

Note on the animal remains found at Cissbury / by Prof. Rolleston.

Contributors

Rolleston, George, 1829-1881.
Royal College of Surgeons of England

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ON

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FOUND AT

CISSBURY.

BY

PROF. ROLLESTON, M.D., F.R.S.



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THE most surprising, though by no means the most important result of the examination of the animal remains found in the excavations at Cissbury was the demonstration of the existence amongst them of the bones of the wild ox, *Bos primigenius*, and the wild boar, *Sus scrofa v. ferus*. It is true that we have abundant evidence from the consilient utterances of poets, historians, and naturalists, from the names of men and of places, and from other quarters also,* for showing that these wild animals persisted into quite recent historical times. Still, for all that, it has been at least rare to find their bones in any prehistoric excavation. I had never been so fortunate as to meet with any such remains so placed till my experiences at Cissbury. It had never seemed difficult to me to account for this absence, the presence of the remains of domestic animals sufficiently explaining it on the principle of "least action," a principle which commends itself as much to savage as to sage. Hence, when I was told that in the pits excavated at Cissbury by the late Mr. Tyndall, of Brighton, the bones of *Bos primigenius* had been found in considerable quantities, as also those of *Sus scrofa v. ferus*, I felt and expressed a great anxiety to see them. This wish was gratified and my scepticism removed by the kindness of my friend Mr. Ballard, of Broadwater, who presented me with the bones now to be described as having come from Mr. Tyndall's pit (see p. 364 of "Journal of the Anthropological Institute," Jan. 1876, fig. 1, *k*, Plate xiv.).

* See Dr. J. A. Smith, "Proc. Soc. Ant. Scot.," 1871—72, ix. p. 667.

I. *Remains from Mr. Tyndall's Pit.*

1. Distal end of left humerus of *Bos primigenius*, with some marks of burning upon it. This fragment consists of the condyles and so much of the shaft as to bring it up to a length of 7.7 in. Its large proportions are the first point which strikes the eye, bringing to mind Cæsar's words as to the urus of his day, *magnitudine paullo infra elephantos*. Its brightish, glazed appearance comes secondly under notice; and, thirdly, the sharp definition of its angles, and processes, and articular surfaces. Looking at it a little more closely, we see a beautiful polygonal reticulation standing out upon the bone, over the surface which gave origin to the lowest fibres of the brachialis anticus. Just such an appearance is presented by the neural arch of the third cervical vertebra of *Bos primigenius* figured by Rüttimeyer, Tab. iii. fig. 3 of his "Fauna der Pfahlbauten," and commented upon by him at pp. 15 and 72 of the same work. They are to be seen, but only in a rudimentary form, in the humerus of a fine Chillingham bull lately presented to the Oxford University Museum by the Earl of Tankerville, immediately above what, in man, would be called the coronoid fossa. The thickness of the cylindrical wall of the humerus is 20 millimeters. The extreme width at the condyles is 120 mill., as against 83 in the Chillingham bull. The circumference, taken at a tangent to the apex of the facet for the head of the radius, is in the Cissbury bull 200 mill., as against 139 mill. in the Chillingham bull.

2. The measurements of an unguis phalanx from a fore-foot of the Cissbury bull illustrate the axiom *ex pede Hercules*, and will show anyone who will construct a couple of triangles with the subjoined two sets of dimensions how greatly the ancient wild bull exceeded in size what Rüttimeyer holds to be its modern representative.

Fore unguis phalanx.	Cissbury Bos.	Chillingham Bos.
	Mill.	Mill.
Extreme length along inferior edge ..	90	.. 72
Extreme length along upper edge ..	70	.. 53
Height 64	.. 48

3. Fragment of tibia, proximal end, *Bos primigenius*. Thickness of cylinder of bone, exclusive of spongy diploë, 15 millimeters.

4. Fragment of femur, proximal end, *Bos primigenius*. Thickness as above, 14 mill.

5. Two fragments of frontal bone of *Bos primigenius*, with strikingly glistening and dense textured walls to frontal sinuses.

6. Fragment of rib of *Bos primigenius*. Its extreme depth is 53 millimeters, as against 45 mill. in the Chillingham bull.

7. Upper molar teeth, *Bos primigenius*.

8. Part of lower jaw of wild boar, *Sus scrofa v. ferus*, with second and third molars *in situ*, and the last just come into use. The bright glazed appearance characteristic of the wild variety of *Sus scrofa* is well marked on the outer, but eminently well on the inner, surfaces of the walls of the jaw.

Very many more bones than these were procured by Mr. Tyndall from his pit at Cissbury. His lamented death has, I believe, caused many of them to be irrecoverably lost. Those described are all that I have access to.

The presence of these wild animals in Mr. Tyndall's pit may be explained by the usually mistranslated* words of Julius Cæsar, "Comm. de Bello Gallico," vi. 28, when writing of the capture and slaughter of *Bos primigenius* by the Germans: "Hos studiose foveis captos interficiunt. Hoc se labore durant adolescentes," &c. These five latter words appear to me to mean that a good deal of trouble must have been taken and a good deal of risk run in getting the wild cattle to the pitfalls; merely butchering the animals after they had tumbled in would not harden a young man, at least in the sense in which Julius, one of the least cruel of a cruel people in a cruel age, would have wished to see a young man hardened. Hurdles of gorse probably were arranged on the principle of the wicker-hoops in a decoy, and it is easy to see how, by such a plan, eked out, perhaps, by the firing of heaps of the same useful material, a wild bull or a herd might be driven over a pitfall.

