by the fact of their temperature being some few degrees higher than that of ordinary springs under similar circumstances. A spring near Fullwood is a good illustration of this fact. It is, I presume, that described at page 271 of Dr. Short's work, under the name of Fullwood Spa; though we cannot now say that it lies "on the north side of a most desert, heathy, mossy mountain," being surrounded with cultivated fields. Its mean temperature is about 50°, though situated at the bottom of the valley, 650 feet above the sea, and it is therefore about 2° warmer than ordinary springs whose elevation is 200 or 300 feet less. Much the same remarks would apply in the case of the other chalybeate springs mentioned in the list, and we must therefore conclude either that they proceed from a sufficiently great depth to exhibit slightly the warming effects of the interior of the globe, or else that their temperature is somewhat raised by the oxidization of the pyrites of the subjacent strata, to which no doubt their chalybeate character is due. Both these causes are so very probable, that I feel strongly inclined to refer the relative warmth of these springs to their combined action.

ON THE GEOLOGICAL AND ARCHæOLOGICAL CONTENTS OF THE VICTORIA AND DOWKABOTTOM CAVES IN CRAVEN. BY MR. HENRY DENNY, A.L.S., &C.

The magnificent range of rocks extending through Craven belonging to the lower scar limestone of Phillips, contains numerous caverns or fissures of considerable extent, which have probably been caused by volcanic agency on the one hand, or by the action of currents of water on the other.

Those who have stood in the awfully sublime portals of Gordale, will not soon forget the feelings with which they
were suddenly impressed, as they gazed upwards at the riven sides of that stupendous gorge—contemplated the abrupt and giddy escarpments of Kilnsey—or the vast Cove of Malham—each and all geological monuments of the first class, perhaps unequalled in Europe; while the stalactitic galleries of Ingleborough exhibit a fine example of the latter.*

To the eastward of Settle, and also near Arncliffe, caves have long been known and visited; but only as subterranean wonders, without any consideration as to their former occupants, or the period at which they were the abodes of men and other animals. Though dates in these cases are only conjectural, some approximation may be arrived at by examining such "foot-prints in the sands of time" as they contain, of the former inhabitants of the hills and valleys of Yorkshire; and these are not a few.

Mr. O’Callaghan and myself having ascertained that some interesting geological and archaeological discoveries had been made at different times in some of these caves, by Mr. Jackson, of Settle, I applied to him for such information as his intimate knowledge of the localities enabled him to supply.

* Whitaker thus describes Grordale and Malham Cove, p. 267.—"The approach to Grordale, on the east side of the village, happily remains what nature left it, a stony and desolate valley, without a single object to divert the eye from the scene before it. This is a solid mass of limestone, cleft asunder by some great convulsion of nature, and opening "its ponderous and marble jaws," on the right and left. The sensation of horror on approaching it, is increased by the projection of either side from its base, so that the two connivent rocks, though considerably distant at the bottom, admit only a narrow line of day-light from above. At the very entrance, you turn a little to the right, and are struck by a yawning mouth in the face of the opposite crag, whence the torrent, pent up beyond, suddenly forced a passage within the memory of man, which at every swell continues to spout out one of the boldest and most beautiful cataracts that can be conceived. Bishop Pococke, who had seen all that was great and striking in the rocks of Arabia and Judea, declared that he had never seen anything comparable to this place."

"Malham Cove is an immense crag of limestone, 286 feet high, stretched in the shape of the segment of a large circle across the whole valley, and forming a termination at once so august and tremendous, that the imagination can scarcely figure any form or scale of rock within the bounds of probability that shall go beyond it."
This was most obligingly communicated, accompanied by an invitation to examine his collection of specimens obtained from thence, and also the offer of his services as guide, if we wished to visit the caves in his neighbourhood. This offer we most gladly accepted, and went over to Settle on the 22nd of August last. After inspecting, with much interest, Mr. Jackson’s collection of personal ornaments, coins, pottery, and mammalian remains, we proceeded to that series of caves in the immediate vicinity, at King’s Scar, which are all situated in the side of a lofty precipitous cliff, at the elevation of about 1,460 feet above the level of the sea, and 900 feet above the town of Settle. The approach to which is somewhat toilsome from the nature of the ground, covered over, as it is, with fragments of rocks, and huge blocks of trap, the wreck of countless centuries.

“Crags, knolls, and mounds confusedly hurled,
The fragments of an earlier world.”

The most accessible is the Victoria Cave. This had probably three entrances, two of which are now partially closed by the debris of the superincumbent precipitous rock. The descent into this cave is rather difficult: entering by a steep fissure you have to crawl through a low and narrow passage into a cave in which you can scarcely stand upright; then through a second contracted aperture into a lofty cavern. The floor is covered with stalagmite and clay, and strewn over with blocks of limestone which have fallen from the roof; hence, by a third and nearly closed passage, you enter another large compartment. Besides these caves there are lateral fissures, whose terminations are not known. So small indeed are some of the apertures through which we had to pass, that it was necessary to take off our coats and hats, and in this lizard-like mode of progression, Mr. O’Callaghan left his shirt studs in the cave. These, when discovered by some future archaeologist, will probably form the subject for a
learned (?) and critical essay on the extraordinary similitude of pre-historic and modern metallic articles of decorative art.

The Kelko Cave, near Giggleswick, which has only been partially explored, rewarded Mr. Jackson’s labours by similar relics of ancient art as the Victoria, though fewer in number.

