I.

NOTICE OF A CAVE RECENTLY DISCOVERED AT OBAN, CONTAINING HUMAN REMAINS, AND A REFUSE-HEAP OF SHELLS AND BONES OF ANIMALS, AND STONE AND BONE IMPLEMENTS.

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This cave is situated at the bend of the cliff, where a lateral valley comes down on the old beach terrace, near St Columba's Church, Oban. It was discovered in the end of December last, by quarrymen removing rock from the face of the cliff, for building purposes on a feu belonging to Mr A. MacArthur, solicitor, and agent for the Commercial Bank. I heard of the discovery from Mr J. Walter Higgin, who had formerly corresponded with me on the discovery in 1890 of a cave in the same cliff immediately behind the Oban Distillery. Meanwhile, the cave on Mr MacArthur's feu had been visited, first by the Rev. Alexander Stewart, LL.D., F.S.A. Scot., Nether Lochaber, and subsequently by Mr W. Anderson Smith of the Fishery Board, and Dr MacNaughton, F.S.A. Scot., Taynuilt, who agreed with Mr Higgin that the discovery was one likely to prove of scientific importance. This having been communicated to me by Mr Higgin, and to Dr Christison, the Secretary of the Society, by Dr MacNaughton, it was decided by the Council that the cave should be explored by the co-operation of the local parties, the Society supplying the funds, and the objects found being appropriated to the National Museum. The Society's action was cordially met by the local parties, viz., Mr J. W. Higgin, Mr John Munro, Dr E. Bailey, and Mr MacArthur, who cheerfully gave their services for this purpose. I went to Oban twice during the course of the excavations, being accompanied the second time by Mr Cunningham, the Treasurer of the Society, who made a plan of the cave, and determined its height above the Ordnance *datum* line. In addition to my own observations when present at the excavations, I have had the benefit of many letters from Mr Higgin, from December 31st to February 15th, during which time the cave was being excavated, and I have also availed myself of the information contained in Mr John Munro's working-diary, 19th to

24th January, and plan and sections of the cave made by his son with reference to its condition and the position of the excavations at that date.

The circumstances of the discovery of the cave were as follows :— The quarrymen, after they had penetrated about 8 to 10 feet into the rock from its exposed western face, broke in upon that side of the cave near its southern extremity, and proceeded to blast and remove the whole of the superincumbent rock from the top of the cliff down

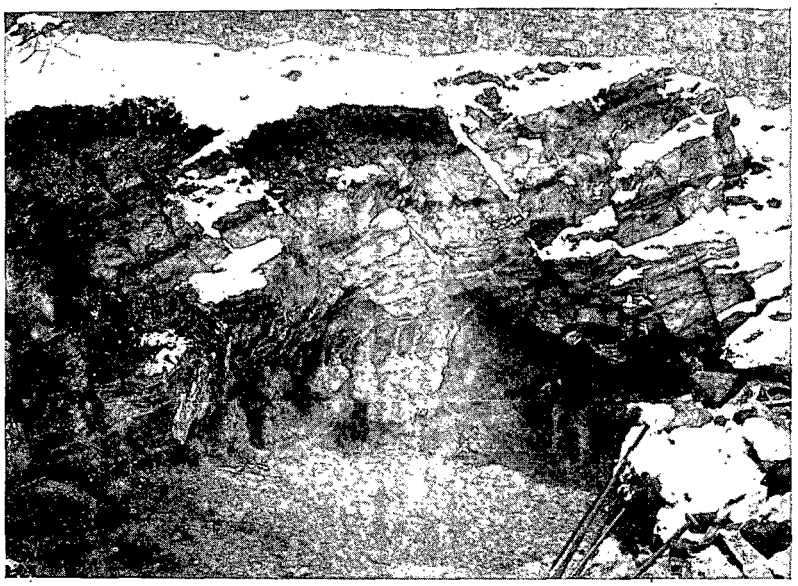


Fig. 1. View of the Cave, looking south—(from a photograph).

to the level of the cave, thus removing its roof, and laying open its east and west sides and its southern end. The east side then formed part of the quarry-back in the face of the cliff, while the west side had been removed down to the level of 3 or 4 feet below that of the black earth floor of the interior. Part of the curve of the roof was still visible on the eastern side, and also on the southern end (see the view

in fig. 1), but no measurement could be obtained of the former height of the roof anywhere above the black earth floor, on which the whole mass of rock forming the roof had subsided after blasting. Towards the north end there was a great talus of earth and stones sloping to the base of the cliff. Subsequent investigation showed that the mouth of the cave had originally opened in this direction. In the wall of rock on the east side, and towards the back of the cave, there were several recesses, one of which was filled with black earth, and appeared to slant upwards and backwards into the rock as far as it could be probed from below. It was ultimately found to form a shaft-like communication with the upper surface on the top of the cliff, where a slight hollow was visible, which had become a receptacle for the soakage from the surrounding surface after rains, the shaft below it forming a channel by which it percolated into the cave. That the shaft was once an open passage from the surface down into the cave was evident from its being now wholly filled with black vegetable mould derived from the surface soil; and it is equally evident that by this channel, before it was completely blocked from above, the greater part of the black earth, which formed the uppermost layer of the deposits in the interior of the cave, had found an entrance.

