

I.

SOME CAVES AND A ROCK SHELTER AT LOCH RYAN AND PORTPATRICK, GALLOWAY. BY J. W. GREGORY, LL.D., D.Sc., F.R.S., JAMES RITCHIE, D.Sc., F.R.S.E., W. Q. KENNEDY, B.Sc., GEOLOGICAL SURVEY, AND DUNCAN LEITCH, B.Sc., GEOLOGICAL DEPARTMENT, GLASGOW UNIVERSITY.

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I. INTRODUCTION. BY J. W. GREGORY.

The discovery of Palæolithic remains in high-level caves in Sutherland and the gradual recognition of Palæolithic implements in the south-west of Scotland has called attention to some unexplored caves on the western coast. Sir Herbert Maxwell suggested the examination of some caves on the shores of Loch Ryan and on the western coast of Galloway. The area offered several promising features, for Neolithic flint arrow-heads are abundant on the 25-foot beach of the Bay of Luce; the 25-30-foot beach at Campbeltown has been identified by Abbé Breuil as pre-Neolithic and upper Palæolithic; and on the Irish coast opposite Galloway the 25-foot beach at Larne, which has been generally dated as Neolithic, has yielded flint and other stone implements of an older type. An informal committee, composed of Rt. Hon. Sir Herbert Maxwell, F.R.S., the late Dr J. Horne, and Professor T. Bryce, F.R.S., Dr James Ritchie, and the writer, was formed, and a grant of £30 made by the Government Grant Committee.

After an examination by Sir Herbert Maxwell and Dr Ritchie of sites on the shores of Loch Ryan, and by the former and myself of the caves near Corsewall Point, two sites were selected to test the 25-foot beach beside Loch Ryan. One of them was a rock shelter and kitchen-midden, recognised by Dr Ritchie, on the western shore of the loch; the other is a well-known cave at Cairnryan on the eastern shore of the same loch.

The excavations were begun in August 1927 at these two sites under the supervision of Mr W. Q. Kennedy. After he had to leave, the work at the Cairnryan Cave was continued by Mr W. Kennedy of Glengyre, Kirkcolm, Stranraer, an enthusiastic archæologist, who cut a longitudinal trench through the inner part of the cave. The excavations at both places yielded numerous bones, charcoal, cut bones, and other evidence of occupation.

It was thought desirable also to test the caves on the western coast of the Galloway Peninsula—the Rhynns. The most likely localities near Corsewall Point were visited first by Sir Herbert Maxwell, Messrs W. Q. and W. Kennedy, and myself, and subsequently some caves farther south by Mr W. Kennedy and myself. Examination of caves at the level of 25 feet was desirable from their possible bearing on the raised beaches at Larne and Campbeltown, and we hoped to find also a suitable cave at a higher level to see if it had been occupied when the 25-foot level was submerged. We failed to find any promising high-level cave, and it was decided to investigate the Ouchtriemakain Cave, 1 mile north of Portpatrick (6-inch map, Wigtownshire, xvii. S.W.), to which Sir Herbert Maxwell directed attention owing to the interesting traditions connected with it. The excavations there were undertaken by Mr Duncan Leitch, B.Sc., of the Geological Department of Glasgow University. Labour was engaged, tools lent, and much other assistance kindly given by James Purvis, Esq., the factor of the Dunskey estates.

Some other caves on the Portpatrick coast were attractive from the evidence on the 6-inch map (Wigtownshire, xxii. S.W.). Thus "caves" are marked on the cliff at Cairnsim, a steep slope north-west of Dunanrea Bay, south of Knockinaam, near the ancient camp of Dunaldboys, high above sea-level and near a site where the discovery of a celt is recorded on the map.

Mr Leitch and I accordingly visited the locality. The caves are marked about 1650 yards south-south-east of Knockinaam shooting lodge, and about 1250 yards from the ancient earthworks of Dunaldboys. We could find there no cave but a trench-like depression about 200 feet above sea-level. A local resident, whose knowledge of the caves along the coast seemed to us intimate and reliable, told us there was no cave there. He knew of the trench.

We saw nothing there likely to repay excavation apart from the graves and earthworks.

The following reports describe the sites and excavations in order of date of the work.

III THE ROCK SHELTER NEAR CORSEWALL HOUSE.

BY W. Q. KENNEDY.

General structure of the western shore. Loch Ryan lies in a general north and south direction and is somewhat asymmetrical with regard to the structure of the opposite shores. The western shore from Stranraer to half a mile above Kirkcolm village consists of Permian breccia resting unconformably on vertical Ordovician and Silurian strata. The Permian is cut by numerous small faults which run perpendicularly to the coast line, and which have been excavated into small caves. The shore has been cut back into a flat beach from Stranraer northwards, but at the Dove Caves, almost at the limit of the Corsewall House Plantation, the beach disappears and is replaced by precipitous cliffs. The flat ground represents the 25-foot beach, but on the cliffs the same horizon is marked by a shallow notch cut by wave action.

