Sir John Lubbock and Mr. Evans, as well as other authorities, speak of as being one of the most neatly made implements it is possible to manufacture out of such very hard material. I have another green-stone implement, of about eight or nine inches in length, made into an ice-chisel as neatly as any artificer in this country could fashion it. And all the other Esquimaux imple-

ments are made in a very perfect manner. I am, however, not sufficiently experienced in the forms of tools and weapons made by other peoples to be able to say anything further than that I have had great pleasure in listening to Dr. Dawson's admirable paper. It has been a source of much instruction to me.

Mr. E. CHARLESWORTH, F.G.S. (a Visitor).—I can only express the interest with which I have listened to the paper read by Dr. Dawson. There are one or two points on which I may be allowed to remark, without very deeply trenching on the rule the Chairman has laid down. My friend, the eminent mineralogist and geologist Professor Warington Smyth, has referred to the French investigator M. Boucher de Perthes; but we ought to remember that long before his time a native of this country, resident in Norfolk, Mr. Frere, had in reality laid the foundation upon which geologists have since carried man back to the period of the mammoth. Nobody believed him at the time his paper was laid before the Royal Society, although it was printed in their Transactions, the fact being that the whole learned world read that paper, discredited it, and entirely forgot it. Therefore, when we quote M. Boucher de Perthes, and give him credit for having reminded us of the state of things which existed so long ago, we ought not to forget that the whole question of the origin of man, and the evidences carrying him back to the period of the mammoth, was argued by one of our own countrymen before the researches of M. Boucher de Perthes were commenced. I may here be allowed to make a remark on which perhaps Dr. Dawson will give his opinion. One of the things that have greatly puzzled me, and which I mentioned at a meeting of the Victoria Institute on a recent occasion, is the fact that while these flint implements are found in such vast abundance in the gravels around London and in Norfolk and other parts of the kingdom, there are but very few that exhibit any traces of abrasion. As a boy I lived in Suffolk, and used to spend a great deal of my time among the gravels of that county hunting for fossils —principally the fossil sea-urchin. I found in those searches that a large proportion of the fossils were much rubbed and worn. Here and there there might be one in a tolerably perfect state, but the majority were much abraded; whereas if we see a collection of flint implements we invariably find that there are scarcely any signs of abrasion on any of them. They are found side by side with the fossil urchins and other things which are abraded, and I should like to know how it is that the flints present so little trace of the same action. Another point on which Dr. Dawson might kindly enlighten us is this: As a resident in America, he is doubtless familiar with a vast number of the implements found on that continent. Can he tell us, approximately, what is the geological age of those implements? Both the mammoth and mastodon are found in association with them there; but in this country we find the mastodon only, that mammal being later than the mammoth in geological history. Is any portion of the beautiful arrow-heads and other flint implements of America carried back in that region to the mammoth period? Dr. Dawson spoke very cautiously of finding

in the gravels of Egypt traces of human work. We must recollect how much the gravels around London have been explored. Priestley, a surgeon in London, who added so much to the early history of geology, worked nearly all his life among the gravels of London as well as of Suffolk and Norfolk, and he never came across one of these flint implements. Therefore, the fact that doubtful implements have been found in the gravels of Egypt leaves it open to us to say that, if we could carry out a large amount of research in that country, we might find as much evidence of human handiwork there as we do in England and other parts of Europe. In conclusion, I will only express the warm thanks we must all render to Dr. Dawson for the really great intellectual treat he has afforded those present this evening.

The CHAIRMAN.—I am sure this meeting will heartily join with me in the duty we have now to perform of thanking Dr. Dawson for the very able and interesting paper he has read to us. In the presence of so many eminent geologists it is not for me to say a word as to whether in my opinion he has established the principal points he has put before us. It seems that Dr. Dawson failed to discover any worked flints in the Pleistocene gravels of Thebes or elsewhere, but he found evidence in the bone breccia of the Lebanon caverns sufficient to satisfy him that they were occupied by the earliest race of mankind, whom I suppose we must continue, in the present state of our knowledge, to call post-glacial men. Whether or not the learned Dr. has made out the points he has started it is not, I repeat, for me to say ; but I would, at any rate, impress on this meeting the great value attached to the personal testimony of a thoroughly trained geologist like Dr. Dawson on questions of this kind, especially when he has had the opportunity of recently visiting the places of which he speaks. It is one of the objects of this Institute to elicit and discuss questions of this kind, and I am sure no one will gainsay me in asserting that we are deeply indebted to Dr. Dawson for a very profitable and successful paper and discussion thereon. Dr. Dawson will now say what he may deem fit in reply to what has been put forward by those who have spoken.