The Dowkabottom Cave or Caves, near Arncliffe, are not situated like those near Settle, on the sides of a precipice, but on a lofty plateau of the rocky crags of the Kilnsey range, 1,250 feet above the sea, from which you descend into a lofty chamber, from whose roof hang ponderous masses of stalactite. Turning by a narrow passage to the left, you enter a larger and very much loftier cave, a considerable portion of the floor of which is covered with stalagmite, owing to the constant flow of a rapid stream of water through it, from the extreme end of a narrow gallery of considerable extent.*

The greater part of the floor of the first cave is covered with loam, charcoal ashes, clay, and soft stalagmite, of

* Whitaker, in his History of Craven, thus describes it:—"Dowkabottom Hole is about two miles north from Kilnsey Crag, high up in the hills, and surrounded by cliffs of limestone. The entrance is an oblong chasm in the surface, overhung with ivy and fern. At the south end is a narrow but lofty opening into a cavern of no great extent. The view downward from the north is tremendous. On this side it is very lofty, and extends to a considerable distance. The rocks at the top, and particularly near the entrance, hang down in the most picturesque shapes, and both these and the sides are covered with petrified moss, richly tinted. The bottom, at first, is rugged, but afterwards changes to a brown clay, which has been found to answer the end of Fuller's earth, and is in some places petrified in masses as hard as marble, with a pellucid stream running over it, from which this deposit is formed. A sudden turn to the left at once changes the scene; the cavern now becoming very spacious, and forming a set of magnificent Gothic arches, composed of petrified matter, white as new-fallen snow. After gaining a rugged ascent, the incrustations on the sides continue, but the roof changes to a flat ceiling of dark blue rock with white seams, from which depend stalactites of various hues, rugged all over, and sharp as the points of lances. Beyond, the rocky ascent leads to a narrower part of the cavern, where the water becomes too deep to admit of any farther progress. When Bishop Pococke had seen Dowkabottom, he exclaimed,—'This is Antiparos in miniature, and except that cavern, I have never seen its equal.'"—Whitaker's Craven, p. 492.
variable depth from the surface, as also in the succession of deposits. Mr. Jackson found them in the following order:—


In some parts, stalagmite forms the first layer, and then immediately beneath occurs the clay, with bones and relics; in other parts, the loamy clay mixed with charcoal ashes, containing bones, pottery, and other ancient remains resting upon the solid limestone floor. In an examination of the cave which I made last September, (by direction of the Council of the Leeds Philosophical and Literary Society, and with the kind permission of the proprietor, J. R. Tennant, Esq., of Kildwick Hall,) in consequence of the superficial deposits of charcoal and soil having been disturbed by previous explorers, I excavated a fresh trench beneath the above, and passed through the following deposits:—

1. A crust of stalagmite, two inches thick.
2. Loose soil and fragments of limestone, one foot.
3. Stiff red clay, two feet.
4. Decomposed stalagmite or soft lime, from one to six feet, resting upon the rocky floor.

At another part, hard stalagmite occurred between these deposits and the solid stone floor. In the first chamber of the Dowkabottom Cave some very large stones were observed by Mr. Jackson, placed on the surface as if to mark the spot for some particular purpose. Upon the removal of these he found in a layer of charcoal ashes, nearly two feet in thickness, only a fragment of a bronze fibula, and gave up the search. Subsequently, however, Mr. Hodgson, who was excavating the same spot for James Farrer, Esq., M.P., of Inglebro House, discovered the remains of three human skeletons laid in the bed of clay about a foot deep. Under this deposit a layer of soft stalagmite was found, and underneath all, several skulls.
and bones of the wolf and goat, and also horns of the deer. On the first examination of these different caves by Mr. Jackson, the bones and teeth of animals were found with relics of human art scattered indiscriminately over the floor, or just below the surface in the charcoal ashes previously alluded to, and the first collection of specimens obtained from thence, consisting of various articles of supposed British and Roman art, coins, bones and teeth of the tiger, hyæna, bear, and wild boar, (which had been identified by the late Dr. Buckland,) were deposited in the British Museum, and a description of the antiquities was brought before the Society of Antiquaries of London, by Mr. Charles Roach Smith, the eminent archaeologist, and since published in his Collectanea Antiqua. The result of Mr. Jackson’s subsequent explorations I now venture to bring before this society as a subject of local interest, and also as a record of the important services which the unaided labours of one individual have been the means of accomplishing; as to Mr. Jackson belongs the merit of first excavating and collecting the various objects of interest from these caves.

That these several caves were for a considerable period the abode of human beings, is evident from the number of personal ornaments and implements of various kinds which have been found by Mr. Jackson, independent of numerous specimens obtained by Mr. Hodgson for Mr. Farrer. Those at present in the possession of the former gentleman consist of about twenty-four fibulae of bronze and five of iron of various sizes and patterns, many in fine preservation and elegant ornamentation, some having apparently been plated with silver; two bronze armlets and four fragments of others; two rings, one of which has had a signet of red enamel, the other plain; bronze articles like studs; one long comb, probably for the back of the head, and fragment of another ornamented; portions of two others in form like an ordinary small-tooth
comb, all made of bone;* six bronze pins, one pin four inches in length, with a flat head the size of a shilling, and plated; two bone needles, six bone spoons, and several fragments of others, the handles rudely carved and the bowls having a hole in the centre as if to allow the escape of fluids; remains of two knives, one key, pieces of bronze in a half-finished state for a fibula, two bone arrow heads, a bone implement, probably the guard from the handle of a dagger; the head of an adze of trap precisely similar in form and size to one in the Museum of the Leeds Philosophical and Literary Society, brought from Tahiti;† the canine teeth of an animal, probably a wolf, perforated, as I presume, for a necklace, bracelet, or charm;‡ as also shells of Nerita littoralis, and Turbo littoreus, perforated for a similar purpose; a single valve of a species of Cardium, probably a worn specimen of muricatum;|| various articles in bronze and bone, the uses of which are unknown; fragments of glass of different qualities, glass rings, probably armlets, glass and jet beads, pottery of the ordinary Roman coarse ware, and the red or Samian ware ornamented with various devices of birds, fish, &c., two

* A specimen, precisely similar to the first of these combs, in the possession of Edward Hailstone, Esq., F. S. A., of Horton Hall, was found amongst the accumulated stones and rubbish in St. Leonard's Priory, York, and pronounced by Warssae, the eminent Danish archaeologist, to be a Norse comb. For figures of these, and various other articles, see Plates 1 and 2.

† This was exhibited by Mr. O'Callaghan at the Meeting of the British Association at Aberdeen, and excited much interest.