The rock shelter (fig. 1) is situated at the rear of the beach, 100 yards south of the Boat House, and has been excavated from the Permian breccia.

The enclosed part of the shelter has a length of 19 feet and the width varies from 9 feet 7 inches to 7 feet 6 inches. The height is 6 feet.

Within the shelter and against the rear wall there was a kitchen-midden which consisted mostly of oyster shells, but numerous bones also occurred. No trace of human occupation was found in the actual midden, but hammer-stones were quite common nearby.

The floor of the cave consisted of loam mixed with shells and containing bones of small animals and also fish. The bones had all been broken as if by human agency. The most striking feature, however, was the fact that numerous birds' beaks were found, and it seems they may have been used for some purpose. In the interior of the shelter was found a collection of lamellibranch shells, all of which had both valves preserved and unbroken.

The depth of floor was 3 feet at which level lay the top of the old

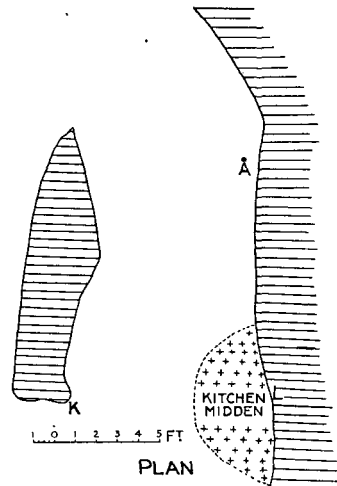


Fig. 1. Rock Shelter near Corsewall House, Loch Ryan.

25-foot beach, consisting of water-rolled pebbles and broken water-rolled shell fragments.

Flints.—The only flints found were in the topmost 12 inches of the floor, and they were three in number.

III. REPORT ON BONE REMAINS AND ON TWO BONE IMPLEMENTS.

BY JAMES RITCHIE.

ROCK SHELTER AT CORSEWALL HOUSE, LOCH RYAN.

The bone relics were few, mostly broken and poorly preserved. They represented young and old examples of domestic sheep and fully grown domestic oxen. The sheep remains showed no particular character which would help to indicate the breed to which they belonged, but the limb bones of the cattle were distinctly small and fine in structure, and suggest the Celtic ox or one of its descendants. There were also fish bones and a few bones of a bird, which was most likely a domestic fowl. Molluscs were represented by four marine shells typical of a sandy seashore: *Pecten maximus*, *Ensis ensis*, *Tapes aureus*, and *Turritella terebra*.

The traces of the presence of man are abundant throughout the collection, which is simply an accumulation of food refuse. They are shown in bones and shells which have been calcined by fire; in wood charcoal, of which a little was present; and in many bones split for the extraction of marrow and possibly for the manufacture of implements. Of relics which have been made use of by man and may therefore be regarded as implements, though their character is of the most simple and crude description, are the following: Portion of the left metacarpal of an ox, broken and trimmed, the end being rudely pointed, so that it might have served for digging in sand or loose earth; a sheep's limb bone, one surface of which has become polished by rubbing; two fragments of scallop shell seem to have been shaped into very short (1 inch) narrow lengths, and are smoothed by usage. One or two bones bear sharp incisions, certainly of human origin, and in my opinion made by a sharp instrument of *metal*.

The few flint fragments which were found are mere irregular chips, and bear no trace of secondary working whatsoever.

All that can be said about the time indications of this collection, therefore, is that the bone remains, a large proportion of which represents domestic animals, show that the occupation was not previous to Neolithic times. The splitting of the bones, however, and the use of

bone in the form of simple implements, would suggest an early occupation, and this also is suggested by the presence of the shell *Tapes aureus*. This species, characteristic of the Danish kitchen-middens, though now very scarce or absent from Danish seas as a living form, can be said to be now rare as a living species in Scottish waters. Although the presence of only one valve amongst a few fragments of other shells reduces the value of the evidence, it hints at marine conditions somewhat different from those of the present. Whether that occupation extended beyond the period indicated by the metal-made incision, which may well have been Bronze or Iron Age, it is impossible to say.

IV. REPORT ON THE EXCAVATION OF THE CAVE AT CAIRNRYAN, WIGTOWNSHIRE. BY W. Q. KENNEDY.

The shore north of Cairnryan consists of steep cliffs rising abruptly from the loch, and little or no beach is present. The rocks are Ordovician graywackes and shales which now have a steeply dipping (80°) to vertical attitude, and are cut by minor strike faults running at right angles to the shore and have produced zones of smashing in the graywackes. These brecciated zones have been excavated by wave action, so that caves of all dimensions occur along the coast. Few of the caves, however, are dry, as the vertical attitude of the rocks, combined with smashing, has allowed water to percolate through. The cave in question is situated about two miles from the village of Cairnryan and a short distance south of the croft occupied by Mr Brown. It lies in the face of the cliff at about 25 feet from the present sea-level and 50 feet below the level of the road.

