

On the Mammoth at Creswell.

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THE bone-caves of Creswell have, during the last ten years, through the able exertions of the Rev. J. M. Mello, F.G.S., been subjected to a systematic exploration, and are now so well known to all interested in science that no general description of them need here be given.

They are somewhat exceptional as regards the geological formation in which they are found, not occurring in Carboniferous Limestone, but in Permian dolomite or Lower Magnesian Limestone. The Magnesian Limestone in England forms a very narrow tract of country extending from Durham to Notts. In the former county it has a thickness of 600 feet, but gradually thins southward, and dies out near Nottingham, at a point twenty miles south of Creswell. The lofty cliffs of Creswell, we know from other sections in the locality, must there represent the entire thickness of the formation.

The picturesque ravine known as Creswell Crags probably owes its origin to the action of the little river Wollen which now runs through it. This statement will cause no surprise to anyone who is familiar with the mode of operation of denuding agencies in limestone districts. Going back into far antiquity, the whole defile was, in all likelihood, one large cave excavated by the stream slowly eating its way along points of weakness in the rock. Some of the present caves are particle by particle losing their roofs, and their history in this respect is doubtless that of the

ravine. It is merely a question of time for each cave to become itself a small lateral ravine.

On the north or Derbyshire side of the ravine, and at the western end, is the "Pin Hole Cave." This cave is the one in which Mr. Mello, in 1875, discovered bones of the Arctic fox (*Canis lagopus*), thus adding that species for the first time to the British antral fauna. It was indeed the first explored of the caves at Creswell, which have now become of such high interest, from affording evidence of two periods of human occupation during the Palæolithic age in Britain, when man was contemporary in the Midlands with the characteristic Pleistocene fauna. It forms a narrow fissure, extending for over forty yards into the crags in a northerly direction. Its name is said to be derived from a curious ancient custom for each person who came to the cave to throw in a pin at a certain spot, and at the same time to take out another pin thrown in by a prior visitor. Mr. Mello, who has fully described this cave in the "Quarterly Journal of the Geological Society," gives the following section of its beds:—

1. Surface soil, containing recent pottery,
bones, &c..... 1 foot 6 inches.
2. Damp red sand, with rough blocks of
magnesian limestone, quartz, quartzite
and other pebbles, and numerous
bones 3 feet.
3. Lighter-coloured sand, consolidated by
infiltration of lime. No bones..... (?)

In the red sand of this cave I, some time ago, discovered a portion of the jaw of a very young elephant, *Elephas primigenius*, or, as it is commonly termed, the Mammoth.

According to Professor H. Alleyne Nicholson, elephants appear for the first time in the Upper Miocene (Siwâlik formation) of India. Some geologists, however, refer the Siwâlik formation to the Lower Pliocene. It is in deposits of Post-Pliocene age that their remains most abundantly occur, and of these the most familiar and the most important species is the Mammoth. In giving to it the specific appellation of *primigenius*, however, Blumenbach little

suspected how many *Proboscidea* had flourished in prior ages. This remarkable form considerably exceeded in size the largest of the living elephants, and was essentially an inhabitant of northern regions. It is said never to have passed south of a line drawn through the Pyrenees, the Alps, the northern shores of the Caspian, Lake Baikal, Kamschatka, and the Stanovi Mountains. If, as stated by Professor Boyd Dawkins, it may be regarded as proved that it lived during Præ-glacial times, it certainly survived the Glacial age, for its remains are found abundantly in Post-glacial deposits in Britain, France, Germany, Russia in Europe, Asia, and North America. Indeed it lived until after the advent of man on the earth. This fact is placed beyond all question by the great number of instances in which its remains have been found associated with implements of human manufacture, under circumstances precluding the possibility of subsequent admixture.