II. Remains from "Large Pit."

I come, in the second place, to the consideration of the animal remains found in the "Large Pit" marked *m* in fig. 1, Plate xiv.,

* For example, Canon Tristram, in his "Natural History of the Bible," 1867, p. 148, translates them thus: "The hunters are most careful to kill those which they take in pitfalls;" and the Rev. J. G. Wood, in his "Bible Animals," p. 128, renders them thus: "These, when trapped in pitfalls, the hunters diligently kill." Very little care or diligence would have been required for killing, though a very great deal would have been required for keeping alive, a wild ox which fell into such a pit as Mr. Tyndall's, thirty-nine feet deep. If the writers just quoted had recollected that in times previous to the invention of pumps it was a very common thing for "an ox or an ass to fall into a pit," not *studiose*, but *casu aut forte fortunâ*, they would have seen that the word *studiose* should be taken with "captos." So common, indeed, in those times, were such accidents, that Maimonides has written at great length about them in his treatise "De Damnâ," a well-known work of great authority. Or if they had read a few lines more of Cæsar's in the same connection, they would have come upon the words "Hæc (cornua) studiose conquisita," which might have suggested a truer rendering. It is curious to note that Cuvier, "Oss. Foss.," iv. p. 113, 2nd Ed., omits the words in question altogether; and Gervais, "Zoologie et Palæontologie Française," p. 131, 1859, who would have done well had he followed Cuvier in some other matters, follows him in this implicitly. The really "learned" member for the City of Oxford, Sir Wm. Marcourt, drew my attention to the splendidly illustrated edition of

given in sections and plan in Plate xvii. of Colonel Lane Fox's paper in the number of this Journal for January, 1876, vol. v. No. 3, and described by him pp. 379-382, *loc. cit.* The entire number of bones from the large pit which I have before me for identification amounts, exclusively of a number of deer-horn implements described by Colonel Lane Fox, and exclusively of five molars of horse found lying superficially, to about thirty. Of this number, ten are fragments of bones of the domestic ox, *Bos longifrons*. Ten upper jaw molars from the same animal are likewise counted in it, and enable us to say that at least two individuals of this variety of *Bos* are represented in this collection; five are bones of the domestic pig, *Sus scrofa v. domest.*, and give proof of the presence of two individuals; one bone only testifies to the presence of the red deer, *Cervus elaphus*, so abundantly represented by its horns; the roe, *Cervus capreolus*, is represented by a piece of frontal bone carrying a nearly perfect horn, and also by a seventh cervical vertebra. A large part of the skull of a goat, *Capra hircus*, is labelled "Red seam, large pit, 9 ft. 6 in. beneath surface."

The first remark to be made about this collection of bones is that the smallness of their number is an argument in favour of the pit having been filled up very soon after it was first excavated. To this conclusion other considerations have been shown (see "Journal of Institute," *l.c.* pp. 381 and 386) to point. Eight bones of the thirty bear labels which show that they were found below the level of the "red seam," *i.e.* below the level to which the first "filling up" reached. These eight bones belong to the roe, the domestic ox, and the goat respectively. There is one bone, a nasal, which might have belonged to *Bos primigenius*,

the "Commentaries," published by Jacob Tonson, in 1712. On referring to it, I found M. Gervais' error anticipated, Cæsar's description of *Bos urus* being illustrated by a magnificent, however misplaced, picture of a—Bison. Nor do I entirely agree with the translation given by Mr. Edward Lee (p. 13 of his charming little book, "Excavations at the Kesserloch," by Conrad Merk; translated by John Edward Lee. Longmans, 1876): "They (the natives) catch them in pitfalls made with great care, and then kill them." That great care was used in making and covering over the pitfalls I do not dispute, but great care, I am sure, must also have been used to secure that the animals ran over them. Julius says neither more nor less than that the uræ are taken, with great trouble, by means of pitfalls and killed; and that the great trouble includes the riskful process of driving the herd, as well as the very safe one of digging the pit, the context seems to me to indicate. Hence I demur also to the free rendering given by Dr. J. A. Smith in the "Proceedings of the Society of Antiquaries of Scotland," ix. p. 593: "The man who killed the greatest number of them, *even by the pitfall*, brings the horns as an evidence of his prowess, and is highly applauded by his countrymen,"—though this interpretation, like Mr. Lee's, shows that the author had striven to realise to himself the circumstances hinted at rather than described by Julius, and did give the greatest man of all antiquity, if not of all time, credit for writing something like common sense.

but it would not be safe to speak positively as to thus identifying it. And dismissing it from consideration, we have from this "large pit" three domestic animals, the cow, the goat, and the pig, accompanied by two wild ones, the stag and the roe. The absence from this particular collection, and, indeed, from the entire Cissbury series which has come into my hands, of the dog, would be remarkable if we did not bear in mind the short time for which these pits were ordinarily left open, and then consider at what widely distant intervals in a modern household such an event as the death of a dog takes place. The remains of the dog are found, though very sparingly, in the earliest human habitations, ancient, like modern, savages having domesticated it before they domesticated the pig; and we have Professor Boyd Dawkins' authority (see "Journal of Institute," *l. c.* p. 390) for saying that the dog, as well as the goat and the *Bos longifrons*, were found by Mr. Tyndall in his pit, already dealt with. The fauna of the "large pit" may, perhaps, therefore be considered to belong to a somewhat later date than that of Mr. Tyndall's pit, as it comprises the domestic pig, which was not reported to have been found amongst that collection, and is entirely without any bones of the wild boar, and probably also without any of *Bos primigenius*, which was so abundantly represented there. From the fauna of the "skeleton pit" (see page 376, *l. c.*, Journal), to be hereinafter described, that of the "large pit" does not differ in any particulars which would justify us in thinking that the two pits belonged to different epochs; and here again the evidence from the animal remains coincides with that from other lines of investigation.