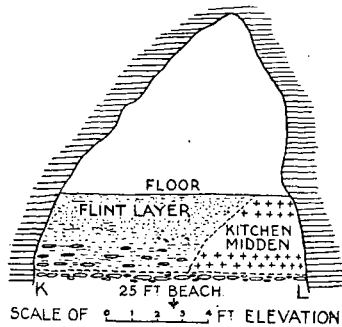
The cave has been excavated from one of the zones of smashing and runs back into the cliff for a distance of 50 yards; after that distance it is represented by a narrow cleft 18 inches to 2 feet in width, which continues farther back. It has a width at the mouth of 40 feet, and narrows gradually. The plan (fig. 2) shows a somewhat irregular shape with occasional large blocks which have fallen from the roof.

The cave consists of two main parts or rooms. First, an outer room, which extends for a distance of about 35 yards. This room narrows gradually and at the same time twists somewhat, so that it is not possible to see the mouth when looking from the rear of the cave. The width at the rear of the outer room is 9 feet.

Secondly comes the inner room, which is continued backwards as a

narrow cleft mentioned above. The part which may have been occupied extends for some 15 yards and then becomes very narrow. The floor of this inner cave rises rather steeply as the gravel tended to accumulate in the rearmost part during the 25-foot beach period. The great difference between the two rooms, apart from that of size, is the dryness. The outer room is very wet, water dripping continually from the roof, whereas the inner cave is relatively dry. The wetness of the outer cave is due to the fact that the portion of the cliff overlying it

is thinner than that overlying the inner room. However, in 25-foot beach times it is possible that the outer cave was dry also, as much of the cliff must have worn away since then. Owing to the wetness of the outer cave it was thought that the inner room would give better results, so that excavation was commenced in the inner room.



Rock Shelter.

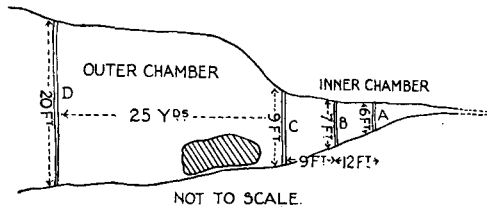


Fig. 2. Cave at Cairnryan: plan and elevation.

water-rolled pebbles were found, and finally, at a depth of $4\frac{1}{2}$ feet, the old 25-foot beach was encountered. It consisted of water-rolled pebbles mixed with water-rolled fragments of shell.

A second trench was commenced 3 yards farther back, which gave similar results, and the beach was here found to lie at a depth of 3 feet.

A third trench was then put down 4 yards farther back, and in this case the beach lay at a depth of $2\frac{1}{2}$ feet.

No organic remains were found in any of these trenches, but in the first one there was a layer of cave earth 18 inches below the surface.

EXCAVATION OF THE INNER CAVE.

First of all, a trench was put down across the mouth of the inner cave. It was some 3 feet in width. Excavation was difficult in all parts of the cave as rocks had fallen from the roof in large flat slabs so that much of the material had to be picked by hand. Occasionally

EXCAVATION OF THE OUTER CAVE.

The excavation of the outer cave was begun by putting down a trench (*d*) as near to the mouth as possible. This, however, was at a distance of 10 yards or so from the actual mouth.

Again excavation was somewhat difficult owing to the flat slabs of rock.

However, it was found that much charcoal was mixed up with the broken material from the roof, and quite a number of bones were found. Also many water-rolled pebbles occurred, and a peculiar feature of these was that none of them was complete. All had been broken across and they were generally coated with charcoal.

Twenty-nine inches from the surface a layer 3 inches thick of yellow cave earth mixed with complete shells was found, but this did not extend to either wall. Some distance below it (12 inches) a second impersistent layer of the same material occurred. Finally, the percentage of water-rolled pebbles increased and the raised beach was found at a depth of 6 feet 6 inches below the surface.

No trace of flint was seen in any of the trenches, but in the outer cave some "hammer-stones" were found.

SUPPLEMENTARY NOTE. BY J. W. GREGORY.

As no trace of human occupation had been found in the inner cave a longitudinal trench was dug under the supervision of Mr W. Kennedy and inspected by myself. From the innermost trench fallen roof blocks and earth between them formed a layer from 1 to 1½ foot thick. It rested on a thin layer of cave earth which lay upon the raised beach gravel.

