

THE BROCH OF MIDHOWE, ROUSAY, ORKNEY. BY J. GRAHAM
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In the Orkney Islands there have been counted about one hundred and ten sites or remains of ancient structures which are believed to have been those of brochs. All that is now to be seen in many places is a grass-covered mound, sometimes with stones peeping through the surface. In these cases most of the stones of the superstructure have been carried away for building houses and dry-stone dykes, and many have fallen into the central court of the broch. On the shores of Eynhallow Sound, the narrow strait that separates the island of Mainland on the south from the island of Rousay on the north, about a dozen are to be seen. Six occur on the last-named island within a distance of 4 miles as the crow flies, and within a few yards of the flagstone rocks of the Old Red Sandstone formation which fall down gradually to the water's edge in a series of ledges or steps. These rocks provided a handy supply of good building material, as many slabs had been dislodged by natural causes and others could be levered or wedged off without much difficulty. Wedges of wood or even of iron might have been used. Though none of the latter has been found in brochs, the inhabitants of Midhowe might easily have had them, because, as we shall see later, they understood the working of the metal. We have been informed that wedges of wood driven in dry and allowed to swell by the absorption of sea-water have been used within living memory in Orkney to prise off slabs. The stones also break with a

natural fracture often leaving three straight edges, some at right angles to each other and to the bedding plane. In the neighbourhood of Midhowe and other brochs on Eynhallow Sound, it is quite plainly seen where slabs had been skinned off to furnish the stones to build them.

The three most westerly of these Rousay brochs lie on the farm of Westness, and are marked on the Ordnance Survey Map as North Howe, Mid Howe, and Broch, the first and third being less than 500 yards apart; Mid Howe, near the centre, stands 200 yards south-east of North Howe and 300 yards north-north-west of Broch. The stony mound of North Howe, partially covered with vegetation, covers a large space of ground, and probably encloses a considerable height of building, as well as numerous outhouses which surround it. Broch which is situated very near the ruins of a farm-steading of the same name, is reduced to a mere hillock, as not only have the stones been used to build the adjacent houses and stone dykes, but it has been encroached upon by the sea.

Midhowe broch occupies the whole landward end of a small rocky promontory which falls in gentle stages into the sea on the south-west shore of the island. This rocky point is bounded on each side by a geo,¹ that on the south, Stenchna Geo, being very narrow with perpendicular sides some 15 feet high, and that on the north, Geo of Broch, being wider and not so deep. The floor of the broch stands only about 28 feet above local low-water mark, so that when westerly gales were blowing the buildings must have been drenched with spray. Before excavation there was only a grassy mound about 18 feet high with stones sticking through the surface in places to indicate the building (fig. 1).

The story of the evolution of the broch was very difficult to unravel, and some points have not been satisfactorily explained, but two later reconstructions were identified, both in the inner court of the broch and in the outbuildings. Whether the later occupations, inside and outside, can all be correlated is not quite clear.

Originally the broch seems to have consisted of a round tower, the broch proper, built near the middle of the promontory, and a very massive wall of defence, with carefully formed ditches outside and inside, stretching across the neck of the rocky point, nearly from geo to geo. Later on groups of buildings were erected on the northern arc

¹ A geo is an opening in the rocks, frequently of no great width, into which the sea has access. Stenchna means stinking, and the name has been given from the stench that rises from the masses of seaweed that are usually found in it.

of the tower, between it and the outer wall, and on the north-western arc towards the Geo of Broch. The lower portions of the structures between the main building and the outer wall are quite well preserved, and still maintain a good height, except where they have been disturbed during later reconstructions, but those to which the sea has had access on the north-west and west are much dilapidated. Not only have the

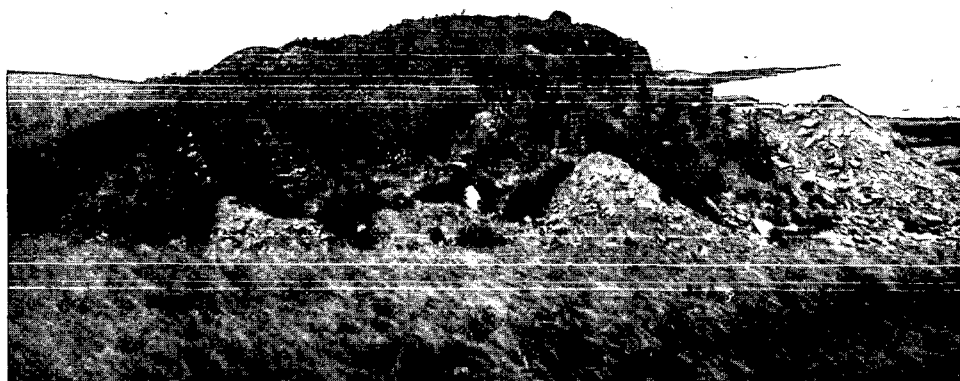


Fig. 1. Midhowe Broch from the north after the commencement of the excavations.

outer extensions of the walls been swept away, but even the rocky foundations have been eaten into, the stone being soft in places.

THE BROCH.

The main building is much destroyed on the exterior, especially on the south where the outer face has entirely disappeared. This part, so far as present indications go, had not been protected by external structures, and so was more accessible to the builders of the houses and the long dry-stone dykes which are to be seen in the neighbourhood. The most of the outer face of the wall has now been laid bare; only a short section on the north-west, where, owing to a caving in of the building, it has been shored up by curious buttressing, has not



Fig. 2. Midhowe Broch : Wall of Broch and inner face of outer wall on the north-east side.



Fig. 3. Midhowe Broch : South-east side.

been excavated. It is still from 7 feet to 9 feet high near the doorway, and rises up to 10 feet on the north-east and eastern sectors (figs. 2 and 3). As is usual in brochs the wall has been built with a distinct batter on the outside. The tower is approximately circular, measuring externally 59 feet 6 inches in diameter from north-east to south-west, and 58 feet from north-west to south-east, and internally 32 feet 2 inches



Fig. 4. Midhowe Broch: Entrance.

and 31 feet 2 inches. The thickness of the wall on the south is 15 feet 3 inches at the base, on the south side of the entrance 14 feet 3 inches, and on the north-north-east 12 feet. On the inside the wall stands to a height of 12 feet to 14 feet 6 inches round most of its circumference, but, for a short distance on the south-south-west, it has been reduced to about 9 feet. In common with many other brochs there is a scarcement, in this case formed by two or three courses of projecting corbelled stones, the top of which is 11 feet above the floor of the inner court. In places it is 21 inches wide, which is much more than in some brochs. The scarcement is not visible round the complete circuit of the wall, because on the north-west it is obscured by a facing

wall built at a period later than the original construction of the broch.

Entrance.—The doorway faces north of west, and is in a fine state of preservation (fig. 4). On the outside it measures 6 feet 3 inches in height, 3 feet 7 inches in breadth at the bottom, and 3 feet 2 inches at the top. The entrance passage narrows to 3 feet at two checks meant to retain the slab door in position, the one on the right or south side being 6 inches deep, and that on the left 9 inches. These checks lie 8 feet 6 inches and 7 feet 5 inches respectively from the



Fig. 5. Midhowe Broch: Entrance to Mural Cell A, and door check in south side of passage, from the inside.

outside, a slight projection of the wall on the south side causing this difference in measurements. Behind the checks the passage has a width of 4 feet 3 inches which continues to the inner end. This entrance, which is paved, has been entirely lintelled, but from the checks to the inner end the stones are broken off and only the wall-holds remain. The outer lintel is a stone of good size, and measures 5 feet in length, 1 foot 3 inches in depth, and 11 inches in thickness; behind it are two more set on edge, and then three placed on the flat with vacancies between them. The outer three support the wall above and the inner three part of the floor of a small chamber above the passage. At the checks there is a slab set on edge and sunk to the floor-level across the entrance, and another 9 inches from the inner end.

Mural Cell A—On the south side of the passage, 15 inches in from
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the check, is a low opening 5 inches above the floor, measuring 3 feet in height and 1 foot 8 inches in width (fig. 5), leading through a passage 2 feet 11 inches long into a domed cell, A, with its corbelled roof intact, in the thickness of the wall. The little chamber is quadrilateral on plan, the walls being slightly curved; that on the east lies in the same line as the wall of the passage into it. This little cell measures 6 feet, 6 feet 9 inches, 3 feet 9 inches, and 6 feet 3 inches on the north, east, south, and west sides, and in the centre it is 7 feet 9 inches high. Running through the wall into the main entrance passage, at a height of 2 feet 2 inches from the floor and 1 foot 3 inches from the north-west corner, is a squared hole 9 inches high and 7 inches wide. This is suggestive of a bar-hole, like those seen in many brochs, for the passage of the wooden bar which kept the stone door in position against the inside of the checks. Here, however, the hole is outside the checks and there is no corresponding socket on the opposite side of the entrance passage to receive the extreme end of the bar, and so its purpose is not apparent.

There was about a foot of debris in the cell, and a number of pieces of antlers of red-deer were found on the floor near the door and also stuck into crevices in the walls. A hammer-head of deer-horn (fig. 36, No. 1) was discovered high up in the debris which encumbered the short entrance passage, and part of a shale armlet on the ground level within the cell.