The AUTHOR.—The answers to the questions that have been put and discussed would be quite sufficient to form the materials for a second lecture and I think it would be very unwise to attempt replying to them all to-night. Upon a few of them, however, which are of the greatest importance, I think a few words may be said. My friend Mr. Pattison referred to the question of civilised men existing at the very early periods spoken of. That question is one which I do not think is settled yet. It may have been that races were dwelling in the Lebanon mountains in a very rude condition when there were more civilised races on the plains upon the borders of the Mediterranean and in the adjacent valleys, of which we have no knowledge. That is, indeed, one of those negative points on which one ought not to say anything. My friend, Professor Rupert Jones, has brought up some interesting points such as one might expect a geologist of his experience to put forward. With regard to the flint dagger in the British Museum, to which he has

alluded, it is, doubtless, a very interesting specimen of the flint instrument, and I may add that the flint implements and knives we have obtained from Egypt are as beautiful examples of fine workmanship as we have found anywhere. In the British Museum there are several fine specimens of these highly-finished flint knives from Egypt, which are sure to be of great interest to any one who goes to look at them. With regard to the point referred to as to the similarity prevailing between the implements found in different parts of the world, it would seem that man, in all times and all countries, made them exactly on the same principles. A great deal depends, of course, on the similarity of the materials used; and then again we must look to the similarity of the social conditions under which men were placed in primitive times, the instincts they had to gratify in accordance with those conditions, and the means they found whereby to fulfil their few and simple wants. It would indeed appear that some of our very early ancestors of the human race found out the way to make implements perfectly suited to satisfy these wants, and those who came afterwards adopted the same methods, which they were unable to improve upon. It is true that we have not found palæolithic tools in the very oldest of the Lebanon caves similar to the great, rude, hatchet-like flints discovered in the French and other gravels; but it is, of course, possible that the very ancient people who lived in that age may have used such implements, not in the vicinity of those caves, but at other stations. We have to take into account the fact that those old people were like some of their modern descendants, living at one period by the river sides, where the gravels are, and at others in the woods and mountains; and that they may not have carried the tools and weapons they used at one place into the other where they were not needed, but secreted them in hiding-places after the manner of the American Indians down to the present day. I do not know the actual use or uses of those remarkably rough chisels and axes that are found in the gravels; but I suppose they were used for the same purposes as the large polished hatchets of a much later age, such as digging the earth, hollowing out wood, and other things of a kindred nature. That, at any rate, is what an American would think of them, and we must bear in mind that in districts like the south of England, as well as in Egypt and Lebanon, where there is plenty of flint, the working and chipping of flint would be practised in a way that was pretty much the same throughout, but scarcely the same as that adopted where the stone was of a different kind. In districts where there was jade and green-stone and not flint, the implements would be made differently from those constructed of flint; and this leads me to another point. We are, I think, too often apt to attribute to time what really belongs to space, and I feel pretty sure that some of my friends have been led into this error. With regard to the question, how many flakes and bulbs might be made by nature herself; that is no doubt a very apposite question, and in looking at such a deposit as that at Jebel Assart and taking out the broken stones, one must come to the conclusion that it might possibly be that an accidental stroke

given occasionally would produce this kind of result [showing a piece of flint]. I do not throw any doubt on the evidence of human workmanship as derivable from this kind of appearance; but it must have occurred pretty frequently in the natural process of things that flint was accidentally thus fractured. I think, moreover, that where one finds a flint that might have been a human implement, or might have been the result of natural fracture, he is not justified in saying it was the result of human handiwork unless he finds something else to confirm that assumption. The archæologists certainly have more confidence in these things than we as geologists should have. As to the term "antediluvian," I may state that I used it as an equivalent to "post-glacial" in geology. Geologists are much alarmed at the present day by the idea of saying anything at all about the "Deluge." In old times they used to attribute almost everything to the Deluge, and in fact they almost rode the Deluge to death; but modern geologists, as I have said, are afraid of speaking of the Deluge. We were beginning to go back a little in that direction, as we find that after the great submergence of continents which took place in the Pleistocene age, and to which I have referred,—that subsidence which seems to have affected all the northern hemisphere,—there came a period which Lyell properly called the second continental period, and which we sometimes call the post-glacial period, when the continents were larger than now,—when England was connected with the mainland of Europe, and the migratory animals walked along the dry land from Germany to England, a period during which England was, doubtless, first colonised, when man lived in a larger world and when men were of huge stature and great physical power, with bigger limbs and bigger heads, so that I hardly know what we should have been if with our present culture we had possessed the physical power of those post-glacial men. I have great respect for those men. They unfortunately came to an untimely end, because that continental period was followed by a second subsidence, which must have been a great and a terrible affair. We now know the Deluge to have been an historical event, the record of which is preserved not only in the Bible, but in other history. We also know that there was a great submergence which closed the second continental period. Whether it was a cataclysmal event which occupied only a short time, or whether it was more gradual and lasted a long time, is a matter which might be disputed, for it depends on the interpretation given to the facts by different schools of geology. But at the time when multitudes of those immense extinct mammals, such as the mammoth and the rhinoceros were swept away by the subsidence which submerged such ranges as the hills of Lebanon and of this country, so as to spread it over with gravel, which is not altogether local, but some of which was swept from the north of England and Wales over this district, the event was of a character which affords evidence of a great and serious cataclysm. As to the time when this took place, and its duration, we are not in a position to say much; but we come to the conclusion that the older part of the human period was separated from the more modern by a very great physical