On the western or outer side of the trench the deposits were 3½ feet thick, including 1 foot of the cave earth at the base; this layer was rich in charcoal and bones. I there collected the sternum of a bird, which Dr Ritchie regards as probably that of a gull, and a much-used hammer-stone.

The longitudinal trench 6 feet west of the third cross-trench exposed abundant charcoal and bones, burnt earth and burnt reddened stones at an old hearth or fire-place; and beside it were found two cut bones.

We re-examined and enlarged the outer trench 11 yards inside the cave, and found the cave earth from 10 inches to 18 inches thick; it contained charcoal and shells, but, like Mr W. Q. Kennedy, we found no bones.

The main occupation had been in the inner cave around the fireplace.

The cave earth with charcoal and bones lay immediately upon the 25-foot beach material; we found no fallen material between the cave earth and the beach gravel, so that the human occupation must have been shortly after the formation of the beach gravel.

V. REPORT ON ANIMAL REMAINS AND HUMAN HANDIWORK FROM CAIRNRYAN CAVE, AT LOCH RYAN. BY JAMES RITCHIE.

Animal remains are not very numerous in the cave but, such as they are, they indicate the refuse of food material, obviously imported to the cave by its human occupants. Three distinct groupings of bones were found.

1. A miscellaneous series found in the upper layers.
2. Second series, mostly of charred bones, found along with charcoal at a spot which has been described as a hearth or fireplace.
3. Third series, found in a deeper part of the cave earth, in the east or inner end of the cave.

There is no real distinction between the animals represented by the bones from these different positions, nor is there much difference in the state of preservation of the bones themselves, although those in the miscellaneous series found in the upper layers are most fresh in appearance, whereas in the other series bones of a porous character occasionally are found.

LIST OF ANIMAL REMAINS.

1. *Miscellaneous Series*.—These consist entirely of the bones of domestic sheep, representing at least three or four individuals. All, with one exception, are the bones of very young lambs, and even the oldest sheep represented is a young individual, the epiphyses of the long bones of which had not yet become attached. The sheep bones represented are small portions of skull, jaws with milk dentition, eight vertebræ, two portions of pelvic girdles, portions of two scapulæ, and a mixed lot of sixteen limb bones. The only other animal represented in this series is the domestic ox, indicated by a single cannon bone of a very young calf.

2. *Fireplace Series*.—Here oxen bones were most frequent, being represented by portions of a rib, a metatarsal bone, and a shoulder-blade. Sheep were represented by small fragments of skull, teeth, and vertebræ, and a domestic pig by a small fragment of the upper jaw of a young animal with milk dentition.

3. *Deeper Series*.—In the deeper layer, the predominant bones are those of domestic sheep, the majority of the animals being again very young individuals. No other domestic animal was represented, but the layer contained the only evidence forthcoming of the occasional presence of wild creatures. These include the femur of a hare, the breast-bone, probably of a species of a gull, and the vertebral joint of a codfish. There were also here hazel-nuts, which had been gnawed by a vole or other small rodent.

BONE IMPLEMENTS.

Apart from the actual presence of the bones and the charring of some of them, they bear very little indication of association with human beings. Remarkably few of the long bones have been split for the extraction of the marrow in the method so characteristic of early sites, but this may be due to the fact that the majority of the animals used were of extreme youth so that the bone contents would have been less important as a source of food. It is somewhat surprising, however, to find that the terminations of the ends of the bones are in almost every case complete, for one would have expected that even if the human inhabitants had not chewed the ends of the bones, at least they would have been gnawed by the teeth of the dogs. That they were not, almost suggests that there were no dogs in connection with this particular settlement.

Only two fragments of bone can be said definitely to have been used as a primitive type of implement. They are fragments from the wall of a limb bone of an ox. One, considerably longer than the other, is less worn and has been partially burnt, but both are of the same general character. They are flattened, somewhat spear-headed in shape, with a straight and a strongly curved edge which meet in a rude point. The smaller of the two, which is $2\frac{1}{4}$ inches long by $\frac{3}{4}$ inch broad, has considerably worn edges and a tip rounded by wear; the other, which is 3 inches long by almost 1 inch in greatest diameter, is smooth and worn at the broad end, but less markedly so towards the end which, instead of being pointed, has a ridged or chisel-like tip corresponding to the thickness of the bone.

From these notes it is apparent that the bone remains give no clear indication of the period when the cave was inhabited. The implements are of the most indefinite kind, with no particular cultural significance, and the presence of domestic animals, such as the ox, sheep, and pig, indicates no more than that the habitation occurred in Neolithic or later times. The material is insufficient to determine the race to which the pigs belonged, but the few bones of well-developed

sheep show that the race was a fine-boned breed. Measurements of the only adult bones, which lacked epiphyses, compared with the dimensions of similar portions of the corresponding bones in modern sheep, are as follows, in millimetres:—

	Loch Ryan.	Shetland sheep.	Modern sheep.
Femur, length	134	145	145
„ diameter	12·5	16	17
Radius, length	125	122	122·5
„ diameter	15	14·5	16·5

The comparison suggests that the sheep of the Loch Ryan cave belonged to the fine-limbed prehistoric breed of sheep known as the “turbary” or “peat” sheep, or to one of its close descendants.