Mural Cell B—On the north side of the entrance passage, but immediately behind the check, is another low opening 2 feet 1 inch above the floor-level (fig. 6), measuring 2 feet 4 inches high and 1 foot 10 inches wide, giving access to a passage 2 feet 6 inches long which leads into a pear-shaped cell, B, with a corbelled roof, and a narrow gallery at its inner end, in the thickness of the wall. The sill of this entrance is 1 foot 9 inches higher than the floor of the cell. The chamber is 8 feet 9 inches high in the centre, and at its widest part measures 5 feet 6 inches across. Its walls gradually converge into those of the gallery, about 11 feet 6 inches from its southern end, and this may be taken as the length of the cell. In the wall of the chamber, on the west side, 7 feet 4 inches from the south-west corner and 4 feet 7 inches above the floor, is a bole or recess, 9 inches high, 7 inches wide, and 12 inches deep. About 14 feet in from the entrance to the cell, the gallery, which at this point is 6 feet high and 18 inches wide, has been deliberately blocked by stones set on edge, for a purpose which will be discussed later, after the primary occupation of the building. This packing of stones extends for a distance of about 10 feet. To get into the gallery for the purpose of tracing its farther

course we had to remove one of the lintels which formed the roof of the gallery and the floor of the chamber above it, opposite the foot of the stair.

Chamber above Entrance Passage.—Above the main entrance passage is a narrow chamber looking into the inner court through an opening 4 feet wide (fig. 6). Across the opening, at a height of 3 feet from

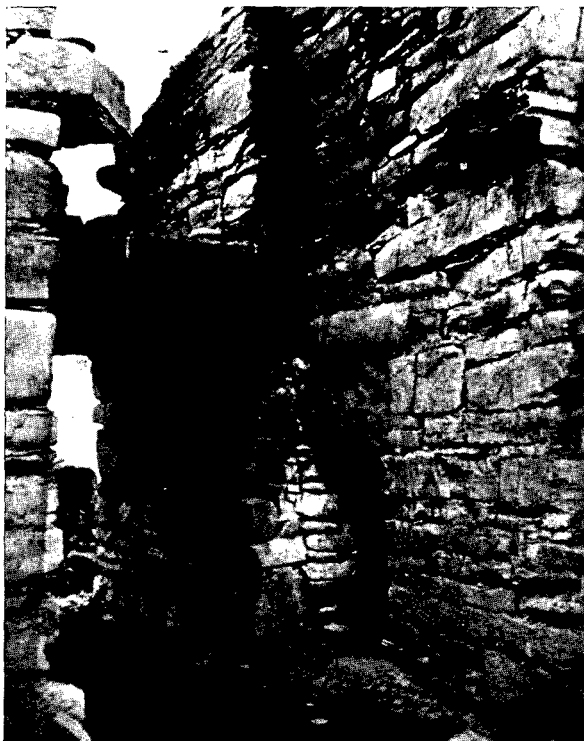


Fig. 6. Midhowe Broch: Entrance to Mural Cell B, and door check before excavation to floor-level.

its floor, there had been a tie composed of three slabs, and behind the upper one are the ends of the lintels which formed the roof. The chamber penetrates the wall to a depth of 9 feet 3 inches, and at the inner end it is only 2 feet 9 inches in width. The door checks seen in the entrance passage below are carried right up into the chamber, but they are entirely structural here. It is not apparent how access was obtained to this apartment, perhaps it was by a ladder or by the upper gallery.

Stair.—There is a doorway in the north-east, 5 feet 9 inches above

the floor of the broch, and 25 feet from the main entrance, wanting the upper part, but still showing a height of 5 feet 3 inches, and measuring 2 feet 9 inches in breadth at the sill. This leads into the foot of a stair, which, following the usual custom in brochs, turns to the right. Often its entrance is on the ground level of the building, but in the broch at Aikerness, less than $2\frac{1}{2}$ miles south-south-east, on the adjacent island of Mainland, the entrance to the stair is at a high level also. Fifteen of the steps remain in position at Midhowe. They rise 5 feet in their flight, and have a general width of 2 feet 3 inches. The stair doubtlessly opened on to an upper gallery within the wall, but at this part it has been completely removed. Opposite the foot of the staircase is a pear-shaped cell which extends 13 feet west from the left jamb of the door into the stair. It measures 4 feet in greatest width and 5 feet in height. This cell is not now correctly aligned with the stair, as it had sagged outwards owing to partial sinking of the outer face of the wall of the tower. It was also packed with slabs. As already mentioned, the roofing lintels of the lower gallery form the floor of the cell, and the lintels of its roof in turn served as the floor of an upper gallery. A chamber, with curvilinear walls, is very often met with in brochs opposite the foot of the stair.

Near the south-east part of the inner face of the wall of the tower is an opening 3 feet 6 inches from the floor, measuring 3 feet 1 inch in height and 1 foot 9 inches in breadth. Through it, after clearing out some secondary building at the back, it is possible to enter the lower gallery and also one above it, the roof of the first forming the floor of the second. But, owing to the reconstruction that has taken place here, it is not clear that it was intended for an entrance. The opening widens to 2 feet 6 inches, about 3 feet 9 inches in at a check on the left side. After removing the late rough building at the inner end, which was 15 inches thick, the inner wall of the two galleries was encountered.

Higher up in the wall and quite close to the scarcement, at a height of 7 feet 4 inches from the floor and 6 feet west of the last opening, is a bole measuring 15 inches in height and breadth and 21 inches in depth (fig. 13). It is too high to have been reached by anyone standing on the floor, and could only have been accessible by a ladder or some other contrivance which also could have been utilised to get into the staircase.

The Galleries.—There are the remains of two galleries within the thickness of the wall, one near the level of the floor of the broch and another about the height of the top of the scarcement. Possibly

there has been another between these two. We have seen that the cell B, on the north side of the entrance passage, led into a gallery which had been blocked up. Under the floor of the chamber at the foot of the stair the gallery is 3 feet 6 inches high and 2 feet 4 inches wide, but farther in the roof rises in height. After removing some of the stones with which it was packed it was possible to crawl into it a distance of 36 feet, and it has been proved to extend 15 feet more. It varies from 2 feet 6 inches to 1 foot 9 inches in width, and its roof stands from 5 feet to 6 feet 9 inches above the floor of the broch. The actual heights of the gallery and of its floor-level have not been ascertained, because we dared not clear it for fear of endangering the structure. All the way along the packing consisted of slabs set on edge which reached to within a few inches of the roof. What appears to be a further extension of this gallery has been excavated on the south, right down to its floor which stands 2 feet higher than that of the inner court of the broch. It is possible that this gallery has been carried nearly as far as the cell on the south side of the main entrance, as in the case of the broch, Dun Beag, Struan, Skye. The thickness of the wall between the gallery and the inner face of the wall of the broch varies, but as seen on the eastern arc, a fair average is about 5 feet 3 inches, while that between it and the outer face of the wall of the building is about 7 feet.

The only indication of the intermediate gallery is to be seen behind the opening in the wall of the broch to the south, where it was found to be only 2 feet 9 inches high. Whether it extended to the north or to the south was not ascertained, owing to the danger of bringing down the outer wall which was in a precarious condition.

The higher gallery, which was built about the level of the present top of the stair, has almost entirely been removed, but there are indications that it may have almost completed the entire circuit of the broch. As the roof of the cell opposite the foot of the stair is lintelled and not corbelled, the presumption is that it also formed the floor of the gallery which extended southwards possibly as far as the chamber above the entrance passage. But two short sections can be traced, one on the south and the other on the west. The first section is about 2 feet wide, but the walls are reduced to a height of 3 feet on the inside and a few inches on the other side. Its inner wall is 6 feet thick. The other section is seen immediately to the south of the little chamber above the main entrance; only a short length of the inner wall remains, measuring no more than 2 feet 8 inches in thickness. It was thought that the small chamber might have been entered by way of the gallery, but its end is built up. There may have been an

opening in it some distance above the floor, but this is only mere conjecture.

Mural Cell at High Level.—On the level of the top of the scarcement, at its widest part on the south-east, is another doorway, 2 feet 4 inches wide, with its jambs reduced to a height of 3 feet. This is the entrance to a small quadrangular chamber in the thickness of the wall. Its eastern or outer side has entirely disappeared. The cell measures 7 feet 7 inches in length on the western side but increases slightly towards the east. About 4 feet of the northern end and 6 feet of the southern remain. At the west end of the south side there is a recess, 2 feet 6 inches long and 7 inches deep. As the walls are well bonded into the main building, at the first glance it looks as if it were part of the original lay-out of the broch, but lying in the centre of the wall, it would have completely blocked the upper gallery. As the end of the section of the gallery which lies behind the south wall of the chamber does not show a built face, it would seem that the building of the cell was subsequent to the original construction of the broch. It may be mentioned that doorways occur at the scarcement-level leading into galleries in the wall in other Orkney brochs,¹ e.g. the East Broch of Burray and the Broch of Borrowston, Shapinsay. There is nothing now left to indicate how the occupants of the last two brochs reached these doorways. But we shall see later that the Midhowe broch furnishes a possible explanation.²

Well or Cellar.—A not uncommon feature in brochs in Orkney and elsewhere is a well, quarried out of the rocky floor within the building. At Midhowe there is a very good example in the northern half of the inner court. It is practically rectangular on plan and lies east and west. At the mouth it measures 6 feet 10 inches in length and 4 feet 7 inches in greatest breadth, and it is 8 feet 6 inches in depth. The walls are almost vertical for 6 feet, about 2 feet 6 inches at the top being built, but towards the bottom, near the north-eastern corner, it contracts to 2 feet 6 inches by 1 foot 3 inches. At the north-west corner of the mouth is a step down, 2 feet long, 1 foot 9 inches broad, and 2 feet 9 inches deep. The mouth was covered by two large slabs, and the place of entry by a dressed slab, measuring 1 foot 9 inches by 1 foot 6 inches, which could be lifted. As there was only about a foot of drainage water in it, and there is no sign of it being supplied by a spring, a very surprising thing as we shall see later, the question arises whether it may not have been utilised as a cellar. Be that as it may, there is no doubt that such cavities in some other Orkney brochs were wells.

Owing to the reconstructions within the broch, which had entailed

¹ *Archæologia Scotica*, vol. v. p. 75, fig. 3, and p. 84, fig. 12.