The area of the floor of the cave, as shown in the accompanying plan (fig. 2), was, roughly speaking, nearly 25 feet in length, and from 16 to 20 feet in breadth. Its mouth, which opened to the northward, was completely blocked by the talus of earth and stones before referred to; and when this was approached from the inner side, in the course of the excavation of the interior deposits, it became evident that there had been a great fall of the superincumbent rock into the aperture. There was some appearance of an artificial re-arrangement of the fallen blocks, by which a kind of barrier was formed, narrowing the width of the mouth of the cave to about 7 feet; but the artificial character of the barrier was not, to my mind, conclusively established. Beyond the barrier of fallen rock, and across the aperture of 7 feet in width, was the talus of earth and stones derived from the slow disintegration of the face of the cliff, by which the whole entrance was covered up and effectually concealed.

The method of exploration adopted was suggested by the circumstances of the case, and the cessation of the building and quarrying operations, consequent on the severity of the frost, fortunately afforded

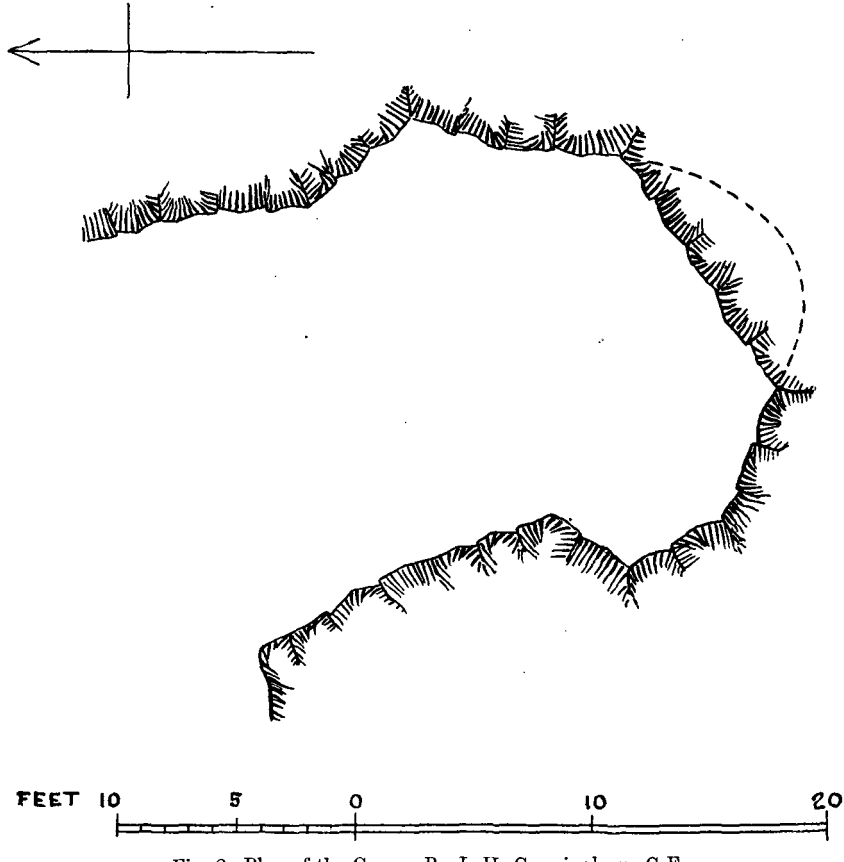


Fig. 2. Plan of the Cave. By J. H. Cunningham, C.E.

the time necessary to carry out the examination of the deposits. The access made by the quarrymen at the west side of the cave having removed all the rock at that side to a level somewhat lower

than the surface of the deposits in the interior, and the rock forming the roof having been also removed, while there still remained about 6 feet deep of a talus of earth and stones over the deposits towards the mouth of the cave, it was determined first to remove the whole upper layer of black earth from the interior of the cave, and then to sink a trench across the back part of the cave from west to east, so as to expose a section of the contents, while the upper part of the talus towards the mouth of the cave was being removed. It was found that underneath the layer of black earth there was a bed of shells, varying from 27 inches to about 3 feet in thickness, extending over the whole floor of the cave, and showing little or no intermixture of black earth or gravel, but here and there patches of ashes mixed with wood-charcoal, and charred splinters of bone. Under this shell-bed was a bed of fine clean gravel, composed entirely of small water-rolled stones. In this gravel, at a depth of about 18 inches (where the section was first made), there was intercalated a deposit of shells, which we at first spoke of as the lower shell-bed, but which proved to be of partial extent and unequal thickness, thinning out towards the sides and towards the mouth of the cave, and in several places presenting an irregular or patchy appearance in the section, as if the shells had been deposited in heaps or pockets in the gravel. Underneath this intercalated layer of shells the gravel extended for about 4 feet or more to the cave-bottom, where it was mixed with large and small fragments of loose rock. The whole thickness of the gravel-bed under the upper deposit of shells was thus about 6 feet, including the intercalated lower deposit of shells.

