

III.

ON THE OSSEOUS REMAINS OF THE BORNESS BONE CAVE, KIRKCUDBRIGHTSHIRE. By WM. BRUCE-CLARKE, B.A., F.S.A. Scot., AND RANDALL J. JOHNSON, Esq., M.A.I.

Before proceeding to consider the osseous remains of the Borness bone cave in detail, it may be well briefly to recapitulate a few facts which were considered in a previous paper.

Up to the present time, three layers, each a foot in thickness, have been removed from the cave; the remains from each square yard of each layer have been placed in boxes, to each of which a number was appended for purposes of reference. The first, second, and third layers are spoken of as the A, B, and C layers respectively.

Before the bones could be removed from the boxes for purposes of comparison *inter se*, and with other specimens, they were all marked with the number of the box to which they belonged.

Previous to this, all the fragments which seemed to offer not the remotest chance of identification were removed, and these alone are nearly sufficient to fill a bushel basket. The remainder of the bones were then classified, all the ox placed together, and so on; the portions of skull were separated from the vertebræ, and similarly the different long bones were placed in separate boxes. When all the bones had been divided in this manner, those that had been broken in getting out were as far as possible repaired; and in one or two cases two halves of a bone which had been split by the former inhabitants were able to be united, though their edges, as may be easily imagined, were somewhat worn, and do not fit very

exactly. This is the case in two instances with the two portions of an ox's metatarsal bone; in one case both of the fragments were found in the B layer about 10 or 12 feet apart, and in the other case one was found in the B, and the other in the A layer. Such a circumstance as this might perhaps be supposed to show that superposition is no proof of age; but this is by no means the case. The one-half may have lain low down in the A layer, and the other high up in the B layer, not to speak of the minute inequalities of a few inches which may often have existed in the surface of the cave. If, on the contrary, one portion had occurred in C, and another in A, the case would have been different. It must, however, be remembered that though as a whole the A layer is the newest, B newer than C, and so on, yet it by no means follows that every individual object in each layer is older than every object in the layer immediately above it, and hence conclusions must be drawn from the objects collectively, and not from isolated individual examples.

After thus separating the remains, it was in most cases easy to arrive at a correct conclusion as to which was which; and from the large number of specimens of every age, a series can be formed exhibiting every gradation from an animal only just born to one in its adult condition. By this means it is possible to determine with comparative ease to which animals the young individuals belonged, a problem which seemed at first to be quite insurmountable. The names of the animals to which they belong have been written on all bones which have been determined for certain; but some, as for instance bits of skull and ribs, though probably belonging say to sheep, show in themselves no indication of that fact, though, when viewed by the light of the rest of the remains, but little doubt can exist of that fact. In such cases the doubtful bones are placed together, and labelled as a whole, the reasons for such a mode of procedure being duly noted. It is quite possible, as the investigations proceed, that more perfect specimens may be procured; and so bones, which are now placed among the doubtful specimens, may be transferred to the list of certainties. With some bones, however, such as ribs, which present few if any distinctive characteristics, this can never be the case.

It may be well to refer here to the method in which some of the bones decay, as the effects produced are sometimes perplexing. The surface of

the bone seems to flake off in thin laminae. This process sometimes occurs all over the surface of the bone, at other times only in certain parts of it. The former mode of decay is very rare, but obviously diminishes the size of the bone, and so renders its identification more difficult. When the decay is very partial, it produces channels in the bone, which at first sight appear as though they had been gnawed; but usually a little practice will enable any one to distinguish the cause of any given mark. Perhaps, however, when the surface of a bone has once been broken by teeth marks, it may be more liable to this latter mode of decay, and if so, many teeth marks must be obliterated by age.

With the bird bones the process of identification is far more difficult, and in the majority of instances it is very hard to be certain. The following example will illustrate this:—With a bird's femur it was for some time a question whether it belonged to a magpie or a shoveller duck, and it was finally decided to belong to the former, inasmuch as other undoubted remains of magpie occur, whilst no bones of duck have been found at all.