² *Postea*, p. 464.

the clearing out of the floor, no signs of sockets for the posts that held up the inner end of the pent-house roof which rested on the scar cement were met with.

Hearth.—As it would have necessitated the removal of important structures which had to be preserved, we could only probe the 18 inches of material on the floor to try and locate the hearth that one expects to find in the middle of the court. There was no scarcity of burnt material here, which may be taken to indicate that there had been one.

SECONDARY BUILDINGS WITHIN THE TOWER.

At least two reconstructions can be traced in the inner court, one seemingly contemporary with a threatened collapse of the north-western part of the tower. To strengthen the building the whole of the lower gallery, from its entrance from cell B on the north-west round by the east and south, was blocked with slabs set on edge, a facing wall was erected against the main building from the north of the inner end of the entrance into the broch to within 9 inches of the doorway into the staircase, and a revetment of slabs placed on edge in a slanting position was built round the outside on the north-west.

From the earliest times the inhabitants of Orkney made full use in their building operations of the flagstones that are so widely distributed throughout the islands. Thin slabs were set vertically to form partitions or to face portions of the walls, and horizontally to make roofs. Partitions or roofs so formed are to be seen in Stone Age cairns, such as those at Unstan and Taiverso Tuick, and in some of the brochs and earth-houses of much later times. Perhaps the most striking features in the broch of Midhowe are the extraordinary secondary constructions erected inside the inner court, where very large slabs put up on end or on edge alternate with ordinary dry-stone building.

A line of large slabs set on end, running in an east-south-east direction, from a point 3 feet 10 inches from the northern side of the inner end of the entrance passage, and in general alignment with it, right up to the wall on the opposite side, divided the inner court into two compartments, C and D (fig. 7-7). The greater length of this partition is formed by five large flagstones placed upright, a short section of ordinary building, and three more flags on edge *en échelon* their ends overlapping by 2 inches to 3 inches. The slabs measure from 2½ inches to 3 inches in thickness. The first five stand from about 6 feet 6 inches to 8 feet in height above the rocky floor, three being about 4 feet 2 inches broad, and the last three about 3 feet

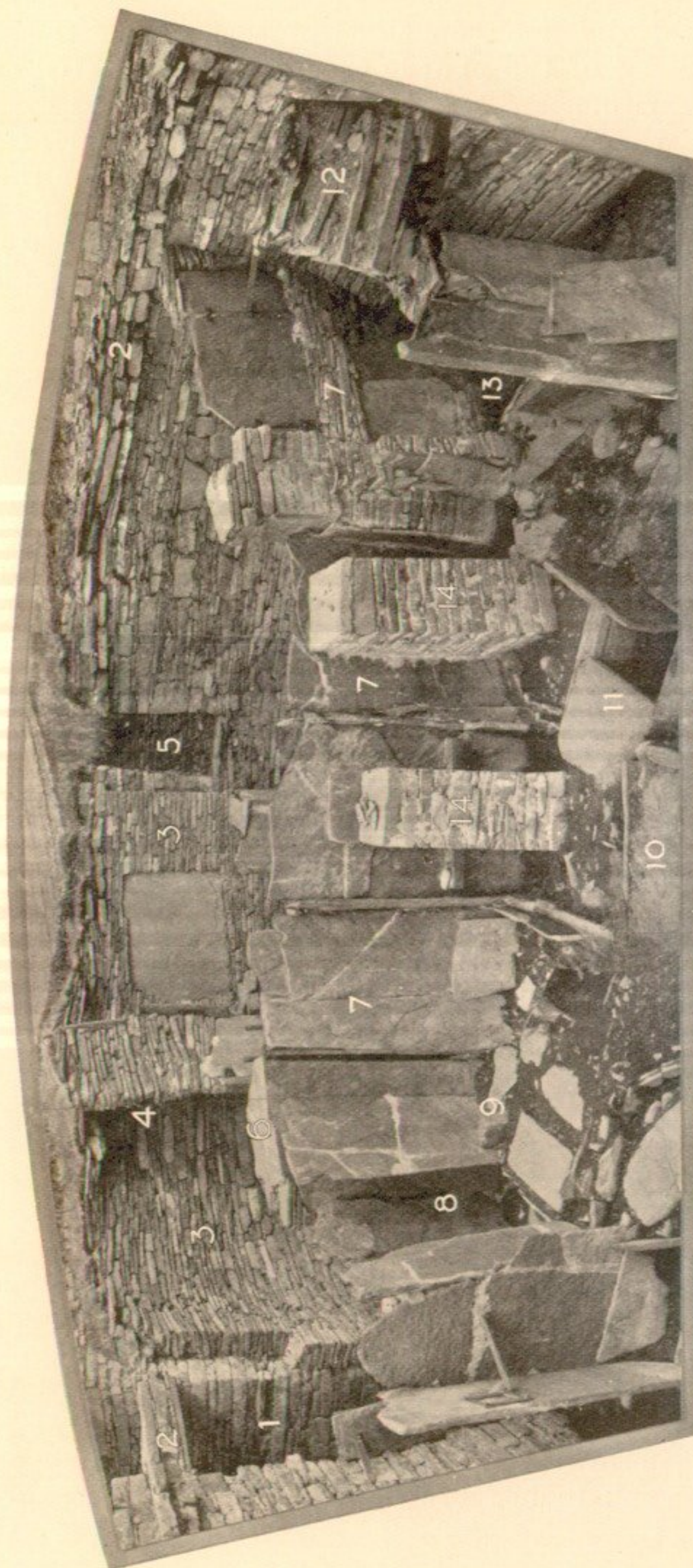


Fig. 7. Midhowe Broch: Interior from south-west. 1. Entrance. 2. Scarcement. 3. Facing wall. 4. Alcove. 5. Stair entrance. 6. Fireplace at high level. 7. Divisinal wall. 8. Entrance to compartment D. 9. Socket stone *in situ*. 10. Hearth. 11. Tank. 12. Remains of stair. 13. Cubicle. 14. Modern buttresses.

10 inches in height. To keep the slabs in position, a narrow one, about 16 inches broad, is inserted at right angles or obliquely between the first and second, the third and fourth, and the fourth and fifth. Between the fifth and sixth is a pillar of dry masonry, 1 foot 7 inches broad, the extension of which runs for a distance of 15 inches more along the northern side of the seventh slab, and also along the top of the three end flags, its height here being from 15 inches to 2 feet. Above this bit of building, jammed in between the upper part of the pillar and the main wall, are two more upright slabs, 3 feet 10 inches and 2 feet 10 inches high.

Compartment C.—At the inner end of the entrance passage is a vestibule of quadrangular plan, with an average length and breadth of 5 feet and 3 feet 3 inches. An erect slab, 1 foot 8 inches high and 1 foot 7 inches broad, is inserted in the north side of the passage at its inner end, thus reducing the width of the entrance to 2 feet 6 inches. On both sides of the vestibule is a doorway leading into what may be termed a short lobby, from which access is obtained to the northern and southern compartments in the central court, and to a row of small cubicles which, there is every reason to believe, were built right round against the inner face of the main wall. The doorway on the north side of the vestibule is 1 foot 10 inches broad, and has a sill in the shape of a flag sunk into the ground. Behind the flag on the left side of this entrance, which is broken and measures only 8 inches in height, is a socket stone in position, which formed part of the lower hinge of the door, and in the corner behind it a triangular stone basin, the cavity measuring 11 inches long, 8 inches broad, and 2 inches deep. The right side of the lobby is formed by the back slab of a press entered from the inside of compartment C, and on the left is the facing wall before mentioned. This veneer of building is 1 foot thick at its south end, but swells out as it rises near the centre, and then attenuates to 9 inches thick (fig. 7-3). Just about the middle is a domed alcove, a very striking piece of architecture (fig. 7-4). The inner side consists of an erect slab, measuring 7 feet 6 inches in height, 2 feet 3 inches in breadth, and 2 inches in thickness, placed parallel to, and 3 feet 3 inches from, the wall, with dry masonry above it. The outer face of this is flush with the outer face of the slab, and from a thickness of 5 inches at the bottom gradually thickens upwards until it merges in the corbelled roof of the alcove (fig. 8). In the supporting slab is a hole, $2\frac{1}{2}$ inches in diameter, 3 feet 4 inches above the floor (fig. 9). The inner end of the alcove is formed by a slab 4 feet 9 inches high and 3 feet 5 inches broad, its lower half on the inner side being dressed off so as to leave an opening, shaped like the

quadrant of an ellipse, 5 feet 9 inches high and 1 foot 9 inches wide at the floor. This just allows room for a person to wriggle through into the adjoining cubicle. Above this slab are 9 inches of building, then another flag 3 feet 6 inches high; above this are 5 inches of building, with yet another slab, 2 feet 1 inch high, balanced on the top (fig. 10). The alcove measures 3 feet 3 inches broad, 2 feet



Fig. 8. Midhowe Broch: Alcove.

6 inches deep, and 11 feet 3 inches high. The erection of this piece of building and of that at the eastern end of the central partition in the inner court of the broch must have been very difficult operations, and one marvels at the wonderful dexterity, and admirable control of their materials, displayed by the men who were able to set them up with what must have been very primitive appliances. Certainly these builders were far removed from a state of savagery. Another very striking piece of work is the insertion of a rectangular slab in the face of the wall beyond the alcove (fig. 9). This stone is placed

4 feet 6 inches above the floor, and measures 4 feet 7 inches high and 5 feet 7 inches broad. It is checked at the left-hand top corner to afford a better grip for the stones which were fitted into them. During



Fig. 9. Midhowe Broch : Outer corner of alcove, slab in facing wall, and cubicle below.

the winter after this part of the broch was excavated, this stone slipped down, fortunately without breaking, but it has been replaced and fixed behind with cement in such a way that no one can see that it has been disturbed, no traces of the fixing material being visible.