The east side of the cave was thickly encrusted with adhering stalactites; and, in detached spots throughout the floor, the shells and gravel had been cemented into cakes by the calcareous drippings from the roof. Premising that the layers of black earth, shells, and gravel thus revealed in the cross section were removed successively over the whole floor of the cave from north to south, and carefully examined spadeful by spadeful, I now proceed to give a summary of the results.

The black earth layer.—In this layer, besides the quantities of

bones of small vertebrates—presumably, bats, rodents, and birds—there were a few bones of animals, apparently (so far as they could be recognised) belonging to the larger ruminants. Towards the back of the cave, and under a projecting part of the roof which remained on the east side, a human skull was found on the surface of the black earth. A few feet further north, on the same side of the cave, another skull was found embedded in the black earth, almost on the top of the shell-bed underneath. Still further north, and only a few feet distant, were a good many other bones of a human skeleton. Two lower jaws were also separately found near these remains, on the same side of the cave.

The upper Shell-bed.—This, though called a shell-bed from its relation to the bed of black earth above it and the bed of gravel below it, is not a natural deposit, but an accumulated refuse-heap, the result of a lengthened occupation of this cave by man, and of the general use of shell-fish, whether as food or as bait, or for both purposes, by the occupants. It is not composed of shells exclusively, but is largely intermingled with bones of land and marine animals which have also been used as food, and with patches of burnt ashes or charcoal of wood. The bones are generally broken into splinters, and their charred fragments and the burnt condition of the shells in the neighbourhood of these patches show that the fires were kindled on the spot. The shells are for the most part of the edible varieties abundant on the neighbouring shores between the tide-marks, such as the limpet, razor, and scallop shells, *Tapes*, cockle and mussels, oysters and periwinkle, and occasionally the larger and smaller whelks. As a rule, the shells were large, as if selected for their size, and not gathered indiscriminately—large and small together. Occasionally, also, they lay in patches of the same kind together, as if the produce of a single gathering of periwinkles, or of limpets, or of cockles had been thrown in one heap. Many of the flat valves of the *Pecten maximus* were broken into scoop-like forms, but these might be accidental, as the natural breakage of this shell, when trodden upon, is along the lines between the ribs. Very many of these shells were quite 6 inches in diameter, and the largest oysters reached 6 by 4½

inches. Broken and splintered bones were interspersed throughout the whole of this mass of shells, scarcely any of the larger bones being entire, and the splinters varying from 2 inches or less to 5 or 6 inches in length. A good many appear as if they had been gnawed by dogs, although in other cases the great density and thickness of the bone make it impossible to account for their fracture in this way. Undoubtedly, the bones were intentionally broken and split up by the occupants of the cave, and as undoubtedly this was done for other purposes than access to the marrow, for we find the bones so treated that contain no marrow, and even the shed horns of deer broken up into splinters. One principal purpose for which this was done was the manufacture of bone implements, of which a very large number were found scattered through the beds of refuse and of gravel with which the floor of the cave was covered.

The Gravel-bed. — When the upper shell-bed or refuse-heap was cleared off, there was exposed beneath it a layer of clean washed gravel or small-sized pebbles, extending over the whole floor of the cave. It rose slightly higher at the east side of the cave than at the west, and highest towards the mouth of the cave, where it was thrown up against the rock at the east side in a considerable slope. In the centre of the floor it was fairly level, and its depth seemed to be not less than between 5 and 6 feet.

The lower Shell-bed.—Intercalated in the upper part of the gravel, and covered by gravel to the depth of from 6 to about 18 inches, was a deposit of shells of irregular thickness, not extending over the whole floor of the cave like the upper shell-bed, but thinning out and disappearing towards the sides, and on the east towards the mouth or entrance. Where it was first shown in the section towards the south end of the cave it was 9 to 12 inches in thickness, but near the centre of the cave it went down into a hollow in the gravel to a depth of 26 inches; a few feet further back it showed on the opposite sides of a trench 2 feet wide a thickness only of 5 and 9 inches respectively, while in other parts it varied from a mere scraping to 3 or 4 inches in depth, and in other parts thinned out and disappeared. Like the upper shell-bed, it was mixed with broken bones of animals, and both

the shells and bones were more decomposed and friable than those in the upper bed; but this may have been due, partly at least, to the fact that the gravel-bed was much wetter than the shell-bed above it. The same shells and bones of the same species of animals were found in both shell-beds, and the same varieties of bone implements.

The Implements. — All the implements recovered from the cave are of bone or deer-horn, with the exception of three hammer-stones, and a number of flakes and chips of flint, a few of which show signs of secondary working, though none are really implements in the sense of being fashioned and finished.