List of bones from "Large Pit."

Bos longifrons.—Part of left upper jaw with the two last molars *in situ*, labelled "From large pit." Part of palate, labelled "From 23 ft. below, beneath upper margin." One lower jaw and nine upper jaw molars. End of radius 3 ft. below the surface. Glenoid of scapula, 6 ft. End of radius 20 ft. beneath upper margin. Fragment of scapula 35 ft. below upper margin. Part of right upper jaw of a calf with one tooth of large size in alveolus not through gum, and a second small tooth still in substance of jaw.

Bos primigenius.—A single nasal bone.

Sus scrofa v. domesticus.—Os calcis "from red seam." Left ulna labelled "large pit." Right ulna, similarly labelled, and probably from same individual. Femur of young individual. Fragment of lower jaw of an older individual.

Cervus capreolus.—Horn with part of frontal, 33 ft. beneath upper margin; seventh cervical vertebra.

Cervus elaphus.—Part of radius of young specimen.

Capra hircus.—A considerable part of the skull with both horns, labelled "Red seam," 9 ft. 6 in. below the surface.

These bones afford proof of the presence in this pit of two individuals of *Bos longifrons* and *Sus scrofa v. dom.*, one only of *Cervus capreolus*, *Capra hircus*, and *Cervus elaphus*, though the horns speak to the presence of many more.

A number of molar teeth of the horse, *Equus caballus*, have also come into my hands, labelled "Large pit, superficial," and the addition of this last word is significant when we add that it is applicable to all the remains of the horse found at Cissbury, and that considering the large size and durability of the bones of this animal we have some justification for holding that if the first excavators of the shafts and galleries had domesticated it we should have come upon some osteological evidence of their success. As none such is forthcoming, we have a fresh point of agreement between the fauna of Cissbury and that of other excavations of the stone period.

The bones of a young badger, *Meles taxus*, as also of a young fox, *Canis vulpes*, have been put into my hands from the Cissbury excavations; their exact locality is not specified; and it is possible that they may be of comparatively modern date. It should be noted that neither the red-deer nor the roe antlers are always merely shed horns, portions of the frontal bone being in some cases left in connexion with them.

I come now to the fauna of the "skeleton shaft," the shaft in which a human skeleton was found, as described by Colonel Lane Fox, p. 375, *l. c.* The animal remains found in this shaft not only bear directly upon the mode of life and degree of culture which the excavators of this shaft and its fellows enjoyed, but they also very irrefragably prove that these shafts had been filled up before the second race of stone-using men dug their ditch and threw up their ramparts. It will be convenient, firstly, to give an account of the vertebrate animal remains, as has been already done with those found in Mr. Tyndall's and in the "large pit;" secondly, to show how the shells of the mollusca, found in great abundance in the shaft, bear, as the shells of mollusca so ordinarily do, upon the age of the various strata in which they are found; and, thirdly, to describe the human skeleton found with those remains, attempting whilst doing this to frame some reasonable hypothesis as to the way in which this representative of the horde of Cissbury flint-miners came by her death and burial.

III. Mammalian remains from Skeleton Pit.

The skeleton shaft was a smaller but not a shallower pit than

most of those examined by us at Cissbury; its diameter was 4 ft. 6 in., whilst its depth from the surface, before the ditch was made, was 14 ft. In this pit were found more than 1,000 separate bones and fragments of bones of artiodactyle mammals, mixed up with an almost entirely complete human skeleton, but contrasting with it, firstly, in being usually fragmentary themselves, and, secondly, in making up by no means the full tale of the bones of the skeletons which they represented. The immense majority, about 600 out of 1,000, of the lower animal bones in this pit was made up by small fragments of the bones of the domestic pig, *Sus scrofa v. domesticus*; and all the larger and longer bones were imperfect from old breakages. The pig-bones give evidence of the presence in this pit of at least six individuals, two of which had been very young, and none of which had attained the age of eighteen months, as in none of them had the last true molar come into use. It has only been by the fragments of the lower jaws that I have been able to establish the existence of bones from as many as six pigs in this shaft; no one set of bones of any other denomination give evidence of more than four individuals of this species having been present. The very large number of pig-bones, and the small size of some of the fragments of the lower jaws, may serve as something of an excuse for my having given four (see p. 376, "Journal of Institute," Jan., 1876, vol. i., No. 3) as the number of individual pigs represented in this collection from the "skeleton shaft." It is of some consequence, as regards the view we have to form as to the way in which the bones of the lower animals came to be mixed up with those of the human skeleton, to have a precise enumeration of the number of those animals, and as nearly an exact enumeration of the number of bones by which each one was represented as may be possible. If all or a large part of the bones of all the skeletons had been found in the pit with the human skeleton, it might have seemed probable that the animals in question had been sacrificed, as in the familiar instance of the funeral of Patroclus, in honour of, and at the time of the interment of, the human body. But as it was found that the bones, whilst giving evidence of the presence in the pit of six or seven animals, fell far short of containing the proper complement of bones for an equivalent number of skeletons, some skeletons being represented by very few bones, it was plain that the human and the brute skeletons had come together into one and the same receptacle after experiencing, previously to their common interment, entirely different modes of handling. There is no reason to suspect the Cissbury flint-miners of cannibalism, but the animals we may reasonably suppose to have been eaten,

most of the marrow-containing bones having been splintered, and the immense majority of the other bones presenting old breakages.