VI. REPORT ON THE EXCAVATION OF OUCHTRIEMAKAIN CAVE, PORTPATRICK. BY D. LEITCH.

Ouchtriemakain Cave occurs on the eastern side of a small bay, Port Mora (locally called Sandeel Bay), about 1 mile north of Portpatrick. Two caves occur side by side along a faulted zone in the steeply dipping graywackes (figs. 3 and 4). Of the two, Ouchtriemakain was chosen because of its size, shape, and position. It was dry, roomy, and flat, while the other had a large waterfall tumbling over the entrance. If conditions had been the same during Neolithic times, the Ouchtriemakain would have been not only dry and comfortable but would have had a good water supply from the other cave.

Ouchtriemakain Cave lies at 21 feet above present sea-level; its direction is 16° N. of W. (magnetic). The rocks strike in the same direction, and dip deeply to the north. The cave consists of a long, narrow passage leading into a broad, circular “room” (fig. 5). The passage first rises steeply and then slopes into the flat cave. In this way the actual cave is not seen from the outside.

Fig. 6 shows the measurements.

Excavation was started by trenching across the circular cave. The long passage-way, which is unroofed and floored by falling rocks, was not trenched.

We first passed through a few inches of black, pebbly surface material, and then uncovered a 10-inch band of cave earth (fig. 7). This cave

earth was composed of about seven layers of yellow clay and black, charcoally clay, rich in small fragments of burnt wood. In the black clay there were also fragments of coal which prove the recent disposition of the clay. We found neither charred pebbles nor any deliberate arrangement of charcoal. The lowest layer of the banded clay was rich

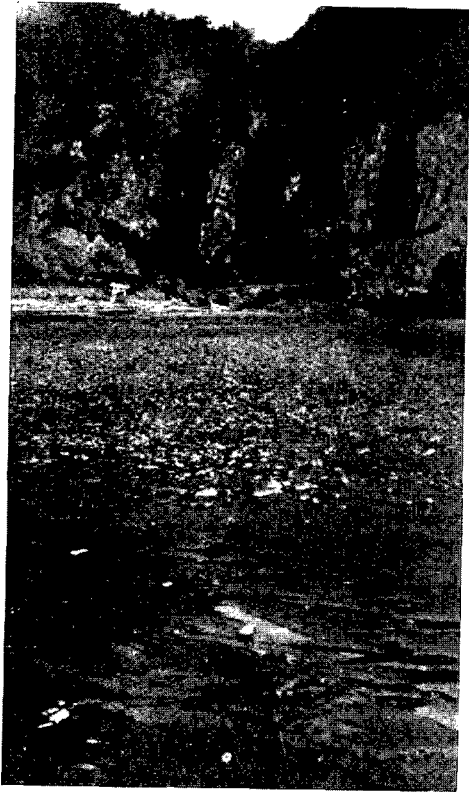


Fig. 3. Ouchtriemakain Cave: view from shore.



Fig. 4. Ouchtriemakain Cave: view from shore.

in *Patella*, probably the remains of recent occupation. It was found later that this *Patella* zone was richest at the mouth of the cave, the shells almost disappearing at the back. Below the banded cave earth were several large boulders, which are probably fallen rocks, although they show a certain amount of rounding. Immediately below the fallen rocks the type of deposit changed, becoming much coarser. This deposit consisted of a mixture of sand and clay with many angular fragments. A few thin bands of charcoally clay also occurred.

At a depth of 2 feet 6 inches the angular fragments were replaced by rounded pebbles and the actual raised beach was reached. The deposit was not a typical beach deposit, the matrix being too clayey and the fragments too angular (fig. 8). Immediately below this we reached solid rock.