The bird's bones were separated out like those of the mammalia; but in most cases a clue was afforded by some characteristic bone, and this was followed up by comparing all the other bird bones with the skeleton of the bird to which the characteristic bone undoubtedly belonged. In this way most of the birds have been identified. In those cases where there was no doubt about them, they have been labelled; but in the great majority of instances, though a number of bones as a whole can be said with tolerable certainty to belong to a given bird, yet individually it would be most presumptuous to name them. In such a case one label is affixed to these bones, and the above facts concerning them subsequently noted.

The batrachian and fish remains are so few in number that there is but little to know about them.

Thus it will be seen that all the remains have been carefully examined; and though in most cases there is but one little doubt as to the animals to which they belonged, yet a complete account of each species, its relative abundance in each layer, and whether it was in a wild or domesticated condition, must be deferred till the cave has been thoroughly worked out, and all available evidence brought to bear upon these points.

At present, now that all the bones have been mended as far as possible, there are 2584 specimens and 1002 fragments, exclusive of the smaller fragments above mentioned.

The following is a complete list of the remains at the present time:—

MAMMALIA.		AVES—	
	No. of Specimens.		No. of Specimens.
Rodentia—		Pigeon (<i>Columba</i> sp. ?),	22
Rabbit (<i>Lepus cuniculus</i>),	15	Rook (<i>Corvus frugilegus</i>),	20
Water Rat (<i>Mus amphibius</i>),	62	Magpie (<i>Pica melanoleuca</i>),	9
Black Rat (<i>Mus rattus</i>),		Starling (<i>Sturnus vulgaris</i>),	93
Short-tailed Field Mouse	118	Razor Bill (<i>Alca torda</i>),	4
(<i>Arvicola agrestis</i>),		Swan (<i>Cygnus</i> sp. ?),	7
Ungulata—		Gull (<i>Larus</i> sp. ?),	6
Horse (<i>Equus</i> sp. ?),	2		
Ox (<i>Bos</i> sp. ?),	1112	DOUBTFUL.	
Sheep (<i>Ovis aries</i>),	630	Thrush (<i>Turdus musicus</i>),	28
Red Deer (<i>Cervus elaphus</i>),	26	Sparrow (<i>Passer</i> sp. ?)	8
Roe Deer (<i>Cervus capreolus</i>),	26	Raven (<i>Corvus corax</i>),	1
Pig (<i>Sus scrofa</i>),	266	Wood Owl (<i>Strix flammea</i>),	2
Carnivora—		Lark (<i>Alauda</i> sp. ?)	5
Badger (<i>Meles taxus</i>),	1	Bones varying from size of Wren	18
Otter (<i>Lutra vulgaris</i>),	3	to Sparrow,	
Fox (<i>Canis vulpes</i>),	8 or 9	Tern (<i>Sterna vulgaris</i>),	3
Cat (<i>Felis catus</i>),	3	Bones belonging to <i>Longirostres</i>	5
Marten (<i>Martes</i> sp. ?),	1	(Cuvier), e.g., snipe, &c.,	
Bones doubtful,	20	Fragments,	8
Fragments,	1002		
		BATRACHIA.	
		Frog or Toad,	25
		PISCES.	
Common Buzzard (<i>Buteo vulgaris</i>),	19	Wrasse, and other remains, especially	
Hen Harrier (<i>Circus pygargus</i>),	6	small bones in great abundance.	
Domestic Fowl (<i>Gallus domesticus</i>),	7		

In addition to the mammalia just referred to, the possible occurrence of goat and fallow deer may be mentioned, though much doubt must at present exist on this head. A pointed horn-core, and some bones which differ from those of sheep, indicate perhaps the presence of goat; and two scapulæ, which are somewhat broken, appear to belong to the Cervidæ, though they are too large for roe deer, and too small for red deer. It is

to be hoped that future exploration may throw some light on these points.

There is also half of the atlas vertebra of a carnivore, which may perhaps indicate the presence of dog.