The fact, which the subjoined table of the bones of the domestic pig will show, that no less than four more or less perfect sets of vertebræ have been recovered from this pit may seem at first hardly in keeping with the view just stated. But the Homeric epithet for the chine, as eaten at feasts (*Iliad*, vii. 321), curiously enough suggests that the vertebræ would be kept together even when thus used; and the comment of the scholiast upon the word in question seems to indicate that the way of utilising the muscles of the back for food with which he was familiar, was not such as to be described by such words as *νότοισι διηνεκέεσσι*. It is easy to imagine that savages with flint knives only to carve with would be glad to be spared the trouble of disarticulating the vertebral column into segments, such as we eat under the name of "chine;" and the deeper lying spinal and interspinal muscles and ligaments would keep it all bound together after they had devoured the more superficially placed soft parts. What they left would be flung on to their rubbish heap; from that it migrated, in a way to be hereafter suggested, into the skeleton shaft.

The fact that the lower jaws are invariably broken,* so as to part the alveolar from the other parts of the bone, bears directly upon the employment of the bone for food, as does also the very scanty representation of the brain-containing part of the skull, or indeed of any part of the skull except the upper jaw. The absence of any manubrium sterni, I should explain, following a hint given by Rütimeyer, by suggesting that it was found useful as a punch when the tynes of the red deer might have become scarce.

An old goat, *Capra hircus*, was represented in the series from this skeleton pit by a radius, a metacarpal, and metatarsal bone, and by four lumbar vertebræ. A kid was also represented by its metatarsal bones.

Two roes, *Cervus capreolus*, were also represented here; the femur and humerus of one had been split for marrow, and was slightly stained with the manganic oxide.

Bos primigenius may perhaps be represented by a couple of thick and rough nasal bones, as well as by a few other fragmentary bones of similar texture, and some much worn premolars. These may have got accidentally mixed up with the bones of the other animals found in larger quantities in this pit, some of the successful drivers of the *urus* having brought away its head

* See Rütimeyer, "Fauna der Pfahlbauten," p. 14.

from the fatal pitfall. They were found immediately below the ditch bottom.

No bone of red deer, *Cervus elaphus*, has come from this pit to my knowledge; a single tyne may have come from it, but its presence in this series I incline to refer to accidental mixing in more recent times than those just alluded to.

An undetermined fragment of bone, which may have formed part of a bone implement, is also referred to this "Skeleton Pit."

I have had entrusted to me, or found myself in this pit, bones of the shrew mouse, of the field mouse, of the toad, and a few teeth of a cub fox. I am not able to attach any importance to them. The important vertebrate animals in this series are, by their presence, the pig, the goat, and the roe, and by their absence, the red deer and the domestic ox, though possibly some of the few and fragmentary bones spoken of above under the heading *Bos primigenius* may be referrible to that variety of the species.

In the Skeleton Pit—Skeletons of Sus scrofa v. domesticus are

Represented by—

4 right	}	Scapulæ
4 left		
3 right	}	Humeri
3 left		
3 right	}	Ulnæ
3 left		
3 Radii		
4 right	}	Femora
2 left		
2 right	}	Ischia
2 left		
3 right		Pubic bones
3 right	}	Iliæ
1 left		

Fragments of 6 lower jaws, the youngest with complete milk dentition, the oldest with third molar not quite in use.

Four sets of cervical vertebræ—

Of which set No. 1 is complete, and will fit with a set of 8 dorsal, 5 lumbar, and 2 sacral.

Set No. 2 is also complete, and will fit with a set of 12 dorsal and 4 lumbar.

Section No. 3 consists of 3 cervical vertebræ, which will fit with a set

of 14 dorsal and 4 lumbar vertebræ.

Set No. 4 consists of 6 cervical vertebræ, which will fit with a set of 10 dorsal vertebræ and 3 lumbar, with which a right pubic bone and the jaws of a pig, certainly under five months, may be connected as parts of one skeleton.

A fifth set of vertebræ, containing no cervicals, but 6 dorsals and 1 lumbar.

In addition to the vertebræ here specified, there are 2 sacral, 1 caudal, 1 dorsal, and 3 lumbar, which cannot very easily be referred to any one of the five sets, but which, from one reason or another, do not speak very positively to the presence in the series of any part of a sixth skeleton. This fact, however, is proved beyond question by the lower jaws and the fragments of lower jaws contained in the collection.

In addition to the bones already enumerated of the domestic pig, there were very large numbers of ribs, nearly all broken, and a considerable number of phalangeal bones.

IV.—*The mollusca found in the Skeleton Pit and their bearing on its date.*

The mollusca found in the Skeleton Pit, though they do not throw any light upon the habits, furnish an almost perfect

demonstration of the relative antiquities of the pit-diggers, of the woman whose remains were found in the pit, and of the diggers of the ditch who came last of all, little suspecting what "mouldered there below."