Implements of Stone.—The hammer-stones are oval, oblong, water-worn pebbles. The largest is of grey sandstone, 3 inches in length by $1\frac{3}{4}$ inch in width, and little more than 1 inch in thickness, with rounded ends, both of which are abraded by use. On one of its flatter sides there are two small pits, like those on so-called anvil-stones, and on the other side a single pit of the same description. One of its narrow sides also shows marks of abrasion by use as a hammer-stone. The second hammer-stone is a small, oval, oblong, rounded pebble of quartzite, $2\frac{1}{8}$ inches in length and $1\frac{1}{2}$ inch in diameter, with rounded ends, both of which are much abraded by use. There are also marks of use near the middle of one of its flatter sides. The third hammer-stone is a slightly smaller pebble of porphyritic stone, similarly marked on the ends and sides.

Other pebbles were found, with fainter and scarcely perceptible signs of use.

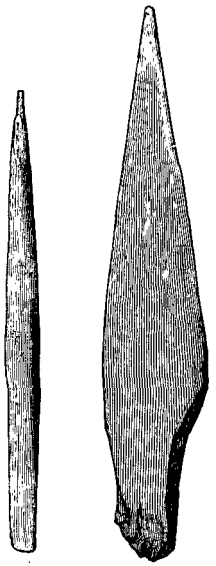
Twenty flints were found, of which three were mere natural nodules from $1\frac{1}{2}$ to 1 inch in diameter; and four $\frac{1}{2}$ inch in diameter, which were in their natural condition. Eight were chips or broken nodules, from over 1 inch to $\frac{3}{4}$ inch in diameter, with no secondary working. Two were split nodules, from each of which four or five small flakes had been struck; two were broken flakes, one of which had a slightly scraper-like finish at one end; and two were slightly curved flakes, 1 inch and $1\frac{1}{4}$ inch in length, the longest showing wear, as if by use as a side-scraper.

Implements of Bone.—The bone implements consist of pins, awls

or borers, rubbers or smoothers, formed from splinters of bone or deer-horn, with the broad end rounded off or polished by rubbing; and barbed harpoon-heads or fish-spears of deer-horn.

The pins are three in number, of which only one (fig. 3) is apparently entire, measuring $2\frac{1}{4}$ inches in length, nearly of the same thickness throughout, but tapering slightly towards both ends; the second is only $1\frac{3}{4}$ inch in length, the end broken off; and the third is but about an inch of the point of a very well-made pin, which has been completely charred in the fire.

The borers are also three in number. They differ from the pins in being very much stouter, and expanding towards the butt-end. The largest, which is still adherent to the mass of shells cemented together by the stalagmite in which it was found, is 3 inches in length, the butt-end flat and rounded, and the other end drawn to a fine, sharp point. The second (fig. 4) is also 3 inches in length, but stouter, and with a stronger point; and the third, a more slender splinter of the same length.

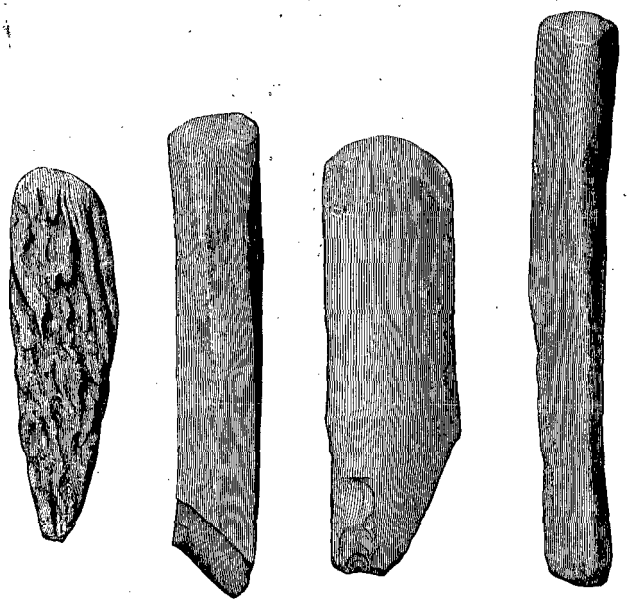


Figs. 3 and 4. Bone Pin and Borer. ($\frac{1}{1}$.)

Five rather slender bones, $2\frac{1}{2}$ to 3 inches in length, and two spines of some big fish, $1\frac{1}{4}$ inch in length, may or may not have been used as pins or borers, but they are not artificially fashioned for this purpose; and three bones, apparently of birds, which were pointed out to me by Mr James Simpson, are flattened on one side.