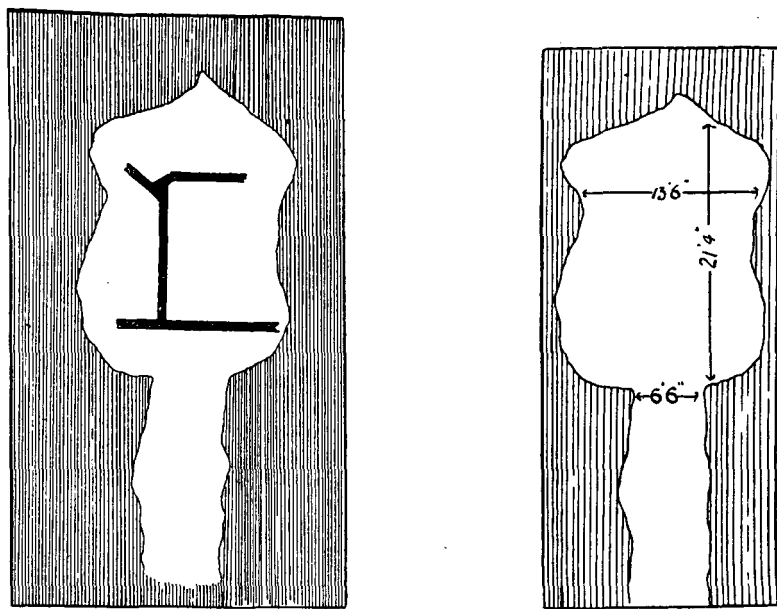
We now trenched longitudinally. Here we were greatly hampered by



Fig. 5. Ouchtriemakain Cave: view of main "room" from passage.

fallen rocks. Instead of trenching in the usual way we first cut the top clays horizontally in order not to disturb any structures which might exist. No structures were found. In the trench the same banded clays were observed running horizontally into the cave. Towards the back of the cave the banded clay dipped suddenly and then died out. From there to the back of the cave, beach material occurred immediately below the surface deposit.

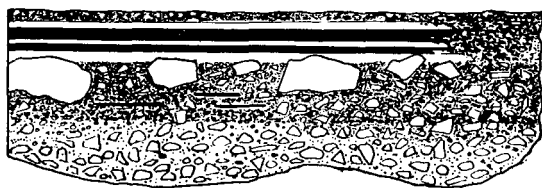
The next trench lay along the back of the cave. Here the beach



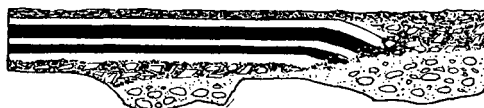
Plan of Cave showing position of Trenches.

Plan of Cave showing measurements.

Fig. 6. Ouchtriemakain Cave: plans.



Section in Trench across the Mouth of the Cave.



Section in longitudinal Trench.

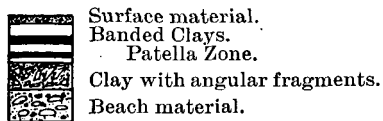


Fig. 7. Ouchtriemakain Cave: sections.

material was only a few inches below the surface material. The banded clay appeared and thinned out towards the walls.

The remains found in these deposits included several pieces of bone and some teeth. They were not restricted to any particular deposit but were mostly found in the banded clays. No trace of flint was seen and only one stone which may possibly have been used as a hammer-stone.

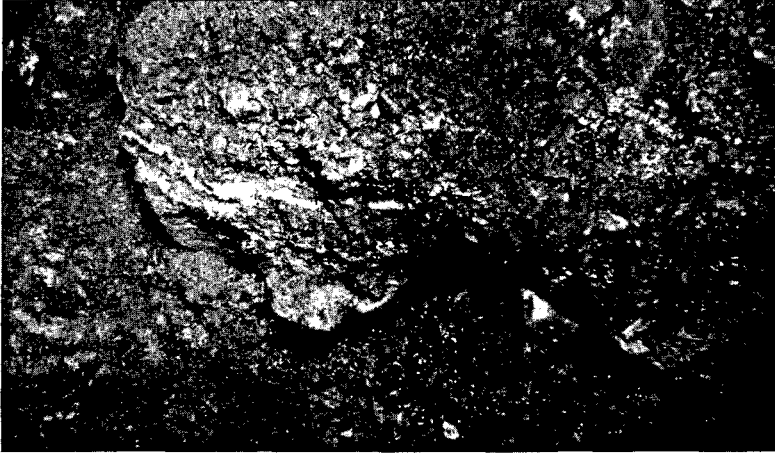


Fig. 8. Ouchtriamakain Cave: view of inside of front cross trench showing banded clays and fallen rocks beneath.

The dripping cave was also excavated, but the only deposit was surface material on solid rock.

My conclusions regarding Ouchtriamakain Cave are that it has certainly been occupied, but only in recent times. Considering that it is only 21 feet above present sea-level and that uplift has possibly been irregular round the coast, it is probable that this cave was not above sea-level during Neolithic times.

VII. NOTES ON THE RESULTS AND THEIR BEARING ON THE AGE OF THE 25-FOOT BEACH. BY J. W. GREGORY.

The three sites excavated have yielded nothing pre-Neolithic, and the fauna, according to Dr Ritchie's determinations, may be Neolithic or later.