‡ Bruce, in his History of the Roman Wall from the Tyne to the Solway, figures a fine canine tooth of the bear, perforated in a similar manner, found amongst other antiquities during the excavations.

|| Personal ornaments made of the same objects from Africa and Tahiti, are in the museum of the Leeds Philosophical and Literary Society, and it is worth bearing in mind as connected with the circumstance of the occurrence of the shells, that with the skeleton of a female found in Paviland Cave numerous shells of the same species were observed; and also that Sir Richard Colt Hoare, discovered in a Barrow, near Warminster, the shell of a nerite, and ivory beads laid by the side of the skeletons of an infant, and an adult female presumed to be its mother.
perfectly round stones, probably intended for a sling, pieces of stone which have the appearance of having been used as whet stones, pieces of flint of an ill-defined wedge shape, but as no flint is found in the neighbourhood, these have doubtless been intended for some implements, several coins, including a large brass and silver denarius of Trajan, and small brass of Constantine and Constantius. On a former occasion the coins found were of Nerva, Nero, Gallienus, Claudius Gothicus, Victorinus, Aurelianus, and Maximus; most of the small brass are base imitations, probably by early forgers. There were also several small coins weighing only two grains each, which I have not had an opportunity of examining. From the various articles of human construction just enumerated, it becomes an interesting subject of ethnological inquiry, to ascertain who were their original possessors. That most of the relics bear the stamp of Roman art is true, but, when the peculiar locality of their deposit is taken into consideration, they point to a somewhat different conclusion, making them probably, Romano-British, rather than purely Roman; for although a Roman camp is supposed to have been at Settle, or in its immediate neighbourhood, there is no indication which would lead us to suppose that the various articles found in the caves had belonged to the soldiers of the Roman Legions, as they exhibit little or nothing of a military character. On the contrary, nearly all appear to indicate the possessors as peaceful and domestic in their habits, though not plebeian, as from the number of personal ornaments it would lead to the supposition they were above that class. The nearest Roman roads were those from Overborough, (Bremetonacæ), through Bolland Forest to Ribchester, (Coccium), and from hence to Ilkley, (Olicana), at each of which places there was a Roman station. The locality of the caves, however, is wide of each of these roads, especially Dowkabottom, and all in the fastnesses of the hills, as if for security, making it
appear that the occupants were not belonging to the Roman legions, but fugitives, probably the wives and families of a persecuted or conquered people, who had fled from the fury of an invading army to these hills for refuge. The question hence arises, Who were they, and to what period must we refer for their history? My friend Mr. John Dixon, a zealous antiquary, who first called my attention to these caves, has so concisely traced the circumstances under which it is probable the various articles were deposited, that I cannot do better than quote his own words:—“From the great quantities of bones, charcoal, fragments of pottery, &c., discovered, the Craven caves would seem to have been occupied for a considerable length of time by a numerous family, who have left unmistakable proofs of their acquaintance with Roman luxury and some of the civilized arts. To such a class, these wet dreary places, hemmed in on nearly all sides by a rough barren country, could not have formed very comfortable homes; and that they were entered upon from urgent necessity and not as matter of choice, seems indisputable. That they were occupied up to very near the close of the Roman dominion in Britain, is at once evidenced by the occurrence of many coins of Constantine and Constantius. Let us inquire what was the state of Britain during Constantine’s reign. From what we are permitted to gather from the scanty records of that period, the whole country seems to have been smiling under the influence of a profound peace. The Emperor died in 337, and the sun of tranquillity still shone down upon his more immediate successors. The decline of Roman power had begun; Byzantium had sprung up; but the end of Roman Britain was yet somewhat distant. The Roman and Briton were as one family. The old Sixth Legion which came over with Hadrian about a century and a-half before, and who made
"York their head quarters, had put by their swords and were practising the arts of peace. About this period, then, we have little or no cause for surmising that any rupture occurred calculated to drive a large body of people to the necessity of seeking a lengthened refuge in mountain fastnesses. There was a dark cloud, however, gathering in the north and full soon it burst. In the year 360, hordes of Picts and Scots crossed the Roman barrier, and descended upon the civilized provinces. The already weakened Roman forces gave way before them, and the whole country, as far as London, became one scene of devastation. The barbarians were driven back only to renew their attacks with more certain success. Tyrants sprung up, and were as quickly put down; and the end of Roman Britain followed. The Anglo-Saxon Chronicle tells us, that in the year 418 the Romans collected all their treasures, and some they hid in the earth, so that no one has since been able to find them, and some they carried with them into Gaul. Then came the fearful times chronicled by Gildas. Deprived of the Roman legions, deprived of the bravest of her sons, Britain is no longer able to resist the ruthless attacks of the northern invaders, who once more pour over the barrier, and in the words of Goldsmith, 'having then opened to themselves a passage, they ravaged the whole country with impunity; while the Britons sought precarious shelter in their woods and mountains.' If we want confirmatory evidence of the historian's words, is it not furnished by these records, disentombed from the solitary recesses of the mountains? Do they not tell a tale of a persecuted band fleeing from some common danger, as truly as if we could summon living evidence from beneath that green mound where the old Britons' bones lie mouldering with the parent earth? And is our setting down these relics as pertaining to the dark days that closed the fourth
"century, and which cast a still murkier shadow upon the "dawning of the fifth, very questionable?"

Dr. Whitaker says, "several of the caves appear to have "been the haunts of ancient banditti, or perhaps the retreats "of the first inhabitants."

Amongst the articles to which I have alluded, found in the caves, some appertain to the personal ornaments and implements of uncivilized nations, as the tooth and shell necklace, bone fish-hook, and adze heads of stone; while others shew a great advance in the arts of civilized life, as the bronze and silver fibulae of elegant form and ornamentation, rings, castings in bronze, coins, &c., which either imply that they have been inhabited by two different races of people, or that they were in a state of transition, as we might expect the Romanized Britons would be; and who would, in that case, naturally have retained some of their primæval and rude productions; in either case it is a point of considerable importance to bear in mind.