The following species of mollusca were found in the pit, adhering to its walls, or amongst the rubble:—*Helix nemoralis*, *Helix arbustorum*, *Helix lapicida*, *Helix rotundata*, *Zonites cellarius*, *Cyclostoma elegans*. They were found in great abundance, but there is no reason to suppose that they had been used for food. There were no specimens of the large edible snail, *Helix pomatia*, found in Cissbury at all, and though the next largest English snail, *Helix aspersa*, was found in other parts of the works excavated, I have no note of it from the Skeleton Pit. Oysters which (see Colonel Lane Fox, *l. c.* 367) were found in one instance at the bottom of the ditch, were not found in any stratum deeper down, and may, therefore, like the horse, be considered as marking a later age. To understand the value of the argument for the antiquity of the shaft and the priority in point of time of the entombment of the woman, whose remains are hereinafter described, to the digging of the ditch, Colonel Lane Fox's section (fig. 3, Pl. xv., *l. c.*) of the skeleton shaft, with the ditch escarp and counter-scarp, should be before the reader and be compared with his description, given at p. 376 *l. c.*, of the structural arrangements there figured. In the skeleton shaft (H., fig. 3, Pl. xv.) the larger snail-shells, by themselves, are sufficient to show, firstly, that the ditch must have been cut through rubble continuous with that which we cleared out of the pit, to the great surprise, no doubt, as also to the great satisfaction of the excavators, who would find the work of cutting through rubble much easier than that of cutting through the natural chalk; and by consequence, secondly, that the shaft was anterior, not posterior, in date to the making of the fort. For it is simply impossible that such large shells as those specified could have worked their way in any abundance through the red seam of silting, made up of fine rain-washed particles, which marked the line of the bottom, and was conformable with the sides of the ditch. The sudden and somewhat unexpected breaking through of this brittle flooring of red silt and the opening into the shaft beneath, out of which a large part of the skeleton had been extracted previously to my coming, by Colonel Lane Fox and Mr. Park Harrison, was a circumstance which, not only by virtue of its general sensational character, but also by forcing upon me the fact of the finely particulate, and therefore the rain-washed character of the red seam, made a great impression upon me. The red seam appeared, as it were, to assert its claim to belong to the lower strata by the abrupt manner in which it

broke away, much as one geological strata parts in an escarpment from one above it. As many of the snails below the seam were in large quantity, as well as individually of large size, it was a matter of ocular demonstration that they had in one way or another got down into the pit before the formation of the red seam, of the ditch, and of the ramparts. The length of the galleries connecting shaft E with shaft H (see fig. 1, Pl. xv.) rendered it impossible to think that the snails could have found their way into shaft H, as Colonel Lane Fox had done, by way of those galleries, and there seemed then, as there seems now, to be no escape from the conclusion that the ditch was a later, the shaft an earlier, excavation. The mollusca, however, furnished us with a stronger argument still. *For the shells of the cyclostomata had, in a very great number of cases, their opercula still in relation with them.* This shows beyond all possibility of doubt that the animals had crawled down alive, and had not simply worked down as dead shells, a view which was further rendered untenable by the fact that in a great number of instances the shells, both of the *Cyclostomata* and the *Helias* were adherent to the sides of the shaft. But they would not have crawled down in rubble to the depths at which we found them for any purposes of hibernation, nor could they, I think, have worked their way through the red seam so often referred to. On the other hand, the protection against both cold and drought which an open shaft only 4 ft. 6 in. in diameter and more than three times those dimensions in depth, would offer to snails on a chalk down, very fully explains both their presence and their abundance. This latter point, viz. the great number of these snail-shells, and especially of the *Cyclostomata*, found in the rubble-filled shaft *below*, though not *above*, the red seam, calls for some consideration. It might seem, at first sight, to indicate that the gallery and shaft excavators had left this pit open for a considerable time, departing herein from their usual custom. Snails, however, multiply with very great rapidity under favourable conditions, and the damp and protection from enemies, such as, notably, the pig, which such a shaft would have afforded, would constitute such favourable conditions. And it must be borne in mind that but little weathering of the sides of the shafts had taken place (see Professor Prestwich, "Journal of Institute," *l. c.*, p. 386), and that the rubble with which this shaft, like the others, was filled up, was not altered, softened, or broken up, as it would have been if long exposed to rain and cold. Taking all the facts together, those, to wit, which are put before us in Colonel Lane Fox's Plate xv., with letterpress in explanation at p. 375 *l. c.*; those which I have before me in the very large collection of

fragmentary and of perfect, of brute and of human bones, and those which the snail-shells represent, we may sum them up as follows:—A human skeleton, with nearly every bone represented, including the often missing patellæ and fibulæ, was found with its skull about 2 ft. 6 in. from the bottom of a shaft, which must have been 14 ft. deep originally, but which had got filled up some little way at the time of the falling of the owner of this skull into it. The skull rested on its base and lower jaw; one of the heel bones I found when I cleared out the upper part of the shaft from the “red seam” marking the bottom of the ditch downwards, 1 ft. 7 in. higher up than the skull. This *os calcis* was lying upon a small outstanding ledge of the natural chalk which had been left projecting inwards from the sides of the shaft, on which it had caught, in what we must suppose to have been the sudden and somewhat ungraceful plunge of the woman into the pit. This fall must have bent the head round, as the crown was looking upwards when it was found. The space occupied by the skeleton from the *os calcis* to the crown of the skull was only 1 ft. 7 in., a distance only some 3 inches or so greater than the length of the femur; but that even this distance should have been preserved, it must have been necessary that a considerable quantity of supporting material must have accompanied the woman in her fall, otherwise the entire skeleton would have been found flat on the floor of the shaft. And, as a matter of fact, we found the bones of the pigs above enumerated mixed up confusedly with the human bones and the rubble, in such a manner, that is to say, as to show that they had all come down together, that the human body must, in the singularly illustrative words of the Hebrew prophet, have * “gone down to the stones of the pit,” with “the carcasses trodden under foot” of the lower animals above specified. I am not clear that any evidence is now procurable for deciding whether the woman “went down alive into the pit” or not; there can be no doubt that her whole body, dead or alive, soft parts as well as bony, went down in their natural continuity. And it seems to me that the peculiarities of the collection of lower animal bones appear to necessitate the hypothesis of a rubbish heap having been accumulated close to the open mouth of this shaft, which rubbish heap must somehow or other have been precipitated simultaneously with a large quantity of rubble (from, possibly, shaft K, see Pl. xv.) and the human body into the “skeleton shaft.” It is of course easy to suppose that this was done by violence, and was an act of foul play. But it is also possible that a rash step on a mass of rubbish and rubble in frosty weather may have

* Isaiah xiv. 19.

caused an avalanche-like descent of the entire mass of half-eaten bones, of rubble, and of the living woman.