break or hiatus. A thing of great interest to me in Lebanon was, that there seems to have been left in the caverns there good evidence of a people who really lived in that old post-glacial and second continental period; and I have no doubt that we shall get further evidence of this. We may also get evidence of the fact that there were civilised men existing then. But during the earlier period of the existence of the human race, before men obtained a knowledge of metals, men, whether civilised or not, must have depended far more on stone implements than they do now. Some of the most civilised of the native races in America cultivated their fields, and did it well, with stone implements, many of them as rudely made as the old palæolithic tools or weapons, and I am somewhat inclined to suspect that some of the implements we find in the gravels belonged to and were used by palæolithic agriculturists. I am not certain that they were quite such savages as we suppose. Mr. Charlesworth has raised a curious point as to the implements found in the gravels not having been rubbed or abraded. I do not know the extent to which this is general, but if it be a general thing, it would lead to the conclusion that, after the pebbles were rounded, the flint instruments were transported from elsewhere, and by some means became mixed with them. It might be a curious point to follow up. I have been asked as to the comparative ages of certain remains found in America. I think it probable that the mastodon lived longer there than in this country—say up to the time the mammoth became extinct—that both lived quite into the modern period, and probably up to the time when the first men made their appearance on the American Continent. The flint implements found there are on or near the surface and mostly in alluvial deposits, so that we cannot say they are any older than the modern period. There are some a little more ancient than the rest found in the Californian gravels and in the rivers of Pennsylvania; but I do not think we have the right to say that any of them are older than those of your post-glacial gravels. Therefore we, in America, are very much in the same position with you in regard to this point. I have only further to say that I am very much obliged to all who have spoken and to the meeting generally for the kind way in which they have received what I have stated, which I know has been somewhat fragmentary.

The meeting then examined the specimens and afterwards adjourned to the Museum, where refreshments were served.

ADDITIONAL NOTE BY SIR J. WM. DAWSON, K.C.M.G., F.R.S. ON REMAINS FROM THE LEBANON CAVERNS.

THE specimens collected in the Lebanon caves have now been arranged in the Peter Redpath Museum of M'Gill University, and I have had the pleasure of showing them to Professor Boyd Dawkins, on occasion of his visit to Montreal in connexion with the meeting of the British Association in that city. The results of this re-examination present, however, little in addition to the facts stated in my paper of May 9th.

In the older breccia of the Nahr-el-Kelb pass, all the teeth and bones appear to belong to a few species of large mammals. *Rhinoceros tichorhinus* is represented by several molars and by fragments of the bones. A deer not distinguishable from *Cervus dama* is also somewhat abundant. A species of *Equus* and a species of *Bos* also occur. The teeth of the latter are too imperfect for determination of the species. Only a few of the fragments of bone have been subjected to the action of fire. There are no remains whatever of invertebrate animals or of plants. The indications are of hunters subsisting, while sojourning in these caves, on a few large animals, just as in North America certain tribes were accustomed to feed almost exclusively on the bison and the caribou. This would further seem to show that, as suggested in my paper, there were at that time more extensive plains at the foot of the Lebanon than at present.

The inner cavern of Ant Elias has one species in common with the older, namely, the fallow deer. It has also the roe (*C. capreolus*), and one specimen is the lower jaw of a fawn with the milk teeth. There are also teeth of the wild goat, and possibly of the sheep, though the latter can scarcely be considered as certain, and one tooth of the hog (*Sus scrofa*). A very few bones belong to large birds, and there are many shells of *Helix pomatia*, which still lives in the vicinity. Shells of a smaller species of snail, included in breccia at the sides of the cave, do not seem to be connected with its occupation by man. A single marine univalve was found, and seems to be *Trochus* (*monodonta*) *articulata*, a species still occurring on the coast. A larger proportion of the bones in this cavern show marks of fire, and the long bones have all been broken to extract the marrow.

The indications in this cavern are of conditions of the Lebanon country and its inhabitants similar to those now existing, except in the greater prevalence of forest; but no signs were found of any intercourse with civilised men, nor did any pottery or bone implements occur. The further excavations now in progress may, however, result in additional discoveries on these points.