Beyond the alcove to the east there had been a series of small intercommunicating cubicles made of slabs and set up against the main wall, but in the collapse of the upper part of the broch most of them were destroyed, nearly all the flags being not only dislodged but broken. Adjoining the alcove are the remains of one or more of these cells, which give an indication of their dimensions. Two stones set in alignment



Fig. 10. Midhowe Broch : Outside of back wall of alcove.

concentrically with the wall of the tower give the breadth about 2 feet 10 inches, and two roofing slabs in position give the height about 5 feet. A divisional slab shows its edge placed about 12 inches from the wall, a space which would allow the inhabitants to pass from one cell to another. In the south-east corner of the room are two more aligned slabs set up 5 feet from the outer wall, which probably formed part of the end cubicle. To the right of the entrance to the stair, in the north-eastern arc of the wall, three wall-holds can still be seen from 5 feet to 6 feet above the floor. It may be recalled that the

living quarters in most of the wheel-shaped earth-houses in the Outer Hebrides consist of a single row of intercommunicating cubicles built around the wall, but although slabs are occasionally used in their construction, the partitions between the cells are formed of dry masonry.

Mention of a press has been made; it lies in the south-west corner of the room, C. The walls consist of erect slabs and the roof of a single one, the last being fire-fractured (figs. 7-6 and 12). When it was exposed during the excavations it was covered to a depth of 4 inches with burnt material. This seems to confirm the opinion that there was an upper row of cubicles round the wall, or perhaps an occupation when the court had been partially filled with fallen debris. The press measures 6 feet in height, from 3 feet 8 inches to 2 feet 9 inches in breadth, and 2 feet 8 inches in depth, internally; its doorway is 18 inches broad, and there is a stone shelf in it 21 inches above the floor. In the edge of the slab at the back is a cut semicircular cavity $2\frac{1}{2}$ inches in diameter, through which one can see into the main entrance passage. The inner upright flag at the north-east corner projects beyond the north wall of the press, and is aligned with the western edge of the upright slab on the south side of the alcove. The opening between them is 3 feet 6 inches wide, and this formed the inner door into the north room. As there is a cavity cut out near the top of the slab in the alcove at the level of the top of the opposite one, which has a corresponding notch, it is considered that the doorway may have been provided with a lintel, its height above the floor being 6 feet 2 inches. A slab, 9 inches high, sunk on edge into the floor forms the sill. Inside the jamb on the south side is the socket stone for the hinge of the door.

The remains of the kerb of the north-east side of a hearth, made of small stones set on edge, are to be seen on the floor near the centre of the south side of the room. This partly overlaps one of the large slabs covering the mouth of the cellar. Superimposed on, but not exactly covering the first hearth are the remains of the kerb of a later one. Against the outside of the middle of the kerb on the south-east side of the late hearth is a socket formed by four small stones set on edge. As we shall see from a similar arrangement in one of the hearths in the south room, there is no doubt that there would be a corresponding socket on the opposite side of the fireplace. Presumably these sockets had uprights inserted in them to support a cross-bar from which cooking appliances or joints of meat could be suspended over the fire.

About 14 inches south-east of the last hearth is a tank, trapezoidal on plan, and measuring 2 feet 4 inches long, 1 foot 10 inches broad, and 1 foot 3 inches deep, formed of four slabs set on edge and sunk

into the floor. A layer of peat-like matter, in places 5 inches deep, covered a considerable area of the rocky floor of this room. This carpet consisted of heather and grasses which had been added to layer by layer as the lower ones got trampled down.

In the lobby leading into this compartment, at the floor-level, were found a weaving comb (fig. 26, No. 1), an awl or borer, a chisel-ended implement (fig. 27, No. 6), all of bone; a deer tine with a deep slot cut in the broad end (fig. 37); a tube formed from a leg bone of a large bird (fig. 29, No. 3); a perforated haft-plate of cetacean bone, half a

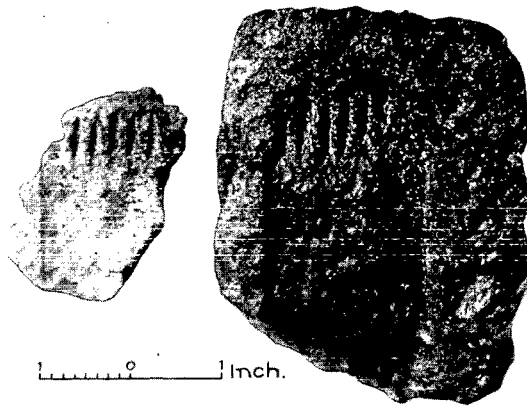


Fig. 11. Mould of Comb in Peaty Matrix.

rotatory quern, the last just within the doorway; two displaced socket stones; and five pot-lids lying near each other.

Near the west end of the cubicle below the large slab inserted in the face of the wall, a chisel-ended tool (fig. 27, No. 2) was recovered. About its centre, lying against the wall, part of the skull and the horn cores of an ox (*bos frontosus*), the first recorded in Great Britain; near the east end, two weaving combs, one (fig. 26, No. 3) at the floor level, and the other (fig. 26, No. 9) 5 feet higher up and slightly to the west of the first; and, outside the eastern end, a whorl and a partially perforated pebble were unearthed. A saddle quern and a pot-lid were also found.

A considerable number of relics were found in the peat-like layer which covered the floor. A chisel-ended tool (fig. 27, No. 5), three pins or borers of bone, and two deer-horn picks came from the eastern side of the apartment; two pieces of Samian ware below the entrance

to the stair; a weaving comb (fig. 26, No. 8) and its peaty matrix (fig. 11), a chisel-ended tool (fig. 27, No. 3), and a bronze pin (fig. 43), immediately north-east of the small tank in the floor; a stout bone borer (fig. 29, No. 1) and a whetstone between the tank and the divisional wall; and half of the head of a pin of morse ivory near this wall to the south-east of the tank. A haft-plate of deer-horn with two perforations in it (fig. 37) was found close to the weaving comb. A pot-lid and three stones of rotatory querns were found on the floor-level and a saddle quern and two stones of rotatory querns at a higher level.

Compartment D.—This room, which occupies the southern half of the inner court of the broch, like the one on the northern half, has a lobby opening off the south side of the vestibule at the inner end of the entrance passage. The door into it is 2 feet 4 inches wide, has a slab sunk to within 9 inches of the floor level as a sill, and is flanked on the west side by an erect flag 1 foot 5 inches in breadth, and on the east side by another 1 foot 3 inches in breadth. Behind and at the level of the top of the sill the lobby is paved. There are the remains of what may have been a double row of cubicles on the south-western arc of the building, but the existing parts are very fragmentary. As there are surviving parts of a double row of similar constructions on the eastern side of this room, it is just possible that this double row of small cells had continued right round the chamber, although every trace of them has disappeared on the southern arc. There are, however, a number of wall-holds here at varying heights from the floor, which suggest a roof of a cubicle here.

The lobby gives direct access to the outer row of cubicles, as in the northern half of the court, and, on turning to the east, to the inner room. Here there is a low step cut out of the rocky floor. On the left is a stall, 2 feet 3 inches wide, formed by the slab at the inner end of the vestibule, the first divisional flagstone, and another, 2 feet 6 inches wide, projecting from it near its eastern edge. This slab also forms the northern jamb of the doorway into the compartment, D, the southern jamb consisting of another erect slab placed nearly in alignment at a distance of 2 feet 6 inches from it, which gives the width of the door (fig. 7-8, and fig. 12). This, like others described before, has a sill made of a slab on edge sunk into the floor, which forms a low step up into the chamber. Immediately behind the jamb on the north side is part of another socket stone *in situ* for the hinge of the door (fig. 7-9).

The remains of two of the cubicles of the inner row survive on the western curve of the room. They are both quadrilateral on plan and are of small dimensions. The roofing slabs have disappeared. The one on the north measures 4 feet 7 inches in greatest length and 2 feet

6 inches in breadth, and the other 2 feet 8 inches by 1 foot 10 inches. The opening into the first, which faces the centre of the court, is 2 feet broad, and is reached by three low steps down, the one at the top having a curved kerb of small stones set on edge.

On the opposite side of the compartment, in the angle between the divisional wall and the main building, to the south-east, are the remains of one or more cubicles, 2 feet 4 inches in breadth, which



Fig. 12. Midhowe Broch: Press in compartment C with fire-fractured slab on roof, and lobby and doorway into compartment D.

retain some of the roofing slabs. In front of these is a larger cubicle, 7 feet 6 inches long, 4 feet 9 inches broad at the north end, and 2 feet 10 inches at the south (fig. 7-13). The entrance, which is placed near the northern end, is 3 feet 1 inch in breadth, and has a slab sunk into the floor for a sill. Above this group of cells are the five upper steps of a staircase still in position; the lower part had been completely destroyed (fig. 7-12). This stair would give access to the high level mural cell, as it is immediately below it, and thus supports the suggestion that the cell was a late intrusion.¹ Placed roughly at

¹ *Supra*, p. 451.

right angles to the divisional wall across the court is one erect flag and two others sunk to the floor-level. Round the south-west segment against the main wall is a well-built drain, about 2 feet wide, with some of its cover-stones in position at its eastern end. It seems to have run towards the main entrance passage, but its outlet could not be found.