Mr. Roach Smith, I believe, endeavours to account for the articles of human construction deposited in these caves by supposing the latter to have been used as places of sepulture by the Romanized Britons, and that the charcoal ashes may have been derived from the fires used for the cremation of the dead bodies, whose ashes were subsequently placed in the urns, together with the coins and other articles belonging to the deceased. Had this been the case, however, surely some of the earthen vessels would have been found entire by the first explorers, which has not been the case; but, on the contrary, they were invariably in fragments, and with the various other articles scattered indiscriminately over the floor, and in the most unlikely places, just as they had been left by their owners, and as would be the case now by any people living for a length of time in a cave, leaving behind them the broken earthenware vessels and articles of domestic use.
strewed about the floor—some probably the result of accident, and others that of conflict and sudden retreat. And further, had the caves been used for the purposes of burial without cremation, which is the most probable, we ought, in that case, to find more human bones to account for, or correspond with, the number of personal ornaments, unless the former have been destroyed by the carnivorous quadrupeds who subsequently inhabited the caves, which is not an unreasonable supposition.

Another conjecture which might be hazarded is this: that as we know the Romans worked the lead mines in Yorkshire during the first century, pigs of lead having been found in this county inscribed (with the Emperor Domitian’s name) IMP. CAES. DOMITIANO. AVG. COS. VII., might not the human relics have belonged to some of these people, who made the caves their temporary places of abode, and some of which probably died therein? Rings, armlets, fibulae, and other objects of a decorative nature, however, appear ill-suited to persons following such menial occupations at that period. I therefore consider Mr. Dixon’s suggestion as far the most likely, under all circumstances, to account for the occurrence of the remains of man and his works in these caves.

In the exploration of the Dowkabottom Cave already alluded to, I found in the loamy soil fragments of skulls, jaws and bones of the short-horned ox, sheep, and goat. The Molar teeth, metatarsal, metacarpal, and coronary bones of the horse; skulls and jaws of the wild boar; portions of the horns of the red deer, one of which is the base of a shed horn, the frontal bone of a human skull, the upper extremities of a human femur, tibia, and fibula, the right side of a human pelvis, a spear head 10 inches in length, two pieces of iron much corroded, two specimens of the upper half of the spherical head of the femur of some animal cut off perfectly smooth
and perforated,* a bone pin formed from the radius of some
quadruped, fragments of Roman Samian ware, a dark-coloured
ware marked with a lozenge-shaped pattern, and also a
coarser unglazed kind, but marked by the potter's wheel, and
the half of a large amber ring. In the clay, numerous
bones, jaws, and skulls of a canine animal, smaller than the
wolf, but having similar characters. In the soft stalagmite,
more skulls and jaws of the above animal, skull of the fox,
the jaw, femur, humerus, and atlas of a wolf of large size and
mature growth, and beneath all the above, and resting upon
the floor of the cave, the parietal bones of a human skull!

The exhumation of such a number of bones of different
animals from these caves, suggests two questions of some
interest. By what means were they deposited? And what
is the probable age of the remains? With respect to the
first point, two different causes present themselves,—

1st. That they have been washed into the caves by some
violent flood.

2nd. That the carnivorous species inhabited the caves, and
carried the remains of other animals into them for food.

The first suggestion appears to me improbable for two
reasons. First, from the elevated situation of some of the
caves, nearly 1,300 feet above the level of the sea, it is
unlikely that any temporary flood could have risen so high
during historic times as to submerge the lofty range of
hills in which they occur. And secondly, even supposing
this possible, the fissures, in some instances, are not suffi-
ciently large to allow animals of the magnitude of the horse,
ox, and red deer, to be floated into the innermost recesses of

* Worsaae figures (page 93) the same object under the name of Dambrick
bane or Draftsman. Edward Hailstone, Esq., of Horton Hall, has kindly
called my attention to similar bone and clay articles figured in Bryan
Faussett's Inventorium Sepulehrale, (p. xl., 59, 69, 81,) found in the Saxon
graves of women in Kent, and which Akerman thinks with good reason,
may have been the whirls of spindles.
the caves, unless they were larger at former periods than at present.

The second suggestion, however, is reasonable and substantiated by similar occurrences in various parts of England. We know that Yorkshire was inhabited at remote periods by the hyæna, bear, tiger, and wolf. That not only do such animals always reside in caves, but that their remains have always been found in cavernous fissures in a fossil state, as at Kirkdale, Oreston, Kent's Hole, Paviland, Brixham, &c. And as such habits appertain to the above animals in a wild state, where could they be so likely to seek a retreat when roaming over the hills and dales of the West Riding of Yorkshire, as in the various limestone fissures of Craven. And into these recesses the remains of the herbivorous quadrupeds might be carried to be devoured at leisure; and here also the carnivorous species would live and die, for a long succession of years, until they became exterminated by the hand of man, and other local causes.

This conjecture is also rendered probable from the fact, that when the caves were first discovered, the skulls and bones of various animals were strewed over the floor in considerable numbers. One person collected as many skulls as he could grasp with his two arms. As the bones, however, were not considered of value in comparison with the relics of human art, they were trodden underfoot, crushed, and destroyed. From the communications of Mr. Jackson, and from my own identification of teeth and bones, the following appears to be a list of the mammalian remains exhumed:—

**Cave Tiger.** (*Felis Spelaea.*) A canine tooth, recognized by the late Dr. Buckland, and now in the British Museum.—Victoria Cave.

**European Bear.** (*Ursus Arctos.*) I have seen in Mr. Jackson's possession a fine canine tooth, the second molar, and a portion of the radius of a bear,
much too small for the *Ursus Speleus*, and too large for the *Ursus Priscus*. Upon comparing these teeth with those of a specimen of *Ursus Arctos*, they perfectly correspond in size and character, and only differ in colour. Although the remains of this bear have hitherto been found only in the fen lands of Cambridgeshire, I have no hesitation in referring the above specimens to this species, found in the Victoria cave on the surface of the floor.

**Badger.** (*Meles taxus.*) Jaws and teeth in the Victoria and Dowkabottom caves.

**Hyæna.** (*Hyæna spelea.*) A fine jaw with teeth was found in the clay in the Victoria cave, and deposited in the British Museum.