It may be objected, perhaps, that even a set of savages would scarcely have their dwelling-place and their rubbish so near so dangerous a thing as an open pit. To this it may be answered, firstly, that an examination of the pit showed that it had actually been allowed to stand open for some time at all events, a red seam of silting having had time to form itself at a lower level in the shaft than that at which the woman's skull was found, to say nothing of the snails, and of the weathering of the walls to which they were attached; and, secondly, that modern experience shows only too abundantly that very dangerous and life destroying nuisances are often allowed to exist very near human dwelling-places. I have, indeed, sometimes thought that the proximity of the pit may have been thought desirable by the formers of the rubbish heap, as it may have been used as a sort of protective pitfall, affording something of security against marauders. If the woman, whose skeleton I shall now proceed to describe, can be supposed to have fallen into the pit whilst prowling round the hut which the rubbish heap implies, we can understand how it was that she was left to lie as she fell and where she fell, a circumstance which needs explanation.

The skeleton found, as above described, in the skeleton shaft under the ditch of the British fort at Cissbury, was that of a woman of about 25 years of age, of low stature, 4 ft. 9 in., with narrow shoulders and hips, but with a large head of the low-lying or "tapeinocephalic" type, not rarely to be found, as remarked ("Journal Ethn. Soc.," Jan., 1871, p. 467) by Professor Busk, amongst "priscan," as also amongst modern Tasmanian and Bushman skulls. As regards the limbs and the limb girdles, it may be remarked that their characters are such as very completely to remove any suspicion as to the assignment of the skeleton to the female sex which the large cubic capacity of the skull might excite. The measurements given below will speak for themselves, but it may be well to state that, though each bone, as a whole, gives an expression of lightness and slightness, and consequently of feebleness in its owner, there are some muscular ridges developed with remarkable distinctness. The right clavicle is much shorter and less curved than the left, but its muscular markings for the pectoralis major, as also the markings on the humerus for the insertion of that muscle and for that of the latissimus dorsi, when compared with the corresponding points on the left side, show that this woman was not left-handed. The two muscles named may have taken on their increased development from exercise in

climbing up and down the shafts of the flint-mines. The development on each femur of a third trochanter to receive the uppermost insertions of the gluteus maximus admits, I think, of being explained by a reference to the same practice, though the femora of the most eminently arboreal of the lower animals do not bear out this suggestion as regards the lower in the same way that they do as regards the upper limbs. The *linea aspera* is replaced by a depression from below the level of this third trochanter down nearly to that of the *foramen nutritium* of the femur, and for the distance corresponding with this depression the femur is much flattened and flanged out. The lower part of the *linea aspera* is much larger on the right side than the left, as though this woman had used the right lower limb by preference, as well as the right upper one. The tibiæ are anteriorly platymeric. Traces only of the lines of junction between the epiphysis of the clavicle and its shaft, between the two epiphyses of the radius and its shaft, between those of the fibula and its shaft, and between the *cristæ ili* and the body of the bone, are visible. The vertebræ are completed, and, what is somewhat surprising, the five bones of the sternum are all but completely anchylosed. There can, however, be no doubt as to the age of the woman to whom this skeleton belonged, inasmuch as the first vertebra of the sacrum is still unanchylosed, and the wisdom-teeth, though present in both jaws, are very little, whilst the other teeth are very much worn. As regards the limbs, the scapulæ, the pelvis, and the clavicles of this skeleton, what Dr. Kuhff has said ("Révue d'Anthropologie," iv. 3, 1875, p. 435), viz. that "plus s'on se rapproche des origines de l'homme, et plus l'on voit s'effacer les caractères différentiels sexuels dans le squelette," is the very reverse of the actual state of the case. As regards the cranial capacity it is otherwise, and the skull of this woman from the skeleton shaft at Cissbury, with a cubic capacity of 105 inches (= 1732·7 cub. cent. = 61·5 oz. av. brain weight), exceeds the immense majority of male skulls cubed and recorded. Out of a large series from very various times and peoples cubed by myself, three only have exceeded this amount. One of these was a Roman of the Romano-British period in Britain, with a cubic capacity of 108 in.; a second was a skull from a British tumulus at Crawley, of probably the time between the evacuation of Britain by the Romans and its entire subjugation by the Saxons, with a capacity of 106·75 cubic inches; the third is a modern European head, with nothing to note in its history, but with a capacity of 105·5 cubic inches.

I have so very lately, in the pages of this Journal, vol. iv. p. 120, Oct., 1875, and elsewhere ("Address on Anthropology,"

British Association, Bristol, 1875), gone over the various rationales which have been offered to account for these, at first sight, somewhat startling results, that it may be superfluous to repeat here what I have already said *locis citatis*.

Looked at in the *norma lateralis*, as given in fig. 1, Pl. xix. vol. v. of the "Journal of the Institute," the skull is seen to have the highest point of its vertical arc just at the coronal suture; the slope of the forehead is a little more pronounced than is usual in female skulls, but, on the other hand, the parieto-occipital region has the vertical dip which, as Ecker has well pointed out, is so characteristic of such crania. As in typical dolichocephalic skulls, the glabello-inial is shorter than the glabello-postremal line, and the lambdoid suture comes largely into view. As in many "priscan" skulls, the coronoid process of the lower jaw fails to pass above the level of the lower edge of the zygoma. The anterior margin of the squamous nearly (but not quite, as drawn in the figure referred to) reaches the frontal bone. The alveolar border of the upper jaw describes a curve strongly convex downwards, and broken into, in the horizontal plane, by the great prominence of the sockets for the canines.