Near the centre of the room, as in the one in the northern half of the court, are two hearths outlined by stone kerbs, the upper partly superimposed on the lower. The earlier, which lies to the south of the centre of the apartment, with its axis east and west, shows a length of 6 feet 5 inches of its southern kerb and part of the eastern one. Against the outer edge of the south kerb is a socket formed by small stones set on edge. The later hearth is smaller and overlies the north-east corner of the earlier one (fig. 7-10). It lies north-west and south-east, and the kerbs on the sides and one end survive. It measures 4 feet 6 inches in length and 3 feet 3 inches in breadth. Outside the centre of each side is a socket similar to the surviving one in the hearth beneath it and in the upper hearth in the adjoining room. These sockets are rectangular, their cavities measuring about 5 inches by 3 inches. Running obliquely from the drain just described towards the lower hearth are two flue-like constructions, their openings at the side of the drain measuring 10 inches and 12 inches wide and 3 inches deep. To the east and slightly underlying the north-east corner of the upper hearth is a beautifully constructed tank formed of slabs sunk on edge to the floor-level lying north-west and south-east and measuring internally 3 feet 6 inches by 2 feet 4 inches and 2 feet in depth (fig. 7-11). Its nicely fitting lid was made from a dressed slab, but this was broken by a visitor to the broch. It retains about 1 foot of water, which evidently must be supplied by a spring, as it remained clear and drinkable all the years the work of excavation was going on. We have seen that the deep cavity in the northern compartment contained only a small quantity of drainage water although its bottom is 7 feet deeper than that of the tank just described. Presumably the fissure in the rock by which the water reaches the small cistern does not extend into the northern half of the court. As one corner of the later hearth encroaches on the edge of the tank it would appear that the latter was the earlier construction.

About $5\frac{1}{2}$ feet above the foot of the main wall to the south-west was a large slab projecting downwards from it towards the inside of the court (fig. 13). Above it was a mass of building extending inwards from the wall and terminating in a slightly obtuse angle. This seems to have belonged to a very late period of reconstruction in the broch

after it had been filled to a depth of 5 or 6 feet of debris. The inclined flag had very likely formed the roof of one of the lower cubicles. As we had to discover what kind of structure lay under the flag, and as it could not be supported, we were compelled to remove it.

In the lobby a saddle quern and two socket stones were brought to light.

Against the foot of the divisional wall, to the east of its centre, were found two weaving combs (fig. 26, Nos. 5 and 6) lying together, and a



Fig. 13. Midhowe Broch : Roofing slab of cubicle in south-west side of compartment D, during excavation.

whetstone a few inches to the west of them ; a weaving comb (fig. 26, No. 7), a bone pin, a bone ring (fig. 32, No. 3), seven pot-lids, and a stone of a rotatory quern, in the cubicle in the north-east corner ; four whorls under the large opening in the wall to the south-west of the latter ; a whorl of cetacean bone, several pieces of a paddle bone of a large whale, and a Roman patera of bronze smashed to pieces by falling stones, outside the eastern end of the drain on the south ; and a ring-headed pin of bronze a few feet farther west. All were lying near the floor, except the patera, which was found 18 inches above the whorl of cetacean bone and the paddle bones of the whale. On the floor within the south side of the door into the chamber was a hollowed stone or mortar. The fragments of the pot, fig. 48, were found close to the wall of the broch, 2 feet above

the floor, in the southern arc. A hollowed stone, two detached socketed stones, a whorl, and a bone chisel, came from the western half of the apartment.

OUTER WALL AND DITCHES.

The outer wall is of extraordinary strength and a most impressive structure, even though its upper portion has been removed. It is built in a flat curve across the neck of the promontory, with its north-western



Fig. 14. Midhowe Broch: South end of Inner Ditch showing late walls built across it.

end resting on the edge of the Geo of Broch, and its southern extremity standing on the edge of a vertical face of rock 5 feet high, and 17 feet from the brink of the Stenchna Geo. The outer face then turns west along the edge of the rock, and, judging from the style of the building in places, we think we were able to trace it a distance of 23 yards, beyond which it had been entirely removed. On the landward side, facing the north-east, the wall measures 47 yards in length. Rising with a slight batter the outer face still stands, for a considerable length, from 5 feet to 7 feet in height above the bottom of the ditch outside. On the inner face, which is built with a more decided batter, it is about 10 feet high (fig. 14). For the greater part of its length the width

at the top is about 19 feet and at the foundation some 26 feet. At its nearest point to the tower its foundation is $8\frac{1}{2}$ feet distant. Nearing its southern end the inner face of the wall takes a sharp curve to the west and then to the south (fig. 14). If the present entrance passage, J, is a secondary construction cut through the wall, a doubtful point, this defence would have been 31 feet thick at one place. It is difficult to understand why the southern end of the wall was not carried to the edge of the Stenchna Geo. Possibly the great height of building which



Fig. 15. Midhowe Broch: North-western end of Ditch showing vertical joint in wall in the right of the foreground, and clay counterscarp with stone revetment above in the background.

would have been required on the lower shelf that occurs here precluded it from being built.

The outer face of the wall towards the landward side is constructed in an unusual way. On the outside the stones are laid on the flat in the ordinary fashion, but within this skin, as can be seen where there is a break, the flagstones are set vertically and radially, as in the peculiar buttressing seen in figs. 17 and 20. About 6 feet from the north-western end is a straight vertical joint (fig. 15), but as the bottom of the ditch outside at this part has been paved, as we shall see later, at a time subsequent to the erection of the main part of the wall and the paving slabs go under the foundation of this short stretch only, it is quite

evident that this part was built at a later time. This may have formed the original entrance to the broch, but we have to consider another opening leading into a long narrow passage through the wall 16 feet from its southern end. This shows later building on both sides, and there is no doubt that it formed an outer entrance into the broch after some of the secondary structures had been built. However, the outer ditch dies out towards its southern end, where it approaches this doorway, which suggests that it may have been part of the original plan of the broch.

About 36 feet west of the south-east angle of the wall is a flight of



Fig. 16. Midhowe Broch : Earlier wall across south end of Inner Ditch.

steps cut out of the rock, diminishing in width from 4 feet 3 inches at the bottom to 2 feet 1 inch at the top, where it opens into the present entrance passage, and 19 feet 9 inches farther on is a broader set of steps also cut in the rock, but these are blocked at the top by late building.

The outer ditch, which has been dug into a yellowish clay, measures from 8 feet 3 inches to 11 feet in width at the mouth, and the flat bottom 3 feet 6 inches. On the counterscarp the clay has been cut in a convex curve, and this has been surmounted with a stone revetment, the remains of which have been traced in various places. At the north-western end, however, there is a well-built retaining wall still, 2 feet 9 inches high (fig. 15). The last 48 feet of the north-western end of the ditch has been paved with flags at a time later than the erection of the wall; and towards the southern end of the pavement, on the landward side, is a construction of stones the purpose of which is obscure. Under

the pavement is a hollow, about 12 inches in depth, the paving flags being supported by blocks of stone.

Within the wall is the inner ditch which extends from its north-western extremity to where it strikes west near its southern end. The scarp is faced with stonés built with a slight batter, and the counterscarp is formed by the inner face of the outer wall. It measures about 32 yards in length, and its depth is about 10 feet below the present top of the wall and 3 feet below the foundation course of the broch. At the mouth it varies from 11 feet 6 inches to 8 feet in width as it proceeds north, and at the bottom from 6 feet 6 inches to 2 feet. Where it most closely approaches the tower, the space separating them is only 3 feet 3 inches wide. For about half of its length towards the north the ditch is now covered by secondary buildings, but it has been traced within chamber H, and a short length is seen at the northern end.

Near its southern end there are two late walls of inferior masonry built across the trench. About the centre of the earlier and more southerly one is what may be termed a stone ladder of six steps (figs. 14 and 16). About $7\frac{1}{2}$ feet in front of this is the second wall (fig. 14). We have not been able to correlate these structures with the rest of the buildings.

Entrance near South End of Outer Wall.—About $15\frac{1}{2}$ feet from the southern end of the outer wall is a doorway, 3 feet 6 inches wide, which leads into a long passage, J. The width of the doorway has been contracted by secondary building on each side. The passage, which runs about 53 feet between walls still standing to a height of from 3 feet 6 inches to 4 feet 3 inches near the entrance and from 1 foot to 2 feet farther in, strikes generally in a westerly direction tangential to the outside of the southern curve of the main building of the broch. For considerable lengths on both sides it is faced by late masonry. From the entrance it maintains the same width, 3 feet 6 inches, for 4 feet 4 inches, where it widens out to 5 feet 4 inches, there being a check 9 inches deep on the north side and another 1 foot 3 inches on the south side. At this place two thin flagstones are sunk into and across the floor, with a vacancy between them. The walls on both sides now curve slightly to the south, the curve on the north being rather sharper at the inner end. This part of the passage is 8 feet 9 inches in length and 6 feet 9 inches across at its widest part. Hitherto its direction has been south-west, but it now alters to almost due west for the remaining part, a distance of about 40 feet. On the left or south side there is a recess 2 feet in length and 6 inches in depth, then 3 feet farther on a check 9 inches deep, immediately behind which is an aumry 8 inches in breadth and 10 inches in depth. From

the check the wall runs in a straight line for 20 feet 4 inches, where there is an opening, 2 feet 6 inches wide, leading into the rock-cut staircase already referred to.¹ The opening at the top of the stair is blocked with a flag measuring 3 feet 4 inches in breadth, 2 feet 9 inches in height, and 3 inches in thickness. Beyond the stair the wall continues for 6 feet 9 inches, with a breach, 3 feet 9 inches wide, and a further length of 4 feet 9 inches. Both of these sections are built on a slight curve, the convexity being towards the passage.

On the north side of the passage after the wall curves in towards the south it strikes almost due west for 5 feet 3 inches, a slot 6 inches wide and 10 inches deep occurring opposite the aumry on the south wall. At this place the passage narrows to a width of 4 feet 6 inches. The wall, which has a flat slab inserted at the return, now strikes backwards in an obtuse angle for 5 feet 1 inch, and continues west for 6 feet 10 inches, where it breaks forward a distance of 1 foot 9 inches. It now goes west in an irregular line for 20 feet, where, like the opposite wall, it runs into disturbed material. The average width of the passage for the greater part of this length is 8 feet 3 inches. At a distance of 11 feet from the present termination are two upright slabs in the wall which project 1 foot into the passage. The walls on both sides are poorly built, but that on the north side is much inferior to that on the other.