**Wolf.** (*Canis lupus.*) The left side of a magnificent lower jaw of a mature animal, and the right side of one more aged; as also bones of the extremities were found by me in Dowkabottom. Skulls have also been found, I believe, by Messrs. Jackson and Hodgson.

**Wild Dog.** (*Canis primævus.*) Nine skulls, twenty-five lower jaws, (one of which is interesting as exhibiting a compound fracture and natural restoration during the lifetime of the animal,) the scapulae, ribs, and bones of the extremities of this animal were found by me in Dowkabottom cave.

**Fox.** (*Canis vulpes.*) Portions of the skull, jaws and bones of the extremities.—Victoria and Dowkabottom.

**Hare.** (*Lepus timidus.*) Lower jaw and teeth.—Victoria.

**Water Rat.** (*Arvicola amphibius.*) Molar and incisor teeth.—Victoria and Dowkabottom.

**Wild Boar.** (*Sus scrofa.*) Several portions of skulls, jaws, tusks, and molar teeth.—Victoria and Dowkabottom.
RED DEER. (Cervus elephas.) Fragments of horns and teeth.—Dowkabottom.

SHEEP. (Ovis aries.) Skulls, jaws, and various bones.—Dowkabottom.

GOAT. (Capra hircus.) Skulls, jaws, and bony cores of horns.—Dowkabottom.

SHORT-HORNED Ox. (Bos Taurus.) Skulls, jaws, and various bones.—Victoria and Dowkabottom.

HORSE. (Equus caballus.) Molar and incisor teeth, coronary, metacarpal, and other bones. The lower jaw, with teeth, of a foal under four days old.—Victoria and Dowkabottom.

Various bones of birds, as goose, partridge, thrush.—Dowkabottom.

With respect to the antiquity of the mammalian remains from these caves, it is a question which cannot be hastily decided, as it is somewhat remarkable that although situated upon the same range of hills, and only a few miles apart, they do not both contain the bones of the same species of carnivorous animals. In the Victoria cave, for instance, we have the tiger, hyæna, and bear; while in the Dowkabottom cave, the only animals of this order are the wolf, wild dog, and fox; the first two of which have not occurred in the former cave. This circumstance might suggest the inference that they were not deposits of the same age, the former being the most ancient. A singular occurrence, though perhaps quite accidental, appears to prove the very opposite to have been the fact. In the Victoria cave, containing the bones of the supposed primæval quadrupeds, were found coins of Gallienus, Victorinus, Claudius Gothicus, Constantine, and Constantius, extending down to the Fourth century. While in Dowkabottom, in which more recent quadrupeds predominate, occurred silver and large brass coins of Trajan, belonging to the First century, A.D. 98. As, however, the
other articles of Roman art were similar in both caves, I consider the evidence which the coins afford no reliable indication of age unless we take them as a whole; when the most recent will be probably those of contemporary date, the coins of preceding Emperors passing current as lawful money long after the death of the individuals in whose reigns they were struck. In all investigations of this kind we must not overlook any circumstance, however trivial, but view it under all its bearings. For instance, the tiger and hyæna are generally supposed to be pre-historic; but associated with these we find the bear, which we know has been a native of Britain during historic times, though the precise period of its extirpation is not known. In Scotland it survived as late as the year 1057, when one of the Gordon family was directed by the King (Malcolm III.) to carry three bears' heads on his banner as a reward for his valour in slaying a fierce bear. The wild boar occurs in both caves, the last specimens of which are stated by Lord Macaulay to have been destroyed during the civil wars under Charles I. That this animal was a well known native of the Yorkshire hills, is probable from the fact of Wild Boar Fell being still the name of one locality in the West Riding, doubtless derived from wild boars frequenting the spot. Therefore, though we are not able to explain the cause of the apparent isolation of the tiger and hyæna above alluded to, yet when we find them associated with the bear and wild boar, and the latter occurring again with the wolf at Dowkabottom, are we not justified in supposing that as species they existed contemporaneously, though the periods of their final extinction might be somewhat distant? That the latter animal, the wolf, was formerly abundant throughout this country, may be inferred from the circumstance that, in the Tenth century, King Edgar commuted the punishment for certain offences into a requisition of a certain number of
wolves' tongues from each criminal. Camden tells us that Lulwell, one of the Welsh princes, had to pay an annual tribute of 300 wolves' heads, which he paid for three years, but discontinued it on the fourth, probably because they were becoming nearly extinct. According to tradition, the last wolf killed near Leeds, was by John of Gaunt, Duke of Lancaster, in 1306, in the parish of Rothwell; and that the Inn now known under the sign of John of Gaunt marks the spot. The last specimen of this animal killed in Scotland, is recorded to have been slain at Lochabar, by Sir Ewen Cameron, of Lochiel, about the close of the reign of Charles II.

At what period, however, the wolf became extinct in England is not known; but in the notes to an edition of Somerville's Chase, by Topham, it is stated that it was in the Wolds of Yorkshire where a price was last set upon a wolf's head, but no date is attached. Therefore, though we are not able to assign the year when such a proceeding was considered necessary, we may venture to state that in all probability the Yorkshire hills were the last residence of the wolf in England. In Ireland, the last presentment for killing wolves was in the county of Cork, in 1710. Although we can trace the existence of the wolf in Britain down to this late period, it is very probable that the animal had been gradually becoming scarce long anterior to this date, as no royal edict is on record to destroy the wolf since the reign of Edward I., in the Thirteenth century, though the limestone caves of Yorkshire and Devonshire might afford them an asylum for many years subsequently.