The rabbit bones consist of a few fragments of the skull; and of some of the limb bones, they belong evidently to a young animal, as the epiphyses are not present. They were found in the A layer, and are most probably of very recent origin, as they were all found close together near to a rabbit burrow—the only one, apparently, which was in existence in the cave.

The rat and mouse bones, with but three exceptions, were all found in the A layer. That two species of rat occur is clearly shown by the character of the teeth, though many of the bones are so young that it is impossible to distinguish which bones belong to which, consequently they are all placed together.

The watervole occurs frequently in barrows,¹ which it makes use of for its hybernacula, probably it visited this cave for a similar purpose, and the black rat and short-tailed field-mouse can hardly be supposed to have been introduced by human agency.

By a reference to the list of remains, it will be seen that the bones of carnivora are in a great minority. The only remains of pine-marten which were found were a humerus, radius, and ulna in contact; they had evidently been covered up whilst the ligaments were intact, for they lay in their natural position; they are of large size, slightly larger than the skeletons usually to be seen in museums, but it is said that the pine-marten, in its wild condition, grows to a larger size. There are no marks of teeth on this specimen, but on the sacrum of a fox, to which a portion of the pelvis was attached, marks of gnawing are clearly seen; this latter specimen was also found in a natural position.

Amongst the ungulata another horse bone has been found to be present; the specimen in question is a metatarsal, and is much broken.

Roe-deer is represented by twenty-six specimens, comprising portions of the pelvis, scapula, vertebræ, and long bones. Its bones are very slightly larger than those of the recent specimen in the British Museum, with which it was compared, and they are more strongly marked with ridges.

¹ *Vide* "Grave Mounds and their Contents." Note on page 16. By L. Jewitt.

A more careful investigation has shown that red deer is but scantily represented, instead of being nearly as abundant as ox. Some of the bones of the two animals are very similar in shape, and, in this instance, in size as well; hence arose the mistake of supposing that red deer was more abundant than it has since proved to be. A metatarsal bone of this animal shows curious indication of human workmanship, the small foramen, which exists on its anterior surface at the upper extremity, having been artificially enlarged, for what purpose it is not clear.

All the specimens, both of red and roe deer, belong to fairly adult individuals.

Of ox and pig a number of bones occur of all ages. The bones of the latter are more fragmentary than those of the former, though in both the skull is much broken up and very meagre in amount, considering the number of animals which must have existed, as is shown by the abundance of certain bones. The calcanea and astragali of the ox show that at least thirty individuals are represented, and probably a still larger number.

The remains of sheep point to a small variety, smaller even than the ordinary mountain sheep of the present day, and on this account are most interesting. They differ but little from those of the ordinary sheep, excepting in their size. Besides this, their leg bones, particularly the metatarsals and metacarpals, are much thinner and more slender, and the ridges on them are more distinct, thus showing that their muscles were much used. The skull shows well-developed horn cores, though only one of the latter in an adult condition has occurred; there are three or four more, younger specimens of skulls, and one in which the horn core has hardly commenced to sprout at all, but no portions of the frontal bone, which carries the horns, have occurred without some sort of horn core; considering, however, the paucity of specimens hitherto obtained, it would be premature to speculate as to whether the female did or did not possess horns. The horn cores are flattened from side to side and slope slightly backwards and outwards.

From the portions of the skull which have been obtained a semi-adult skull has been put together, so as to indicate, as far as possible, the outline of the head, but it is exceedingly improbable, if, indeed, not utterly impossible, that these pieces all originally belonged to the same individual. Besides this, there is a very young skull which probably lay perfect *in*

situ, but as it was taken out by a workman alone it was much damaged, and the upper jaw is only represented by a few loose teeth which can hardly be connected with the rest of the skull, though the lower jaw is all but perfect.

Lower jaws separated into their two rami are of frequent occurrence, so that a perfect series may be formed of the dentition, from the period when the milk-teeth had hardly come into position to that of the adult; but adult specimens are of very rare occurrence, there being only one that is anything like perfect. The rest of the bones, too, show a considerable proportion of young animals, not so many as a quarter being adult.