The only pieces of flint are three flakes that were found by Mr W. Q. Kennedy at the rock shelter. The evidence is indefinite, and Dr Ritchie remarks that they have no secondary chipping and give no indication of age. They were doubtless used by the people of the rock

shelter, but may be flakes picked up from the Neolithic deposits. The bones give the only direct evidence as to the age of the deposit, and as they include domestic sheep of turbary type, oxen, possibly of the Celtic breed, and the fowl, it is relatively modern.

The beds containing the charcoal, bones and the hearth in the Cairnryan cave appear to have been deposited shortly after the formation of the 25-foot beach. The cave was clearly excavated by marine abrasion during the time of the 25-foot beach. Its floor then consisted of beach material, and as soon as the sea had withdrawn at the beginning of the 25-foot uplift, man must have taken refuge in the cave; for the cave earth, with relics of human occupation, rests directly on the beach gravel, and lies below the layer charged with fallen blocks from the roof. As these falls would probably have begun shortly after the sea had left, the bones must have been deposited very soon after the completion of the 25-foot beach.

The evidence of the rock shelter is also in favour of its occupation shortly after the formation of the 25-foot beach, and as one of the bones was cut by a metal tool, Dr Ritchie considers that this deposit is probably of the Bronze Age.

The Ouchtriemakain cave gave fewer results. As that cave is in a very convenient position at the head of a quiet bay with an excellent water supply, the absence of evidence of any early occupation by man is significant. Neolithic man lived on the area, both farther east in Galloway and on the Irish coast of the North Channel. It is probable that the cave had either not been formed or was under water in Neolithic times.

The absence of any early occupation of these caves bears on the problem of the age of the 25-foot beach and throws doubt on its Neolithic age at Loch Ryan.

There seem to be three possibilities as to its age—Palæolithic, Neolithic, or Bronze Age.

The main evidence for the Palæolithic age of part of the 25-foot beach comes from Campbeltown, where the 25-30 foot beach has yielded numerous worked implements which, according to the Abbé Breuil,¹ may be Upper Palæolithic. That age is accepted by Mr J. G. Callander,² and by its discoverer, A. Gray.³ If, therefore, the 25-foot beach in south-

¹ H. Breuil, "Observations on the pre-Neolithic Industries of Scotland," *Proc. Soc. Ant. Scot.*, 1922, vol. lvi. Ser. 5, vol. viii. pp. 261-65.

² J. Graham Callander, "Recent Archæological Research in Scotland," *Archæologia*, 1928, vol. lxxvii. pp. 88, 92.

³ A. Gray, ". . . also of an old flint working place in the 30-foot raised beach at Millknowe, Campbeltown," *Proc. Soc. Ant. Scot.*, 1894, vol. xxviii. Ser. 3, vol. iv. pp. 263-67; he calls it Palæolithic, *ibid.*, p. 274.

western Scotland is all of the same age it should be, according to this determination, Upper Palæolithic. Mr Callander points out that there is evidence for the Palæolithic age of this beach in Loch Ryan, as Mr Ludovic Mann collected there Tardenoisian implements and old patinated flints. Mr Callander remarks in a letter that "if the 25-foot beach was not formed until Neolithic times or later, it is impossible to explain the presence of the earlier implements."

It has been remarked that the Abbé Breuil admits the possibility of doubt as to the age of the flint implements of the 25-foot beach at Campbeltown, as, he adds, "it is to be regretted that osseous debris, faunal or industrial, was not met with, which would allow us to state precisely whether this set of implements is not really Azilian." He remarks that the difference between the Campbeltown flints and those of the Azilian is, however, notable;¹ his description of them is headed, "The Pre-Neolithic Flints of Campbeltown," and he says the tools appear to be an Upper Palæolithic series, with a Magdalenian aspect, and some, he says, are "quite Magdalenian."²

Similar doubt between the Neolithic and Palæolithic age of a 25-foot beach applies on the Irish side of the North Channel. The well-known beach at Larne³ has been referred to the Neolithic, though it contains implements of an older type. I once had the privilege of examining that beach under the guidance of Mr Knowles, and felt the difficulties in regarding all the implements and the beach as Neolithic. Some of its flaked implements are much like those from Campbeltown.

The second possible age is Neolithic, which is so well established for the 25-foot beach at some localities that that age has been generally accepted for the whole of it. There is no direct evidence for the Neolithic age of the 25-foot beach at Loch Ryan or Portpatrick. The only argument for it is the height above sea-level, and that does not seem reliable. I have recently summarised some of the evidence as to the variability in level of the Scottish raised beaches:⁴ the "25-foot

¹ Miss Garrod (*The Upper Palæolithic Age in Britain*, 1926, p. 176), however, remarks that they can be "scarcely older than Azilian" because of their position on a 25-foot beach; she quotes the opinion of Sollas that this beach may be of different ages in different places.