I wish here to offer a few remarks upon the smaller species of canine animal already alluded to, whose bones occurred with those of the wolf, in the Dowkabottom cave; as in the estimation of some persons these may materially affect the question as to the relative age of the other remains. In
consequence of the diversity of opinion as to the specific identity of the wolf and the dog, I am not able to assign the above skulls, jaws, and other bones to either of these animals with certainty. They are too small for a mature wolf of the ordinary size, and we know they cannot have been immature, as the teeth leave no doubt of their having belonged to adult animals. The molar teeth especially, and the low contracted character of the forehead closely resemble the wolf; but when placed beside the remains of a wolf found in the same cave, the contrast in size is very obvious. The inference appears to be that the canine remains belonged either to a smaller species of wolf, (which has been hitherto undescribed) or to a wolf-like variety of dog, equally unknown, named by me provisionally, Canis primavus, which existed in Britain contemporaneously with the former, and from which it is not possible to distinguish it by the bones alone. If the dog is only the domesticated progeny of the wolf, as some writers believe, it might, a priori, be imagined that the numerous bones found were simply the remains of dogs belonging to the ancient human inmates of the caves which had been kept to hunt down the wild animals of the district for food, who had died in the cave, and became gradually buried up. This conjecture, however, appears liable to serious objections; for, although unquestionably contemporary with man, it is not so certain that they were co-tenants of the cave at the same period; as, in the first place, these bones occur below the mass of articles of human construction and human remains, except in the one startling instance of the parietal bones at the bottom of the stalagmite. And again, the human bones are so few as to suggest the probability of their having been carried to the cave as food by the carnivorous quadrupeds, rather than that the latter were the servants of the primæval human occupants, who would scarcely have allowed the decomposing bodies of
so many animals to remain in their place of abode. I therefore infer that the quadrupeds, whatever they might have been, were wild, and resorted to the caves for shelter, as is the habit of similar species in a wild state at the present day. Animals never (as far as I am aware) degenerate in a state of nature; and as we find the dog depicted on the monuments of Egypt and Nimroud in a domestic state, and known and referred to as such, during the sojourn of the Israelites in Egypt, and as in the most ancient languages, as also in every modern dialect, the dog is known by a distinctive appellation, instead of being the descendant of the wolf, the supposition arises that it was originally specifically distinct, and very early subject to man's use. At all events, the period of its domestication is lost in the lapse of ages, or not alluded to in the earliest of human records. And independently of the circumstance that the dog, as a species, is found in every region of the globe where man is resident, there is some reason for believing that it may be an earlier inhabitant of this planet than man himself; in support of which I may adduce the fine skull exhumed from the gravel in Norwich, and presented to the Museum of the Leeds Philosophical and Literary Society, by Mr. O'Callaghan, which has been pronounced by Professor Owen to be that of a dog; and also that the evidence in favour of the dingo of Australia having existed in that country prior to the Aborigines, is supplied by the discovery of a skeleton of that animal at Warnamboil, beneath a bed of volcanic ashes; and further, that in the museum at Melbourne there is a fossil skull of a dog found in a cave at Mount Macedon, with other animal remains, by Mr. Selwyn, the Government Geological Surveyor of Victoria, which skull is stated on the authority of Professor M'Coy, to be identical with that of the dingo of the present day. Whether,
however, we consider the canine remains to be those of wolves or dogs, we must not, in either case, assign them to a recent deposit, as the absorbent condition of the bones leaves no doubt of their antiquity. If any additional evidence is required to substantiate the probable age of the mammalian relics from the Victoria and Dowkabottom caves, it is furnished by the fact that Dr. Buckland found in the Kirkdale cave (also in Yorkshire) the bones of all the animals I have enumerated, with the exception of the wolf-like dog, associated with those of the elephant, rhinoceros, and hippopotamus, and must therefore all have been contemporaneous.

From the occurrence of the remains of man and his works in these caves, apparently mixed with the bones of extinct animals, it brings the oft-contested point before us—Were they contemporaneous in this instance? That this is a question of extreme difficulty to determine I am fully aware, and have elsewhere endeavoured to prove, from the numerous instances which are on record of their association under circumstances so apparently conclusive, that we are justified in either extending the epoch of man's advent, or bringing the life periods of the extinct mammalia down to a more recent age, when the last of the latter might be coeval with the first of the former. I need not now refer to the various localities in which the remains of man and extinct animals have been discovered both in Britain and on the Continent, as all such occurrences have been invariably negatived at the outset by geologists, apparently from a pre-determination not to allow of their having been of the same age, however conclusive the evidence they adduce. Instances, nevertheless, continue to occur in spite of these geological edicts, which are of such a character as to render it almost impossible to doubt or disprove them. I here allude to the discovery in the Brixham cave, of flint implements of human construction, with bones of the cave bear, hyæna, cave lion, cave tiger, elephant, rhinoceros,
hippopotamus, giant deer, and other extinct animals, by Dr. Falconer, who has also lately observed a similar deposit of flint and agate knives with extinct animals in the Grotta di Maccagnone, near Palermo; and more especially Mr. Prestwich's communication to the Royal Society,* of the occurrence of several hundreds of flint axes and arrow-heads, in undisturbed gravel, with bones of the elephant, rhinoceros, hippopotamus, &c., at Abbeville, and Amiens, in the north of France, which has been corroborated by Sir Charles Lyell, who, in his eloquent address to the British Association at Aberdeen, observes:—"No subject has lately excited more "curiosity and general interest among geologists and the "public, than the question of the antiquity of the human "race: whether or no we have sufficient evidence to prove "the former co-existence of Man with certain extinct "mammalia in caves, or in the superficial deposits commonly "called drift or 'diluvium?' For the last quarter of a century "the occasional occurrence in various parts of Europe of the "bones of man, or the works of his hands, in cave breccias "and stalactites, associated with the remains of the extinct "hyæna, bear, elephant, or rhinoceros, have given rise to a "suspicion that the date of man must be carried further back "than we had heretofore imagined. On the other hand, "extreme reluctance was naturally felt on the part of "scientific reasoners, to admit the validity of such evidence, "seeing that so many caves have been inhabited by a "succession of tenants, and have been selected by man as a "place, not only of domicile, but of sepulture; while some "caves have also served as the channels through which the "waters of flooded rivers have flowed, so that the remains of "living beings which have peopled the district at more than "one era, may have subsequently been mingled in such "caverns, and confounded together in one and the same

* See Annals of Natural History, September, 1859, p. 230.
"deposit. The facts, however, recently brought to light during the systematic investigation, as reported on by Dr. Falconer, of the Brixham cave, must, I think, have prepared you to admit that scepticism in regard to the cave-evidence in favour of the antiquity of man, had previously been pushed to an extreme. To escape from what I now consider was a legitimate deduction from the facts already accumulated, we were obliged to resort to hypotheses requiring great changes in the relative levels and drainage of valleys, and, in short, the whole physical geography of the respective regions where the caves are situated,—changes that would alone imply a remote antiquity for the human fossil remains, and make it probable that man was old enough to have co-existed at least with the Siberian mammoth; but in the course of the last fifteen years another class of proofs has been advanced in France in confirmation of man's antiquity, into two of which I have personally examined in the course of the present summer; and I am fully prepared to corroborate the conclusions which have been recently laid before the Royal Society by Mr. Prestwich."