The relics found in the outer ditch included a penannular brooch (fig. 45), near the south end; another, fractured and crushed (fig. 44, No. 4), in front of the south entrance; half of a stone whorl, three pot-lids lying together, a whetstone, and part of a human skull, within a few feet of each other near the centre of the trench. All except the whetstone and whorl, which came from the bottom, were recovered in the filling of the trench from 2 feet below the surface downwards. A saddle quern was found in the break in the outer face of the main wall. Two pot-lids lying together, and a saddle quern, near the north-western end of the ditch, and two detached socket stones, opposite the south end of the wall, were found at the bottom level, as were a considerable number of animal bones, fire-fractured pot boilers, four hammer-stones, and a pointed bone tool.

A fair number of tools and other objects were discovered in the inner trench, and on the path between it and the tower. Two pointed tools and a pin of bone were found high up on rock near the south end. At lower levels were a saddle quern near the wall of chamber H; two boar's tusks, half of a whorl of pottery, a chisel-ended tool, a small polishing implement, and a small worked scapula (fig. 32, No. 5), all of bone,

¹ See *supra*, p. 469.

and part of a cup fashioned from a whale's vertebra, near the outer side of the trench about the centre; a saddle quern and a pot-lid, close to each other, towards the south end. Part of the skull, horn cores, and a vertebra of an ox (*Bos frontosus*) on the inner side not far from the south end. This was the second occurrence of *Bos frontosus*.

On the path, at a higher level, were discovered part of a small-toothed comb of bone (fig. 32, No. 1), a bone pin and the point of another, two pointed bone tools, a small rounded hollowed stone, part of a saddle quern, and three hammer-stones.

In the continuation of the path towards the west which is now blocked up by buttressing there were found a penannular bronze fibula (fig. 44, No. 5) opposite the middle of chamber H, and a weaving comb and hollowed stone opposite the inner end of chamber F.

Relics were extremely scarce in the long entrance passage J, as only one bone pin, a whetstone, a piece of steatite and a small fragment of a crucible were recovered, and these were found at its inner end near the tower.

THE OUT-BUILDINGS.

There is a group of buildings of most irregular plan occupying the narrow space between the tower and the Geo of Broch to the north-west and the outer wall to the north. All are secondary constructions, and two periods of building are clearly discernible. Those on the north-west, chambers E, F, and G, have had their outer segments facing the sea entirely swept away by the waves, but the complete outline of the one to the north, chamber H, is well preserved.¹

The character of the building in these four chambers differs from that of the tower, but it is still very good. We now find slabs occasionally built in as a facing to the walls in places, and bonded into, and projecting from them, at times, structural features that do not occur in the broch in its original condition. The latest work is much inferior to that seen in the tower or in these four apartments.

Chamber E.—Judging from what remains of this, the most southerly chamber, it seems to have been sub-oval on plan. The wall on its inner side curves round from north to south, the chord measuring about 26 feet in length, while the width of what survives is about 10½ feet at most. The entrance seems to have been in the south-east, but it is now blocked by late building. It measures 2 feet in width. The wall is from 2 feet 6 inches to 4 feet thick and stands about 3½ feet high. Near its present northern end is an aumry, wanting its upper part, 2 feet 3 inches from

¹ As this chamber has been divided into several compartments in later times, these have been numbered H1, H2, and H3, to facilitate their description.

the floor; it measures 19 inches wide and 2 feet 1 inch deep and widens towards the back.

The late piece of building blocking the doorway on the south-east measures 7 feet in breadth and projects $5\frac{1}{2}$ feet into the chamber. Its walls on the north and south are curved. In front is an aumry, 17 inches wide and 15 inches deep, placed 2 feet 2 inches from the floor, and to the right of it a peculiar recess, the north side and the back built straight and the south side curved. It measures 1 foot 10 inches deep and the same in width at the back, but the opening is only 6 inches wide. The purpose of this recess is not easy to explain, as it is difficult to reach the inner end with the arm outstretched.

A chisel-ended implement of bone was found on the south-east side of the chamber, a hollowed stone 8 feet to the north, and a saddle quern below the doorway, 5 feet farther on, all at the floor-level.

Chamber F.—This is a long narrow chamber with straight walls on both sides, running roughly north and south. It widens from 4 feet 9 inches at the inner end to 11 feet at its broken outer extremity. The wall on the west survives for a length of 13 feet and that on the east for 22 feet 6 inches. The latter averages about 2 feet in height and 2 feet in thickness. Some $6\frac{1}{2}$ feet from the end of the east wall is an upright slab bonded into it and projecting 10 inches into the chamber. In the wall opposite is a similar flag. The original entrance, which was in the narrow south end, measured 3 feet 6 inches in width, but it has been blocked up (fig. 17). Immediately inside it, in the west wall, is a recess, 7 inches wide and 15 inches deep, which may have been a bar-hole. At the outer end of this wall are the remains of an aumry. This chamber has also undergone reconstruction in places. In front of the blocked doorway two flags, 9 inches in height, have been sunk into the ground on edge and now form a trough-like structure, 3 feet 6 inches long and 14 inches wide (fig. 17). An opening has been made near the inner end of the east wall, and an irregularly shaped cubicle has been inserted



Fig. 17. Midhowe Broch: Blocked-up doorway into chamber F, showing buttressing behind and trough-like structure in front.

so as to occupy the inner end of the adjoining chamber 'G, blocking up the entrance into its narrow end. This cubicle is four sided, with an average length and breadth of 6 feet 7 inches and 5 feet 6 inches. For the greater part the walls are lined with flags, but part of the northern side consists of a wall, about 1 foot thick, built in a flat curve. The opening into the cubicle has flags set on end as jambs, and measures 1 foot 7 inches in width. Some 2 feet 6 inches from the north-east corner is a slab, 1 foot 6 inches wide, which projects towards the inside. Between it and the east wall is a stone shelf 9 inches from the floor.



Fig. 18. Midhowe Broch: Outer end of east wall of chamber G and two floor-levels.

Part of the roof formed of flagstones still survived when excavated, and gave the height of the cubicle as 6 feet. At the north side of the entrance to this little cell is a box-like structure formed of slabs set in the floor, measuring 2 feet 10 inches in length and 2 feet 3 inches in breadth. The slabs on the south and west sides are 2 feet 1 inch and 1 foot 3 inches high, but the two on the north side are reduced to 4 inches and 7 inches. About 4 feet to the north-west, near the centre of the chamber, there seems to have been a somewhat similar structure, but the slabs do not appear above floor-level. Two survive on the south side, set in line, and two on the north end, placed obliquely.

A bone borer was found on the floor in the south-west corner of the chamber, a hollowed stone near the box-like structure on the floor on the eastern side of the room, and a socket stone at the west side of the

blocked-up door. A whorl and a socket stone came from the cubicle occupying what was originally the inner end of chamber G.

Chamber G.—This apartment, like chamber F, lies roughly north and south. The entrance was in the south end and measured 3 feet 3 inches in width. The common wall between them, as we have seen, runs almost straight, and it stands only about 1 foot 10 inches high, as the floor of this chamber is higher than its neighbour on the west. There are neither projecting slabs nor aumries in its surviving length.

The wall on the east side follows a very irregular course. It reaches a height of 6 feet and measures from 2 feet to 4 feet 3 inches in thickness. The northern end of the wall encroaches on the scarp of the inner ditch, running in a north-westerly direction. It curves round to the south-west for a distance of 14 feet, where its course is interrupted by a large slab, 6 feet in greatest height, projecting 2 feet 7 inches into the interior (fig. 18). In the northern part of the wall is a double aumry, 2 feet 11 inches from the floor, measuring 2 feet 2 inches high, 16 inches broad, and 16 inches deep, with a stone shelf inserted across the centre (fig. 18). There are the remains of another aumry at the level of the bottom of the first, 2 feet to the north-west. From the south side of the projecting slab the wall curves in a southerly direction for 7 feet, where there is another projecting slab, beyond which it continues in a straight line to the inner end for about 14 feet, but 2 feet 6 inches from the last upright flag is another projecting obliquely into the chamber. Half-way between them is an aumry, 2 feet 9 inches from the floor, measuring 17 inches high, 13 inches wide, and 12 inches deep.

The inner part of this chamber, as already mentioned in describing chamber F, is occupied by a late cubicle which was entered from the latter. This cubicle blocks the original doorway and is built upon kitchen-midden refuse.

The floor of the inner part of chamber G—that is, between the first-mentioned projecting slab in the east wall and the intruded cubicle at the back—is 1 foot 6 inches higher than that of the original one. The higher floor is paved and seems in places to have been supported with stones set on edge, because in the south-east corner it is hollow underneath, about 5 inches of ash-like material which had percolated through between the paving stones being found under them. In the centre of this part of the chamber is a hearth which was covered with masses of iron slag (fig. 19). The west and south sides are formed of large slabs set on end which have been badly fractured by heat. Running tangentially from the west edge of the hearth in a northerly direction are the remains of a drain-like structure formed of flags set on edge, with the bottom paved, measuring 8 feet in length. Only two slabs

survive on each side, the central pair being opposite each other. They lie $4\frac{1}{2}$ inches apart at the bottom and 6 inches at the top. The bottom of this structure is 1 foot 8 inches below the top of the hearth. It has been suggested that this may have been the flue for the air blast into the furnace, but owing to the fracturing and collapse of the stones by heat its complete course could not be traced.