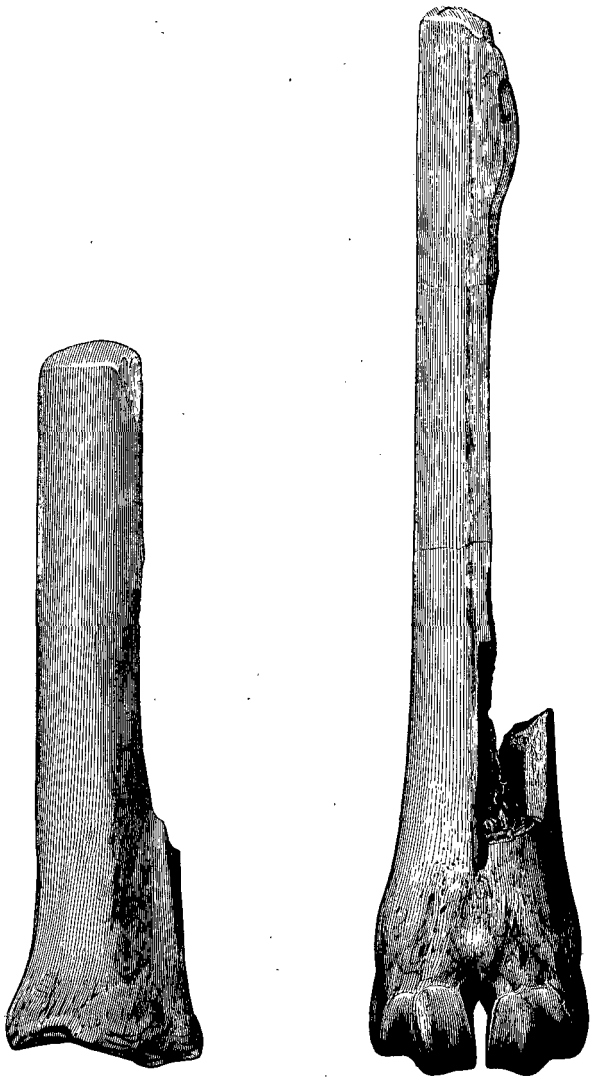
The round-nosed, chisel-ended implements are the principal features of this cave. Their number is very great, and their likeness to each other extraordinary. One of deer-horn and two of bone are shown in figs 5, 6, and 7. One hundred and forty of these implements were found, all single-ended except two, which had bevelled or rubbed surfaces at both ends. One of these is shown in fig. 8. They varied in size from 3 inches to $1\frac{1}{4}$ inch in length, and were

all formed in the same manner of a splinter of leg-bone or of deer-horn, the one end of which was left with the fractured edges untouched, and tapering to a rough, uneven point; while the other was shaped to a rounded or more or less bevelled edge, of the width of the splinter. All show much wear, as if from rubbing on the bevelled end, but none whatever on the unshaped end of the splinter. Some, made of a very dense bone, have a high polish



Figs. 5, 6, 7, 8. Implements of bone and deer-horn. ($\frac{1}{1}$.)

on the rubbed end; and the chisel-like edge is worn quite round, like the edge of an ivory paper-cutter. The widest is fully $\frac{3}{4}$ inch at the broad end, the edges of which are rounded and polished for $\frac{1}{2}$ inch back from the working face of the tool. The rounded end, of course, is the working end; the other end, with the tapering form, and bearing the rough edges and irregular



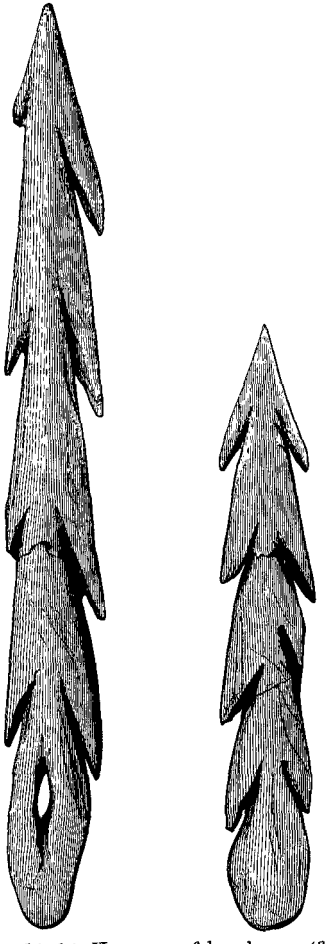
Figs. 9, 10. Bone Implements made from leg-bones of deer. ($\frac{3}{4}$.)

point of the original fracture, presents no sign of use, and it is impossible to imagine any kind of use for it of sufficient importance to warrant the trouble of rounding off the other end as a butt. That the apparent butt-end is really the end for use, and that its form is the result of use, and not merely of fashioning, is plain from a study of the objects, and from comparison with the two largest implements found (figs. 9 and 10), which have worn and bevelled ends similar to the smaller ones. Both are made from the leg-bones of deer, which have been broken across at a distance of 5 and 7 inches from the joint, and split longitudinally, the end of the split bone furthest from the joint being then turned into an implement of this kind. The bevel on its rubbed and polished end, with the wear and polish at the corners and sides, is exactly that of these shorter implements formed from a triangular or tapering splinter. But if you were to haft one of these by inserting the tapering unworked end into a handle of soft wood 3 inches in length, you would have the exact counterpart of the two larger implements on which the joint end of the shin-bone is left as a handle.