After the testimony, therefore, of such a man as Sir Charles Lyell, whose profound researches as a geologist, and extensive knowledge of all the collateral branches of science are of European recognition, surely this highly important subject ought to be finally settled; more especially as his conviction is the result of a careful and minute investigation on the spot, by one who formerly held a different opinion. To those who yet remain sceptical, I would observe that the subject appears to be reduced to very narrow limits, inasmuch as when we find the remains of man, his works, and extinct animals in a deposit of clay or gravel, which afford the most indubitable evidence of never having been disturbed since its deposition, we ought at once to admit equality of age, and,
in instances like that in the north of France and elsewhere, we are driven to adopt one of two inferences which doubters may suggest. Are the flint implements of man’s construction, or are they extraordinary natural or accidental formations of silex? This latter is so absurd as not to deserve a moment’s consideration, and therefore no other rational conclusion can be arrived at than that of Sir Charles Lyell’s, that they are of human construction, and were deposited at a period coeval with the remains of the extinct pachyderms with which they are now found associated.

If it is still urged that no human bones have yet been found in such situations as fully to establish the remote antiquity of the human race, or the co-existence of man himself with the larger pachyderms, I would refer to the female skeleton found by Dr. Buckland, in the Paviland cave, which lay extended in the usual position of burial. By the side of the thigh bone, where the pocket is worn, was found about two handfuls of shells of the nerita littoralis in a state of complete decay. At another part of the skeleton, in contact with the ribs, were from forty to fifty fragments of small cylindrical ivory rods about four inches in length, also portions of ivory rings, and pieces of ivory in process of manufacture into some articles, which had been cut by a rude instrument, the marks of which remained on the surface. Now Dr. Buckland considered this skeleton as coeval with, if not anterior to, the Roman invasion of this country; but not antediluvian, as he believed the bones of the elephant, rhinoceros, bear, hyæna, and wolf to be, which were found in the same cave. When, however, we bear in mind that most of the ivory articles were so much decayed as to split longitudinally by the separation of the laminae of the tusk out of which they were made, and that they were most undoubtedly manufactured when the tusk of the elephant was firm and hard, as also the decayed state of the shells,
additional proof is afforded not only of the very high antiquity of these relics, but also of the individual to whom they belonged. For if we find tusks of elephants in a cave, the ivory of which exhibits little or no indications of decay, (and these are unhesitatingly allowed to be of a very remote date,) by what process of reasoning can we refer articles made of ivory, decomposing from the effects of time, and associated with the former, to a later or more recent date?

Again, I might refer to the extraordinary discovery by Messrs. Dickeson and Brown, in New Orleans, of a deposit of ten forests of cypress trunks of the same species which still exists in the locality, many of them of very great diameter, arranged vertically above each other, and separated by layers of earth. Above the most recent of these beds now grows a forest of evergreen oaks, the age of which alone is estimated at 1,500 years. At sixteen feet below the soil, and in the fourth of these beds from the surface, was found a well-preserved human skull, corresponding perfectly in its form with the skulls of the actual Aborigines of America, and accompanied by the remains of burnt wood, from which we must conclude that this country was inhabited ages ago by men of the American race, who have left in their burial mounds flint arrow and spear heads, and stone adzes, similar to those found in Europe. And further, these rude weapons have been found associated with the bones of the mastodon. In a conversation I had with Catlin, the American traveller, he informed me that Koch, who exhumed and brought to England the fine skeleton of the mastodon which is now in the British Museum, stated to him that with the bones of the above animal he found several flint arrowheads; and that one of these weapons had penetrated some depth into the substance of a leg bone. Poor Koch was much annoyed that his testimony upon this point was doubted, simply because it was heterodox and militated against the generally received
opinion. As connected with the above skeleton, Mr. Catlin related to me a remarkable fact, which almost implies that the former existence of the mastodon had been handed down by tradition amongst the Indians. When he was in the locality where the bones were subsequently exhumed by Koch, the Indians told him that there were several large bones buried at a particular spot, by some trees. Catlin said "How do you know?" They replied, their fathers had told them so. He again inquired, "Have you seen them, or has any one else?" "No; but we can shew you the spot, and they are very deep," was the reply. Some fur traders had commenced a search for the treasure, but gave it up as fruitless, which also deterred Catlin, who then left for the Rocky Mountains. Koch next visited the district, when the Indians told him the same story. He expended all his cash in the search, and at the depth of twenty-five feet in drift and gravel, he found the bones of the mastodon, as well as a quantity of charcoal, and the above flint arrow-heads, &c. Now if the tradition as related by the Indians is doubted, by what means could they be cognizant of the fact that bones were buried at this spot? it could not have arisen from previous diggings, as they do not disinter such remains. The Maores of New Zealand are aware of the existence of the bones of the moa and dinornis, but entertain a superstitious regard for them, as belonging to their ancestors, and under this idea, will not allow of their removal. We must, therefore, either believe the testimony of the natives as regards the tradition, or suppose that, as in Ireland, the localities where the bones of the giant deer are buried, are indicated by peculiarities of surface and vegetation. Mr. Glennon, of Dublin, a most successful discoverer of bones of the megaceros, informed me that in riding through the country he could always point out a spot likely to contain such remains by the peculiar appearance of the ground. As the natives, however, have
no inducement to collect such objects, the latter supposition is improbable, as it could only be acquired by long experience in searching for such relics, which they have not had.