In the angle between the inner end of the supposed flue and the hearth was a clay pot, $11\frac{3}{4}$ inches in height (fig. 47), sunk into the floor, its base being 2 inches deeper than the bottom of the flue. To the



Fig. 19. Midhowe Broch: Chamber G from the north-west, showing smelting hearth and aumry in the east wall.

east of the hearth was a pocket in the floor, 1 foot 8 inches deep, filled with charcoal and ash.

Near the centre of the inner end were found a small hollowed stone, perhaps a lamp, between it and the smelting hearth a pot-lid, and to the east of the hearth two boar's tusks.

Chamber H (H1, H2, H3, and H4).—The adjoining chamber, H, on the east is the largest of the four. It is sub-oval on plan, being widest near the west end. It measures 43 feet in greatest length and $28\frac{1}{2}$ feet in greatest breadth. Its walls still maintain a height of from $4\frac{1}{2}$ feet to 5 feet. To make room for its wall on the north side a width of as much as 8 feet of the inner side of the outer wall of the broch has been removed in places, and the bottom of the inner trench has been

filled in to a depth of $2\frac{1}{2}$ feet. There is no doubt about this chamber and the other three just described being of later date than the tower and the outer defences.

Commencing in a right angle in the south-west corner of the chamber the wall sweeps round the west end and north side in a series of curves and re-entrant angles, with erect slabs projecting inwards from the wall at two of the breaks. The wall at the east end is nearly straight, as is



Fig. 20. Midhowe Broch: East end of south wall of chamber H, showing late doorway slapped in wall and entrance to compartment H3 in front.

that on the south side. The latter, however, shows three breaks in its course. The former, $5\frac{1}{2}$ feet from the south-east corner, measuring 3 feet in width, may have been a late doorway into the chamber (fig. 20). Some 5 feet 3 inches farther on to the west is a space, 6 feet 4 inches wide, blocked by a large slab, now split, set on edge. Extending from its western side there is a length of $12\frac{1}{2}$ feet of good building with a gap near its centre, about 4 feet 1 inch wide, blocked with late building. It is possible that this may have been the original entrance into the apartment.

It can hardly be imagined that such a large chamber as this was not originally divided into two or more compartments, but extensive recon-

structions have taken place in later times; and, although in the south part there are two short sections of good walling which may be contemporary with the first lay-out of the chamber, so much of the interior is occupied by late work that no traces of earlier divisional walls have been identified.

Slightly to the north of the centre of the chamber is a cellar, its lower part quarried out of the rock. As it encroaches on the line of the inner ditch, and is sunk into it, it must have belonged to a later period, and was almost certainly constructed when chamber H was erected.



Fig. 21. Midhowe Broch: Outer face of south-east corner of chamber H.

The cellar is pentagonal on plan and lies north and south. It measures 4 feet 3 inches in length, 3 feet 6 inches in breadth, and 3 feet 11 inches in greatest depth. At the north end there is an extension of the cavity for another 18 inches, with a breadth of 2 feet 5 inches and a depth of 2 feet 1 inch. This would give access to the cellar. The whole was covered with flags, but only the one covering the extension was lifted by us. During a subsequent occupation this cellar was covered up when later structures were erected.

In fig. 21 is seen the outer face of the south-east corner of this chamber as well as part of an aumry in the wall. This also gives a good idea of the fine material the broch builders had at their command.

Chamber H has been broken up later into four sections, H1 to H4,

by divisional walls of inferior masonry, from $4\frac{1}{2}$ feet to 5 feet high, and a cubicle has been erected in the south-west corner. Three of the sections only were meant for human occupation, H1, H2, and H3.

The cubicle in the south-west corner is quadrangular, measures about 4 feet 6 inches each way, and for the greater part is formed of slabs set on end.

Compartment H1, occupying the north-western corner of the chamber, is crescentic on plan, and measures about 16 feet 6 inches in length and 6 feet 6 inches in greatest breadth. The secondary wall forming its eastern side stands 3 feet 6 inches in height and measures from 18 inches to 3 feet in thickness. It follows an irregular course and contains upright slabs projecting from it and inserted against its face in places. Between its northern end and the main wall of the chamber is a low passage, lintelled in parts, 7 feet long, 18 inches wide at the narrowest part, and 3 feet high. This seems to have formed the entrance to the compartment.

Jutting out from the main northern wall of the chamber are two others which converge towards the south and enclose a triangular area truncated at the southern apex. The western of these two walls, which forms the eastern side of section H2 and is built in an ogee curve, is 17 feet 6 inches long and 4 feet 4 inches high. It stops short 1 foot of the northern wall as if to allow of a passage eastwards, but this is blocked at its inner end by a transverse slab and another set up against it at right angles on the farther side. Against the foot of the wall is a box-like setting of slabs set on edge, measuring about $3\frac{1}{2}$ feet by 18 inches. The slabs vary from 11 inches to 2 feet in height.

The wall on the east forms the western side of compartment H3, which is of irregular oval plan and measures $15\frac{1}{2}$ feet by $13\frac{1}{2}$ feet. The wall is curvilinear and stands 5 feet high.

In these two walls there are no less than fourteen aumries, five in compartment H2, two at the truncated southern part, and seven in compartment H3. Two of the last are placed immediately below two above (fig. 22).

Against the northern wall of the compartment H3 is a short flight of stone steps leading up towards the top of the outer defensive wall (fig. 23). At the northern end of the eastern wall is a built-up opening, 2 feet wide, which may have formed an outlet to the wall-head before the stair was built.

The southern end of the compartment has been formed of slabs set on end, with a gap 2 feet 6 inches wide to form the doorway (fig. 20). Outside this entrance and immediately to the west is another opening between two slabs set on end, opposite and aligned to each other, which



Fig. 22. Midhowe Broch : Aumries in west wall of compartment H3.



Fig. 23. Midhowe Broch : Stair in compartment H3.

leads into H2. It measures 2 feet in width. Behind the slab which forms the northern jamb is another socket stone in its original position.

The area marked H4 does not seem to have been meant for occupation after the late reconstructions had been effected in chamber H, as the backs of the walls are ragged and the space enclosed by them has been filled in burying the cellar in the floor.

Considering the large area occupied by chamber H, the relics found in it were disappointingly few. Nothing was discovered except a few shards in H1. In the narrow blocked-up passage in the north-east corner of H2 were found the half of a large pottery vessel, near the northern end of the chamber a whorl and a perforated stone, between the two stone box-like constructions on its east side part of a hollowed stone, a few feet farther north a detached socket stone and a stone whorl, and a socket stone near its original position on the east side of the entrance into the compartment on the south. About the middle were part of a saddle quern, some hammer-stones, a perforated stone, and a bone whorl. On the top of the wall adjacent to the southern entrance was a haft-plate of deer-horn with two perforations. The stone lamp (fig. 42) came from midden refuse between the built-up doorway and the wall of the tower about 2 feet below the wall-head here. Compartment H3 yielded a ring-headed bronze pin, a weaving comb, a bone like a whistle (fig. 32, No. 4), a bone pin and part of another, a whorl, and a hollowed stone, and on the wall-head to the south of the entrance a bone bead. From H4, which had been filled in, came two bone tools, and from the cellar below a small hollowed stone.

Late Cubicles outside Entrance to Tower.—On the narrow shelf of rock outside the entrance into the tower and on each side of it are the remains of several small cubicles, K. Opposite the entrance, at a distance of 3 feet 4 inches and 6 feet 9 inches from its outer end, are two sills formed of slabs, 3 feet and 3 feet 3 inches long, sunk on edge into the ground.

Aligned with the south side of the entrance are two slabs placed on end, 14 inches apart, the first set with its inner edge against the wall of the broch. The gap or doorway gives entrance into a small cubicle with built walls, the western running parallel to the other for the greater part of its length and then curving round to meet it. This cell is 6 feet in length and 2 feet 6 inches in breadth at its northern end, and has been 2 feet 6 inches in height, as shown by a roofing flag which remains in position at its inner end. To the south of this building is a solitary slab set on end and to the west of it a fallen piece of masonry. A weaving comb (fig. 26, No. 4) and a bone rubbing-tool were found on the floor.

On the north side of the entrance are two more cubicles lying concentrically with the wall of the broch. The one nearest it is 6 feet 9 inches in length, 2 feet 7 inches in breadth at the doorway and 3 feet 10 inches at the inner end, where a flag in the roof remains showing its height as 3 feet. The doorway, 1 foot 6 inches wide, is formed by two slabs set on end. The western wall is built, but the eastern wall is formed by two large slabs. A small clay pot which had collapsed under its stone lid (fig. 49) was found in the south-west corner, and a rotatory quern and a socket stone farther in. Outside, at a height of 2 feet from the ground, was a broken bronze ring, $1\frac{1}{8}$ inch in diameter.

The adjoining cubicle is 6 feet 6 inches long and 2 feet 6 inches broad at the front, widening out in two steps on the west to 5 feet 2 inches. Its portal, 2 feet wide, is formed by two slabs set on end in line with, and not across, the entrance. A boar's tusk came from this cell. Between this chamber and the edge of the rocks is the inner wall of an irregularly shaped compartment which otherwise has disappeared.

Buttressing against Outer Wall of Tower.—In describing the main building in the broch we have drawn attention to a threatened collapse of its north-western curve and to the measures taken to prevent its fall.¹ The lower gallery in the tower was blocked up for the greater part of its length with slabs packed in parallel to its sides, and it was buttressed on the outside. We have suggested that the casing wall inside the broch was also part of the preservation scheme. The buttressing was formed by jamming in slabs radially with the wall of the tower between it and the inner walls of the secondary chambers E to H. This revetment extends from near the main entrance of the tower round the north-western sector to beyond the middle of chamber H. Portions of it are shown in figs. 17 and 20. This construction blocked up the narrow pathway which gave access to the four chambers and explains why their original entrances were filled with building or secondary structures.