The use of these implements is not suggested by anything beyond their form and characteristics, but it is plain that they have been subjected to much use, and use of a kind that has smoothed and sometimes striated their ends, rounded off their corners and edges, and imparted to the densest bone of which they can be made a high degree of polish. I know no tool that comes nearer to them in modern use than the bone tool, not very dissimilar in shape and construction, with which the country shoemaker used to finish the welts of his shoes. We have, however, in the Museum a series of tools almost similar, and similarly made from the shin-bones of oxen or deer, which through long use have acquired a similar high polish at the ends; and a similar, and in some cases even a greater, smoothness and saponaceous feel, suggestive of the absorption into the bone of much animal fat in the process of dressing and working in skins. These bone tools have been found in greatest numbers in primitive prehistoric dwellings, or in refuse-heaps of shells and split bones, chiefly in the Orkney Islands. Similar tools have been found in the

Swiss Lake-Dwellings, and are still made and used for dressing skins by the Esquimaux and other skin-clad tribes of the Arctic regions.

The harpoons or fish-spears are seven in number. They are all made of deer-horn. Of the seven, only two are entire, the others being merely fragments of the point-end, showing from two to four barbs. The largest (fig. 11) is really a harpoon, with a perforation in the butt-end for the line, which is used either to attach it to a float or to be retained in the hand after the fish has been struck, and the head of the harpoon disengaged from the shaft. It is 6 inches in length, and flattish on the under side, which shows the cancellated structure of the horn, but the other side, which is of the dense external part of the horn, presents a kind of ridge, or midrib, running from the point to within about an inch of the butt, which is flattened and rounded off. There are four barbs on each side, the first within half an inch of the point, and the others alternating, so that the points on one side come nearly in line with the middle of the space between the points on the other. The barbs do not stand free from the shaft of the implement entirely, but are cut in at a sharp angle with the line of the edge, and only about a quarter of an inch of the extremity of the



Figs. 11, 12. Harpoons of deer-horn. ($\frac{3}{4}$.)

barb is free. The cuts appear to have been made by the sawing backwards and forwards of a sharp, rough-edged tool, which thickened rapidly towards the back. They are apparently such as would be made by working with a splinter of flint or other sharp stone.

The second harpoon (fig. 12) differs from the first only in being smaller in size and having no perforation in the butt. It is $4\frac{1}{4}$ inches in length, and has four barbs on each side, similarly made, and placed almost opposite to each other.

Fig. 13. Small Harpoon of deer-horn. ($\frac{3}{4}$.)

The third harpoon is merely the point-end, $2\frac{1}{4}$ inches in length, with two barbs on each side, not placed opposite to each other, but alternately.

The fourth and fifth have merely about $1\frac{1}{2}$ inch of the point-end, showing the bases of two barbs. The sixth and seventh (fig. 13) are 2 inches in length, with two barbs each, and have the butt-end rounded off, as if made from a broken portion of a longer implement, the marks of the incisions of another pair of barbs being still visible at the base.

These harpoons are extremely interesting, as being the first specimens obtained from a Scottish cave.

Similar harpoons have, however, been found in a large mound known as *Caisteal nan Gillean* in the island of Oronsay, as recorded by Mr Symington Grieve, F.S.A. Scot., in his monograph on "The Great Auk, or Garefowl." This mound was explored in 1879–82 by Mr Grieve and Mr Galloway. It was nearly circular in form, 150 feet in diameter, and about 30 feet high, composed in its upper and lower parts of blown sand, but having a refuse-heap of shells and bones nearly 8 feet thick intercalated near the top of the mound. The contents of this refuse-heap were the usual edible shell-fish of the sea-shore (the limpet being the most abundant), remains of the wrasse, grey mullet, dog-fish, and skate, and remains of crustacea. Of marine animals there were the rorqual, the grey seal, and the common seal. Of land animals, chiefly the red-deer and swine. The ox was not represented, and the sheep by only a single bone, which may have come from the surface. The implements

were eleven bone harpoons or barbed fish-spears; bone pins or borers; "also a number of bones rubbed at one end, some on both sides, so as to form an edge, and others only on one side," made chiefly of the bones of the red-deer. These last appear to be of the same character as the rubbing or skin-dressing implements from the Oban cave. A few hammer-stones and a few chips of flint were also found, but no finished implements of flint or other stone. Here and there throughout the mass were the remains of fires, consisting of embedded patches of ashes, charcoal, and wood.

Unfortunately, no detailed description of these implements from *Caisteal nan Gillean* has been published, so far as I can ascertain, but I am informed that the harpoons resemble those found in the Oban cave, both in their general character and in being made of deer-horn.

The only other example which resembles them in its general character is that found in the neolithic stratum of the Victoria Cave at Settle, in Yorkshire, which is described and figured by Professor Boyd Dawkins.[1] It lay upon the grey clay at the base of the accumulated deposits near the entrance of the cave, and from the same stratum were taken a bone bead with linear ornamentation, three rude flint-flakes, and broken bones of the brown bear, stag, horse, and Celtic shorthorn. This harpoon-head is 3 inches in length, and has two barbs opposite to each other on either side, and two opposite to each other but pointed the reverse way, near the butt, which has the same broad, flattened, elliptical shape as those from the Oban cave. The barbs are cut into the shaft in the same manner as those of the Oban harpoons, though they stand out somewhat more freely from the edge.