In conclusion, however, I am not prepared to assert that the question of contemporaneity is fully established by the contents of these caves, though they certainly furnish facts which lead to such a conclusion. We find the bones of the tiger, hyæna, bear, wolf, wild boar, &c., occurring with various articles of human construction and in certain instances human bones, in some cases above the stalagmite, in others underneath it. Who is to decide which of the two is the most ancient? In a letter from Mr. Jackson respecting the Victoria cave, he says: "The bones and teeth I have found have always been, "with the antiquities, strewed all over the place; but there "were bones both above and below the other things. In "all cases where I have broken up the stalagmite with no "deposit of earth upon it, the antiquities were underneath." On the first discovery of these caves the floor was strewn over with cart loads of skulls and bones of animals, which would imply a long period of occupancy; beneath these occurred man’s bones and the works of his hands. In the Victoria cave, where the greatest number of works of early art were found, only two human teeth were identified. Where were the other portions of the skeletons? It would almost suggest the idea that some of the carnivorous quadrupeds had frequented the cave subsequent to man having made it his place of abode, for it seems very unlikely as I have already observed, that so many human beings as the personal ornaments must have belonged to would have resided in the cave while it presented so much the character of a charnel house! If we allow the above to have been the case, and also connect with it the circumstance that all the remains of pottery were fragmentary, might not this arise from the natural propensity of some of the animals to search
for and devour such human bones as they could disinter, and in so doing scatter the various ornaments and portions of earthen vessels which the former occupants had left with their own remains on the floor of the cave? I may be told this reasoning would bring the life periods of the extinct mammalia down to too recent a date, as the coins suggest, that towards the close of the Roman occupation of Britain, or the latter part of the Fourth century. At all events this period is not too recent for the bear, wolf, and wild boar, which I have shown are of comparative late extirpation, and therefore might have frequented the caves long subsequent to man; and the supposition that a solitary straggler of the tiger, whose remains are of rare occurrence, might have resorted to the cave subsequent to man's occupancy, is not so improbable as at first it might appear, from two circumstances. In the first place Mr. Jackson found the tooth of the tiger, and the teeth and bones of the bear, on the surface of the floor, near a place where a small stream of water had washed away the soil, and the jaw of the hyæna was in the clay just underneath. And, secondly, from the fact of my finding the parietal bones of a human skull below the clay, soft stalagmite, and bones of the wolf, resting upon the rocky floor of the cave, which would at least imply that the human and canine remains were coeval; and as we know the wolf existed at the same period with the hyæna, tiger, bear, hippopotamus, rhinoceros, and elephant, we may reasonably infer that man was also contemporary with the latter animals, which inference I consider further strengthened by the circumstance that in this very neighbourhood the works of his hands were found in close approximation to the bones of the hippopotamus, elephant, and urus, in the brick-clay at Wortley, during 1852. This, however, does not necessarily imply that the Romanized Britons were the people contemporary with all the extinct animals enumerated, for, besides the various
brass and other articles of this era, I have also alluded to implements of a rude and primitive type, fewer in number, and if I may judge from what specimens were exhumed in my presence, all occurring beneath the bronze ornaments; and lastly the remains of a human skull, considerably lower still. These must point to a period long anterior to the Fourth century, which was in all probability the last time when these caves formed the places of abode of a half-civilized race of people, while the former may appertain to a pre-historic age.

Thinking that the formation of the skull might afford some indication as to this early race of man, Mr. O'Callaghan and myself carefully compared the parietal bones with those in the skulls of an ancient Egyptian, a Mexican from the burial-ground of Cuzco, the ancient capital of Peru, a Roman disinterred near York, and a modern European, and found that the situation of the lambdoidal suture did not correspond with that in any of these; and what was more remarkable, the right side was considerably less in size and much more flattened than the left, but whether this is an accidental malformation, or the effects of artificial pressure, cannot be determined. Mr. Farrer informs me that the skulls obtained by him from the same cave were all considered as early British. I am not aware, however, whether these exhibited the same peculiarity, or that any indications of such a custom having been practised by these people has been discovered, which would point to a remote or aboriginal race. The Caribs compressed the frontal bone, while the early Mexicans produced deformity on the back part of the head, by pressing the occipital bone, the lambdoidal suture, and the adjoining portions of the parietal bones, sometimes to the right, and sometimes to the left, so as to cause one side of the head to be much higher than the other. This deeply interesting physical peculiarity may be
more satisfactorily examined, and further evidence procured on future explorations of this cave, which are to be soon undertaken by Mr. Farrer.

EXPLANATION OF THE PLATES.

PLATE 1.

1 and 2 Bone Spoons.
3 Bone Needle.
4 and 5 Bone Combs.
6 Bone Implement, unknown.
7 Bone Implement, supposed whirl of a spindle.
8 Bronze Ornament.
9 Bone Article, use unknown.
10 Bone Arrow-head.
11 Bone Implement, supposed to be the guard of a dagger.
12 and 13 Bone Fishhooks.
14 Canine Tooth of a Wolf, perforated.
15 Stone Adze.
16 Bone Pin or Skewer.
17 Bone Pin.
18 Turbo littoreus, perforated.
19 Nerita littoralis, perforated.
20 Portion of an Amber Ring.
21 Bone Article, use unknown.

PLATE 2.

1 Bronze Pin, with silver head.
2 and 3 Bronze fibulae.
4 Bronze Bracelet or Armlet.
5 Bronze Buckle.
6 Two Views of a Bronze Stud.
7 Bronze Ring, with red enamel signet.
8 Bronze Article, unknown.
9 Iron Hook.
10 Bronze Ornament.
11 Iron Hammer Head.
12 Iron Key.
13 Remains of a Knife.
14 Remains of a Knife.
15 Iron Article, unknown.
16 Portion of a Glass Armlet.
17 Disk of Sandstone, with circles cut upon it.
18 Iron Spear Head.
19 Metal Tube, use unknown.