The skull when placed without the lower jaw on a horizontal surface is supported by the first and second upper molars and by the conceptaculum cerebelli. When looked at in the *norma frontalis* this skull strikes the observer, firstly, as being eminently well filled or rounded out in the supra-temporal regions, but, secondly, as having the impression of culture which is given by this development, neutralised by the peculiar conformation of the upper and lower jaws. The large size of the sockets of the canines in both jaws gives a squareness to that region of the face, whilst in the lower jaw the triangular raised area of the mentum is feebly developed, as compared with the alveolar part of the jaw.

The lower jaw, when placed on a horizontal plane, touches it with its inferior border on the left side only by a segment corresponding with the two anterior true molars. A wide interval separates the symphysis from such a plane, and though the angle of the jaw on the right side does aid in supporting it when thus placed, that on the left does not. Both angles are rounded off. The foramen mentale on the left opens a little further back, viz. immediately beneath the second præmolar, than is usual in European jaws. Just above it is seen the opening of an alveolar abscess in relation with the præmolar, which appears to have been broken across midway between its crown and its neck during life, and to have had its pulp cavities consequently exposed. The apex of the coronoid projects only about one-tenth of an inch above the level of the condyle when



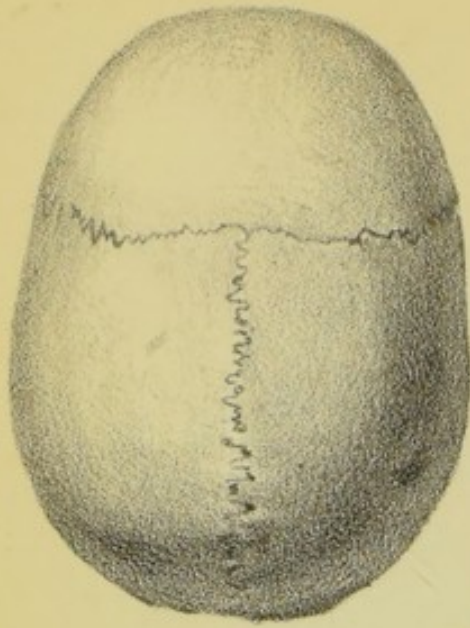


Fig. 2.

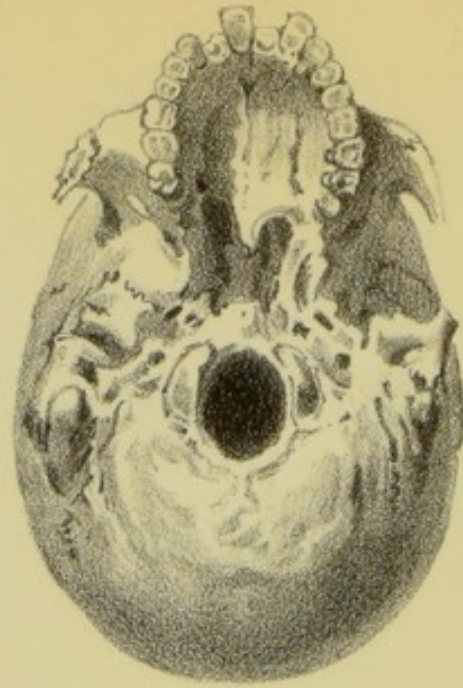


Fig. 3.

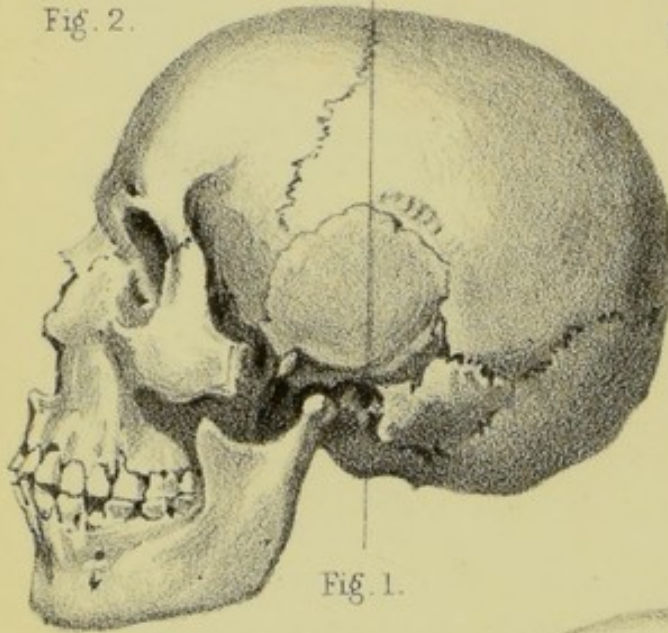


Fig. 1.

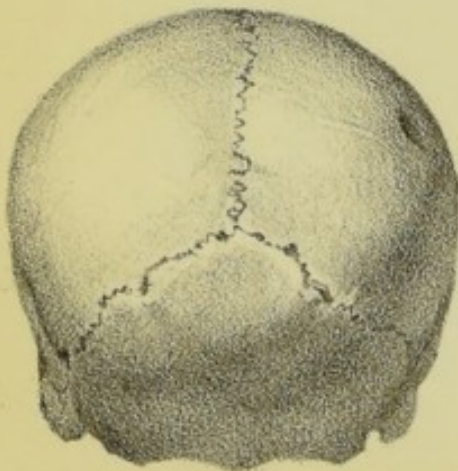


Fig. 4.