A doubly-barbed harpoon-head of bone was also found in Kents Cavern, near Torquay, in Devonshire, along with other two which were barbed on one side only. They were found in the cave-earth under the stalagmitic floor, and associated with implements of palæolithic types. The Kents Cavern harpoon, however, differs from the Scottish examples, and from that found in the Victoria Cave, in having its barbs cut free on both sides of the shaft, and standing at a much less acute angle. In character it therefore resembles the French and other Continental examples of palæolithic times.

[1] *Cave Hunting*, p. 112.

Harpoons barbed on both sides, made principally of reindeer-horn, have been abundantly found in the caves of Dordogne and other parts of France. They also occurred in the cave at Kesslerloch,[1] near Schaffhausen, and at Mont Saleve, near Geneva. As before observed, these palæolithic harpoons are characterised by their free-standing barbs, and the great majority of them are unperforated. Some, however, do possess perforations in the butt-end; and while they are styled by some writers harpoons,[2] and by others spear-heads, M. Lartet has remarked that "without definitely limiting the use of these weapons to the ancient fishermen, it may be stated that remains of fish are found in the stations with the barbed implements, and none occur with the lanceolate spear-heads." A harpoon of reindeer-horn, from the palæolithic station of Laugerie Basse,[3] in the Dordogne, now preserved in the museum at Toulouse, is, however, very similar to the Oban ones in the way in which the slanting barbs are cut, and has also a rounded and flattened butt, with a perforation made in the same manner. But it is described as of a type extremely rare in Perigord. Another, $8\frac{3}{4}$ inches in length, also with a flattened and perforated butt, and the barbs standing free, but slanted backwards at an acute angle and slightly curved, was found in the neolithic lake-dwelling station at Latringen, in the Lake of Bienne, in Switzerland. Others have been found in other lake-dwellings.[4]

The fishes speared, both by the palæolithic fishermen of the French caves and the neolithic fishermen of the Swiss lake-dwellings, were exclusively of fresh-water species—chiefly salmon, trout, carp, bream, and tench. But sea fishes were apparently taken in this manner by the fishermen of the Danish kjökkenmöddings,[5] in which bone fish-spears have been found with remains of flat fish, mackerel, &c. The fish-remains found in the refuse-heap at Caisteal-nan-Gillean, with harpoons

[1] *Excavations at the Kesslerloch, near Thayngen, Switzerland*, by Conrad Merk. Lee's translation, 1876, p. 38, and plates vi., vii., viii., and xiv.

[2] *Reliquiæ Aquitanicæ*, p. 100.

[3] *Materiaux pour l'Histoire de l'Homme*, vol. xiv. p. 96.

[4] *Materiaux*, vol. xv. p. 10, pl. ii. See also vol. xviii. p. 360 and p. 527, and vol. xxi. p. 60 and p. 93.

[5] Madsen's *Danske Oldsager, Steenalderen*, pl. xl.; Montelius, *Antiquités Suedoises*, vol. i. p. 14.

of bone similar to those of the Oban cave, were the wrasse, the grey mullet, the dog-fish, and the skate.

There is one very curious statement on record of the existence of the practice of spearing sea fish on the West Coast of Scotland which brings it down to the beginning of the last century. Martin, who has recorded more obsolete customs than all the other travellers in Scotland put together, has the following passage in his account of the Western Isles, under the head of Skye :—

"The Grey Lord, *alias* Blackmouth, a fish of the size and shape of the salmon, takes the limpet for bait. There is another way of angling for this fish, by fastening a short white down of a goose behind the hook, and the boat being continually rowed, the fish run greedily after the down and are easily caught. The Grey Lord swims on the surface of the water, and then is caught with a spear, a rope (line) being tied to the further end of it and secured in the fisherman's hand."

Unfortunately, Martin has omitted to describe the precise kind of spear by which the natives of Skye were accustomed to catch the grey lord (which I take to be the saithe or coal-fish) when swimming on the surface; but there is little doubt that this spearing of sea fish in 1700 on the West Coast was a direct survival of the ancient custom, and not a new invention.

The Fauna of the Cave.—The human and other osseous remains from the cave have been submitted to Professor Sir William Turner and his assistant, Mr James Simpson, from whom a detailed report will be subsequently obtained; but Mr Simpson has kindly supplied me with a provisional list of the fauna, which is sufficient for the present purpose. The animals whose presence has been determined are the red-deer and roe-deer (the former of great size), the ox (*bos longifrons*) or Celtic shorthorn, the pig (also of large size), the dog, the badger, the otter, and the cat. The *bos primigenius*, the large long-horned ox, is not present; and neither the horse nor the sheep has been determined. Fish-bones are numerous, but usually in bad preservation. They indicate, in many cases, fish of very considerable size, such as might have been captured even by the largest of these harpoons; but the species have not been determined, although I thought I recognised the lower jaws of

a wrasse and a saithe among the number of better-preserved ones. The large edible crab or partan was represented, curiously enough, by no portion of the shell except the great claws, which were, however, very plentiful. Bones of birds were few, and these apparently sea-fowl, but the species undetermined.

It is thus evident that the fauna of the cave is the ordinary recent fauna of the district. There are no extinct animals; and the only feature of the refuse-heap which calls for notice is the great preponderance of shell-fish as compared with other food supplies, whether derived from the land or the sea.