Bones of the Mammoth are found in great abundance in Siberia. This fact alone would, in the absence of any further evidence, have led geologists to the conclusion that the Mammoth was fitted by nature to withstand the vicissitudes of a colder climate than either of the two living species of elephants. But we are not left to inference in this matter. Sir Charles Lyell records, in his "Principles of Geology," that, in 1803, Mr. Adams discovered, on the banks of the Lena, in lat. 70° , the entire carcase of a Mammoth, which fell from a mass of ice in which it had been encased. So perfectly had the soft parts of the carcase been preserved, that the flesh as it lay was devoured by wolves and bears. The skeleton is still to be seen in the museum of St. Petersburg. Instead of being naked, like the existing African and Indian elephants, the creature was found to be covered with a very thick and shaggy coating of fur. It must not, however, from this and other similar discoveries, be inferred that the Mammoth was, in every latitude, enveloped with such a thick covering. In this respect it may have presented variations according to the climate of the particular region in which it dwelt, after the manner of the modern domestic goat. Sir Richard Owen has pointed out that the teeth of the Mammoth have a larger proportion of dense enamel than either of

the two species of living elephants. This circumstance doubtless enabled the Mammoth to grind down and employ for food the harder and more ligneous tissues of trees and shrubs, thus (combined with the nature of its covering) fitting it to live in a cold climate, "a meet companion for the reindeer," with which its remains are frequently associated. The late Mr. Charles Darwin, in his "Journal of Travels in South America," shows conclusively how completely erroneous is the idea that herbivorous animals of large size require a luxuriant vegetation for their support, and points out various parts of the world which, though comparatively sterile and desert, are remarkable for the number and great size of their indigenous quadrupeds.

That the Mammoth roamed over Derbyshire is sufficiently evidenced by the number of its remains found at Creswell. Mr. Mello records that each of the four caves—Pin Hole Cave, Robin Hood's Cave, Church Hole, and Mother Grundy's Parlour—yielded remains of this proboscidean.

In various parts of England, including Creswell, *detached* milk teeth of the Mammoth have been found; but a specimen exhibiting, as the one discovered by me, in the Pin Hole Cave, does—a portion of the jaw containing the ante-penultimate and penultimate milk molars, set in their natural position—is a great rarity. Sir Richard Owen, to whom I submitted the specimen, and who kindly described it in a joint paper with myself, before the Geological Society, pronounced it to be the first one he had seen. It is said that the late Dr. Falconer had in his possession milk teeth of the Mammoth *in situ*, obtained from the gravels of Barnwell, near Cambridge; but if this be correct, it is certain that no trace of the specimen can now be found. There is a specimen similar to the one discovered by me, at Creswell, in the Bright Collection, at the British Museum, but it is not known from what part of the world it was derived; it is moreover labelled, and is believed by many to belong, not to *Elephas primigenius*, but to *Elephas antiquus*. As the difference between the teeth of these two species is one of the relative abundance and width of the folds of enamel, there is doubtless considerable difficulty in

drawing this distinction when dealing with the teeth of very young individuals. The Creswell fossil, then, appears to be the only one of its kind in this country that is forthcoming, and of which the precise place of derivation is known.

A figure of the Creswell fossil accompanies this paper. It will be seen that it is a portion of the fore-part of the upper jaw of a very young elephant. The teeth of the right side only are present, those of the opposite side having been torn away. The longitudinal extent of the two molars is a fraction over three inches. The surface of the foremost and smaller tooth has suffered very considerable wear; indeed it has been worn down into a triangular shape (the apex being forward); the foremost plate being almost removed. The length of the grinding surface of this tooth is fourteen millimètres, and the breadth, near the base, fifteen millimètres. Of the second molar, only the anterior portion has suffered wear, the two hindermost divisions of the tooth not having risen into use; thus, while the grinding surface of this tooth is only fifty millimètres in length, the whole length of the tooth is sixty-two millimètres. The roots of the smaller molar are fully developed, and one (the anterior) is curved forward. Of the larger molar, three roots are visible.

Sir Richard Owen having informed me that the British Museum did not possess an illustration of the phase of dentition of the *Elephas primigenius*, exemplified in the smaller molar above-described, I have presented my specimen to the National Collection. It takes our thoughts back to the far distant age when Britain was joined to the Continent, and when the Creswell ravine echoed to the roar of the lion, the howl of the wolf, and the laugh of the cave-dwelling hyæna. It needs no effort of imagination to picture the probable circumstances under which the ill-fated young elephant—a portion of whose skull has so recently been brought to light—came to an untimely end by the deadly attack of one of the fierce carnivora of Pleistocene days.



UNDER AND SIDE VIEWS OF A PORTION OF THE UPPER JAW OF A YOUNG MAMMOTH, FROM THE "PIN HOLE CAVE," CRESWELL. (NATURAL SIZE.)

d1 d2. Grinders, or Milk-molars, *in situ*, right side.

a. Cavity, through which is visible the curved anterior root of the smaller Grinder.