² H. Breuil, *op. cit.*, pp. 261, 263, 265.

³ G. Coffey & R. L. Praeger, "The Larne raised Beach: a Contribution to the Neolithic History of Ireland," *Proc. Roy. Irish Acad.*, 1904, C, vol. xxv, No. 6, pp. 143-200, pls. iv-ix. W. J. Knowles, "The Antiquity of Man in Ireland, being an account of the older series of Irish Flint Implements," *Journ. Roy. Anthr. Instit.*, 1914, vol. xlv, pp. 83-121. Dr R. A. S. Macalister (*The Archaeology of Ireland*, 1928, pp. 30-65) regards the Larne implements as not earlier than Neolithic, and gives references to the literature. He rejects the view that they are unfinished and were taken elsewhere to be ground. Dr Reginald Smith, "On the date of Grimes Graves and Cissbury Flint Mines," *Archæologia*, 1912, vol. lxxiii, p. 141, supports their Upper Palæolithic age.

⁴ J. W. Gregory, "Raised Beaches and Variations of Sea Level," Internat. Geog. Congress, Cambridge, 1928, *Second Report of the Commission on Pliocene and Pleistocene Terraces*, pp. 84-7.

beach," *e.g.* varies from 5 to 15 feet above sea-level near the Heads of Ayr and in Culzean Bay; it is at 20 feet in Mid-Argyll (*Mem. Geol. Surv. Scotland*, Sh. 37, pp. 133, 145); between 21 and 23 feet on Colonsay (*Ibid.*, Sh. 35, pp. 65-70), and is at 40 feet above sea-level near Irvine. It overlaps in level with the "50-foot beach" which is at from 30-36 feet near Lismore (*Mem. Geol. Surv. Scotland*, Sh. 45, p. 169), and rarely above 40 feet near Kilmartin (*Ibid.*, Sh. 36, p. 100).

The age of a Scottish beach is therefore not safely determined only by height above sea-level, and there is also uncertainty from the associated implements. The 25-foot beach is generally regarded as Neolithic, as by Dr W. B. Wright for the Firth of Lorne (*Mem. Geol. Surv. Scotland*, Sh. 35, 1911, pp. 65-70). Professor Sollas¹ refers the 30-foot beach at Oban to the Azilian. Dr Macalister² assigns the 25-foot beach on opposite sides of the North Channel to different cultures—the Irish to the Campignian and the Scottish to Azilian.

The third possibility is that the age of the raised beach in Loch Ryan and Portpatrick is post-Neolithic and probably Bronze Age. The difficulty in acceptance of the 25-foot beach at our excavations as Neolithic is the age of the associated bones. Dr Ritchie has determined them as Neolithic or later, and is obviously inclined to their post-Neolithic age. As one of them from the rock shelter has a metal cut, it is clearly not older than Bronze Age, and the fauna as a whole is consistent with that date.

In a preliminary report on the bones, Dr Ritchie remarks of the Cairnryan Cave and the rock shelter "in both the sites of occupation, the presence of a very large percentage of bones of domestic animals is certain evidence that in neither cave was the occupation previous to Neolithic times, and on the whole the aspect suggests that it was probably later."

The nearest definitely dated prehistoric remains to Ouchtriemakain are some graves at Port of Spittal Bridge where Mr Purves had recently obtained a Bronze Age food bowl. The bowl has been presented by Lady Augusta Inskip to the Hunterian Museum, where it has been skilfully repaired and mounted by Mr. Kinghorn. As the bone implement at the shelter, as remarked by Dr Ritchie, was cut by a metal tool, and as there is nothing in the associated animals necessarily of a pre-Bronze Age, the occupants of the caves may have belonged to that period. As the cave earth with the bones rests on the 25-foot beach, it is the younger. Its Bronze Age would be consistent with the Neolithic Age of the 25-foot beach gravels if the interval between those

¹ W. J. Sollas, *Ancient Hunters*, 1904, 3rd ed. 1924, pp. 612-13.

² Macalister, 1928, *op. cit.*, p. 9.

periods be short. Both Mr W. Q. Kennedy's account of the sections at the rock shelter and the clear evidence of the long trench in the Cairnryan Cave indicate that the occupation of the sites was very shortly after the deposition of the 25-foot beach. If the men—as shown by the metal cut bone—belonged to the Bronze Age, the evidence of the excavations is in favour of the completion of the 25-foot beach at Loch Ryan and Portpatrick having been also in the Bronze Age.

It therefore seems probable that though the 25-foot beach at Campbeltown and also that at Larne may be Upper Palæolithic, elsewhere that beach may be Neolithic, and at Loch Ryan its formation may have lasted at least until the very end of the Neolithic, so that upon it was immediately deposited material of the Bronze Age.