The age of the Refuse-heap.—The inquiry into the age of the refuse-heap does not include an inquiry into the age of the cave itself, which is a purely geological question. The cave was obviously there, and accessible, when the human beings first took possession of it. But it is a question pertinent to the occupation of the cave, whether the sea had wholly and finally left it when they first took possession; and this question may be answered in the affirmative or in the negative according to the interpretation that may be given to certain facts connected with the manner in which the refuse of the people's food is found to be deposited in relation to the gravel-bed which overlies the rocky floor of the cave. This gravel-bed itself is ages younger than the cave, because, at the time when the wash of water within the cave was sufficiently deep and strong to do the work of excavating the rock, little or no gravel would remain within it. The gravel-bed therefore does not belong to the time when the land sat so low in the water as to permit the free influx and reflux of the waves in volume over the cave-floor, but rather to a time when the sea was retiring, and a beach was being formed in front of the cave. Then the work of filling up the floor with gravel would be performed by the heavier storms driving into it the lighter gravel from the beach. That beach, however, was not the present beach, which is fully 100 yards off, but a beach on a much higher level, or fully 30 feet above the level of the present beach. That the gravel-bed in the cave is really the inwash of the sea when it stood at that level I think there can be no doubt; but that any of it was thus washed in subsequently to the first occupation of the cave

by man requires to be substantiated by evidence of the clearest and most irresistible kind, because it involves the question of the alteration of the relative levels of sea and land by fully 30 feet since the neolithic period in the West of Scotland. For, as I have said before, there can be no question of the character of the fauna of the cave, which cannot be considered as having any relation to palæolithic times. Even if we had any proof of the existence of palæolithic man in North Britain, he could hardly be associated with a fauna of a character so totally distinct from that with which he is always found to be associated in South Britain, unless on the hypothesis of some special reason for the difference of the fauna. But the evidence of the mere superposition of the upper layer of the gravel over the lower shell-bed is not decisive enough to carry the inevitable consequences. The lowest point reached by driving an iron bar to the bottom of the gravel was 34 feet above the Ordnance *datum* line. The cave is nearly as broad as it is long, and consequently, when the gravel was being washed in, there would be a tendency in the reflux to wash out the centre, and leave it heaped up towards the sides. Probably, also, when the washing-in power was nearly exhausted, a bank would be thrown up towards the mouth of the cave. Finally, it would be left with its gravel bottom quite uneven, and higher towards the sides than at the centre, and probably higher at the mouth than further in. When, therefore, the cave was taken possession of by the people who brought to it daily such provision of shell and sea fish and such land animals as they obtained for food, and cooked and consumed their common meals within it, the refuse of their food and occupancy would fall into and fill up the lowest levels of the hollows in the gravel floor, and the higher portions being so loose and mobile would be trodden down over it, so that it would be intercalated in the gravel in patches and pockets, as it was found, while the gravel so levelled down would also be mixed with refuse and implements.

On the other hand, I must allow that it did appear to some of us, while the excavations were in progress, that the upper portion of the gravel-bed at least must have been washed in over the deposit of food-refuse which was intercalated within it, and consequently that the

occupants were for the time driven out, but afterwards resumed possession, and retained it without further disturbance from the sea. In that case the upper deposit of shells and food-refuse above the gravel and beneath the black earth would be the only part of the contents of the cave accumulated since the sea retired from the higher level, while the deposits of refuse intercalated in the gravel would indicate the occupation of the cave during the time when the sea stood at the higher level, and occasionally washed into it. But it seemed to me that the force and volume of the waves that would carry this gravel into the very back of the cave would necessarily lift and disperse or carry out with the reflux at least the lighter parts of the deposit of refuse—empty shells, charcoal, and ashes. Nevertheless, the patches of shells intercalated in the gravel still retained among them the smaller and lighter shells as well as the heavier, and occasional deposits of ashes and charcoal. But there is no absolutely decisive evidence for either of these suppositions; and even though my objection be found to have little value, there is no escape from the conclusion that, if the upper gravel was washed into the cave after its occupation by man, it must have been during or subsequent to neolithic times, for archæologically the fauna and implements of the cave must be classed as neolithic at the earliest.

Other Caves at Oban.—This cave is the fourth that has been discovered at Oban in the range of cliff which rises over the old raised beach behind the town. They are situated as follows, proceeding from south to north :—(1) behind the Gasworks, a small cave with shells and bones; (2) behind the Distillery, a much larger cave, with a very considerable refuse-heap, explored by Mr J. W. Higgin in 1890, also contained a quantity of human remains, including one small skull and eight lower jaws, some flint chips and bone implements; (3) the present cave in Mr MacArthur's feu near St Columba's Church; and (4) at the corner where Nursery Road enters Strathaven Terrace was a considerable cave, containing human remains, flint implements and flakes, and the bones of existing animals,—which is described by Sir William Turner in the Report of the British Association for 1871. [A detailed account of the human and animal remains found in these caves is given by Sir William Turner at p. 410 of the present volume.]