At present the remains of some of the bones are so fragmentary that all statements as to their exact size, and a more accurate comparison with the present breeds of sheep, must be deferred till a future date.

The remains of this animal, like those of the ox, are pretty evenly distributed throughout the cave, whilst the bones of pig are almost confined to the B and C layers, only 21 out of a total of 266 occurring in the A layer.

There is but little to remark upon in the bird remains. The first list consists of those the occurrence of which there is no doubt about, whilst in the second list, to which the term doubtful is appended, are placed those which either from their paucity, their fragmentary character, or their lack of any special characteristics, cannot be for certain determined. In both lists the number of specimens is indicated.

Out of a total of 269 specimens of birds' bones, 201 were found in the A layer, and 68 in the B and C layers. These 68 specimens consist almost entirely of pigeons' and starlings' bones. The occurrence of the common fowl is most perplexing;¹ the eight specimens were all found in the A layer, in four separate portions of the cave; perhaps they owe their introduction into the cave to the ravages of a fox, the remains of which animal were previously referred to.

The bird remains, as a whole, are hardly such as would have been

¹ The domestic fowl apparently was known in England at the time of the Romans, *vide* "Cave Hunting," by W. Boyd Dawkins, F.R.S., p. 77. Its occurrence on the Continent has been carried still further back, *vide* "Nature," vol. xi. No. 265, Nov. 26, 1874, p. 71, paper by J. H. Jeitteles.

selected for food, though, at the same time, it must be remembered that inhabitants of caves would not always be in a position to obtain that which was the most agreeable. The presence of buzzard will no doubt account for some of the remains, though not for all; but further considerations on this point must be deferred.

A large number of the rook bones are probably of late introduction, as they were found lying on the surface of the cave and are covered with a green vegetable growth; it is curious that no such growth should be present on any of the other bird bones; it is, however, present on one or two of the mammalian remains.

A very slight examination of these osseous remains led to the conclusion that their presence in the Borness Cave could not be rationally accounted for, unless their introduction was effected by human agency. To this conclusion the bones, some of which were split longitudinally, others broken across transversely, and many of which were completely charred, undoubtedly pointed. A further investigation has proved that the great bulk of the remains are composed of ox, sheep, and pig; and secondly, that bones which had been subjected more or less to the action of fire are even more abundant than was previously supposed to be the case. Further than this, specimens of bones occur which show that the inhabitants of this cave must have been in possession of weapons of considerable cutting power, though no trace of the weapons themselves has yet been discovered. A portion of a deer's antler affords perhaps the best instance of the effects of a sharp cutting instrument. Another and larger portion of antler shows undoubted signs of having been sawn at the base, but in connection with this an interesting point is brought out. It may be seen that the antler was not sawn straight across from one side to the other, but that a considerable portion of its circumference was cut with the saw, and then some force was probably employed to completely sever it from the skull, as is shown by a minute projecting portion of the antler. That such an effect would be produced by sawing the antler first round the circumference and then breaking it off may be readily seen by repeating the experiment upon any piece of stick. The significance to be attached to this fact is, that the instrument employed was not one of great cutting powers, or otherwise the antler would have been cut straight through, and show an evenly cut surface. A piece of wood is often cut

in this way by a child with a small and blunt saw, whilst the carpenter, with a sharp and effective instrument, leaves an evenly cut surface. Marks of a sharp cutting edged tool are also very clear all over this specimen.

Another extremely interesting piece of bone remains yet to be noticed, it shows so many signs of having been cut that it was probably intended for an instrument of some kind, but was afterwards rejected; whether it was lost or was found to be unfit for the purpose for which it was intended, it is of course impossible to say.

In the above paper Mr Bruce-Clarke is responsible for writing the whole of it, the examination of the mammalian remains having been performed by him and Mr Randall Johnson jointly. The remains of sheep came more particularly into Mr Bruce-Clarke's, and those of pig and ox rather more into Mr Johnson's hands; the rest of the remains were examined by Mr Bruce-Clarke alone.