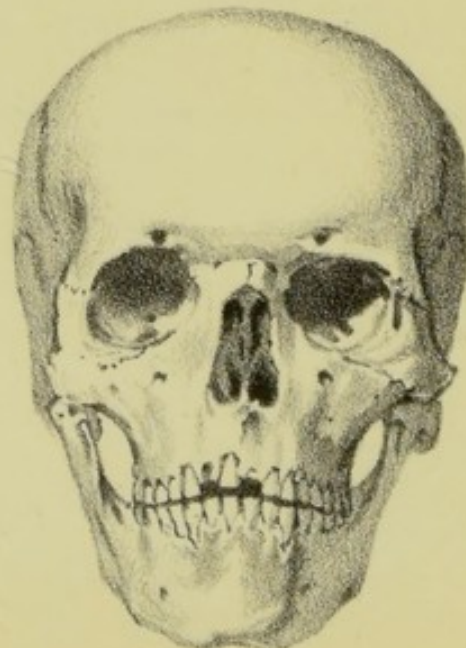


Fig. 5.

the jaw rests on a flat surface. Coupling these peculiarities with the shortness of the coronoid and the worn condition of the two anterior true molars, we may say that the lower jaw would, if taken alone, have furnished a strong ground for conjecturing that its owner had lived in early times. For though well-formed jaws are found in early cemeteries, it is certainly rare to find such a jaw as this in the burial places even of the bronze period. The thickness of the bone is referable to the irritation which the only recently completed evolution of the wisdom-teeth, as well as the injured premolar, would cause; when allowance is made for this, the sexual characters of this lower jaw are as distinct as those of any other part of the skeleton, and notably its inferiority in the points of width and of muscular markings.

The lower parts of both nasals are lost; the upper halves form a broad and low arch, above which a moderately developed glabella passes without any mesial depression into similarly developed supraciliary eminences on either side. The left supra-orbital notch had, even at the early age at which this woman died, been converted into a foramen. Viewed from behind, the lateral walls of the occipital pentagon are seen to converge somewhat from the point of maximum width, which lies a little below the level of the faintly marked parietal tuberosities. In this aspect the skull is seen to narrow rapidly, as if pinched in, immediately behind this level of maximum width (see "*Journal of Institute*," vol. v. p. 124). The upper part of the occipital bone, however, though its sides are conformable with the posterior and inferior portions of the parietals, is not produced so far backwards as is sometimes the case in skulls of this type, and specially in male skulls, and, on account of this truncation, it does not come largely into view in the *norma verticalis*. In this aspect the sides of the cranium are seen, as we follow them forwards from the point of maximum width, to undulate gently inwards over a space corresponding with a shallow post-coronal depression, and then to taper very gradually to the region of the frontal tubera; as we follow them backwards they converge with much greater rapidity, but still without giving a sharply pointed occipital end to the vertical oval. It is aphaenozygous. A circular depression, about half an inch in diameter, is seen on the right parietal bone, its floor is covered with vascular ramifications, but the injury to which its formation is due had been recovered from long before death. All the cranial sutures in the vault of the skull are free from ankylosis, except the frontal, which, as usual, is closed, though it may be stated here that it is occasionally patent even in undoubtedly priscan skulls. The occipito-sphenoid suture had

been entirely closed before death, but there are some traces of the intermaxillary still visible upon the palate. The palate is well formed, deep, and elliptical. The wisdom-teeth alone have escaped degradation through wear, and as the entire set of teeth is present in the lower jaw and is similarly worn, this fact shows that this woman lived upon a coarse or ill-prepared diet.

The measurements of the bones and other points upon which the preceding statements are based are as follows:—

Measurements of Cissbury Skeleton.

SKULL.

	Cub. inches.		Cub. inches.
Cubic capacity	105	Depth of lower jaw at symphysis	1·4
Circumference	21·3	Width of ascending ramus	1·45
Extreme length	7·7	Interzygomatic width, approxi- mately	4·6
Glabello-inial length	7·4	Cephalic index	·74
Extreme breadth	5·7	Antero-posterior index*	·53
Vertical height	5·85	Orbital index	·83
Absolute height	5·6	Nasal index	·45
Least frontal width	3·1	Distance from foramen occipit. to fronto-nasal suture	4
Greatest frontal width	5	Distance from foramen occipit. to nasal spine	3·75
Frontal arc	5·1	Distance from foramen occipit. to alveolar edge	4
Parietal arc	6	Basilar angle	23°
Occipital arc	5	Facial angles, taken with M. Broca's goniometer, to root of nasal spine	68°
Height of orbit	1·3	to alveolar edge	65°
Width of orbit	1·55		
Length of nose	2		
Width of nose	0·9		
Width of root of nose	0·85		
Length of face	3		
Interangular diameter of lower jaw	3·4		

LONG BONES.

Femur	15·8	Transverse diameter between most distant parts of ilia	9·1
Tibia	12·5	Length of scapula from glenoid fossa to vertebral border along spine	3·9
Humerus	11·3	Length along lower margin	4·6
Radius	8·6		
Right clavicle	4·8		
Left clavicle	5·4		
Transverse diameter from pelvis	3·8		

DESCRIPTION OF PLATE XIX.

Fig. 1.—Skull of female found in skeleton shaft at Cissbury ;
norma lateralis.

Fig. 2.—*Norma verticalis.*

Fig. 3.—*Norma basalis.*

Fig. 4.—*Norma occipitalis.*

Fig. 5.—*Norma frontalis.*

For description in detail, see p. 33 *et seq.*