The new entrances to chambers E, F, and G, which would have to be constructed, would probably be on the seaward side, but as these parts have been entirely swept away nothing more can be said on this point.

In chamber H the new doorway seems to have been made near the eastern end of its south wall, just beyond the buttressing. This opening, which is 2 feet 6 inches wide, shows the lower part of the jambs ragged and does not seem coeval with the building of the wall (fig. 20).

¹ *Supra*, p. 455.

In this case the door would be reached from the south. The narrow space between the tower and the edge of the scarp of the inner trench, which was available for the approach, showed a setting of flagstones about 2 feet 9 inches higher than the foundation of the tower, indicating that this alley may have been paved.

Late Buildings to south and south-east of the Tower.—The few remaining outer buildings here are generally so dilapidated that their purpose has not been determined. Returning to the entrance, near the south end of the outer wall, there is an undeterminate piece of structure built 3 feet 9 inches outside the outer face of the wall and to the north of the doorway. On the opposite or south side are still more scanty remains of building, with a drain, 14 inches wide, retaining several of its cover-stones, and running down for 8 feet towards Stenchna Geo. Within the doorway of the passage, in the angle on the south, is a triangular insertion of poor building showing three stone steps leading up towards the present wall-head.

At the extreme western or inner end of the long passage, in the narrow space between the tower and the Geo, are several short faces of walling which we could not connect up to form any definite plan. At this place the whole outer face of the wall of the tower had crashed down. A cup-marked stone is built into one of these wall sections (fig. 24), and on the floor-level near it was a hollowed stone.

At each side of the foot of the rock-hewn stair leading up into the entrance passage is a single cubicle. The one on the east has lost its outer slab, but the two end slabs, measuring 2 feet 4 inches in breadth and height, set on edge, 5 feet 4 inches apart, at right angles to the outer face of the wall, remain. The space between them has been quarried out of the rock. The cubicle on the opposite side, the west, is also rectangular and formed of slabs. It measures 3 feet 9 inches in length, 2 feet 7 inches in breadth, and 3 feet 2 inches in depth, and its cover remained in position. This box was almost full of broken pottery amongst which was a hollow stone. An irregular line of walling extends from this cubicle some 14 feet towards the Geo, terminating 7 feet from it.

At the foot of the stair half of a hammer-head of bone split longitudinally (fig. 36, No. 2) and a small Y-shaped piece of cetacean bone were found.

Some 13½ feet west of the foot of the stair are three broad steps cut in the rock, each rising about 1 foot in height. Across the highest step is a curved wall of inferior masonry, from which an erect slab projects towards the steps. Fragments of five or six crucibles of clay for melting bronze and small fragments of thin sheet bronze were found

at the base of the eastern side of the slab, and a hollowed stone basin lay on the rock in the north-east. Near the last were the fragments of



Fig. 24. Midhowe Broch : Cup-marked stone to the south of the tower.

the clay pot seen in fig. 46. In the north-west corner was a socket stone, and there were indications that there might be a doorway here in the



Fig. 25. Midhowe Broch : Cup- and ring-marked stone on the north-east wall of the tower.

west wall. Two more fragments of crucibles were got in fallen material to the east of the steps.

Cup-marked Stones.—We have just referred to the cup-marked stone built into a section of late walling. It measures $15\frac{1}{2}$ inches in length and $11\frac{1}{4}$ inches in height. There are twenty-one shallow cups impinging on each other, measuring from 2 inches to $2\frac{1}{2}$ inches in diameter (fig. 24).

Three hollowed stones, including the two illustrated in fig. 43, Nos. 1 and 2, lay separately a few feet south-west of the cup-marked stone.

Built into the foundation of the outer wall of the tower on its north-east side is another stone bearing seven or eight cup-marks and portions of three rings cut apart from the cups. The latter measure from $2\frac{1}{2}$ inches to 3 inches in diameter. The largest ring is $8\frac{1}{2}$ inches across (fig. 25). Both stones have been dressed down before being fitted into the walls. The stone measures 18 inches by $11\frac{1}{2}$ inches.

We discovered nothing to indicate how the large chambers E, F, G, and H had been roofed, neither did we see any built hearths near their centres. As there were no signs of corbelling in the present wall-heads it may be that the parts adjoining the walls had been occupied by cubicles with slab walls and roofs.

RELICS.

A large number of relics were discovered and these were typical of what might be expected in a broch. As usual, bone—animal and cetacean—and deer-horn were extensively used in their manufacture. A small number of ornaments of bronze, much pottery, and a few objects of Roman workmanship were also recovered.

OBJECTS OF BONE.

Central part of a small-toothed hair-comb with only two detached teeth surviving, the two transverse binding plates decorated with two rows of dot and circle ornamentation (fig. 32, No. 1).

Ten long-handled weaving combs of cetacean bone (fig. 26): (1) with thirteen teeth, three broken, sides and base of handle concave, $4\frac{7}{8}$ inches long (fig. 26, No. 1); (2) with nine teeth, two broken, sides of handle concave and base notched, $4\frac{13}{16}$ inches long (fig. 26, No. 2); (3) has had eight teeth, three remaining, sides and base of handle concave, 4 inches long (fig. 26, No. 3); (4) with nine long teeth, sides and base of handle imperfect but originally concave, $5\frac{3}{8}$ inches long (fig. 26, No. 4); (5) with eleven teeth, sides and base of handle concave, $4\frac{15}{16}$ inches long (fig. 26, No. 5); (6) with eight teeth, one remaining, sides of handle concave, base imperfect (fig. 26, No. 6); (7) smallest of the combs, has had ten short teeth, three remaining, base of handle imperfect, on its upper face an

incised saltire (fig. 26, No. 7); (8) with eight short teeth, the point of one broken, the base of the handle swelling out to a greater width than the teeth, $3\frac{1}{2}$ inches long (fig. 26, No. 8); (9) portion only and partly

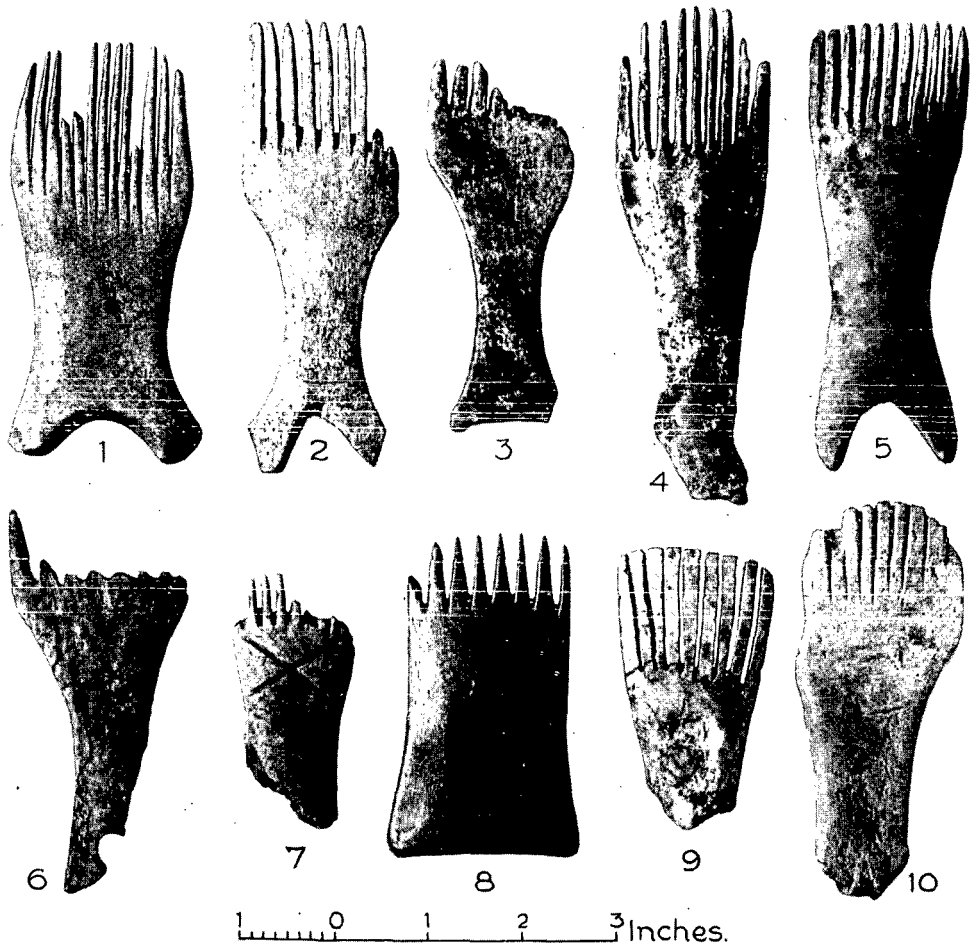


Fig. 26. Weaving Combs of Cetacean Bone.

made, with nine teeth rudely sawn out and not trimmed, base imperfect (fig. 26, No. 9); (10) portion only and unfinished, has probably had twelve teeth, partly cut out not sawn, sides of handle concave and base imperfect (fig. 26, No. 10).

Seven rounded chisel-ended implements made from metatarsal and metacarpal bones of sheep, the distal ends being sliced away on one side: (1) $4\frac{3}{8}$ inches long (fig. 27, No. 1); (2) $4\frac{1}{8}$ inches long, epiphysis wanting (fig. 27, No. 2); (3) $4\frac{5}{16}$ inches long, the proximal end partly pared off (fig. 27, No. 3); (4) $4\frac{1}{8}$ inches long, imperfect at proximal end (fig. 27, No. 4); (5) $3\frac{9}{16}$ inches long, the proximal end dressed to rectangular section (fig. 27, No. 5); (6) $4\frac{5}{16}$ inches long (fig. 27, No. 6);

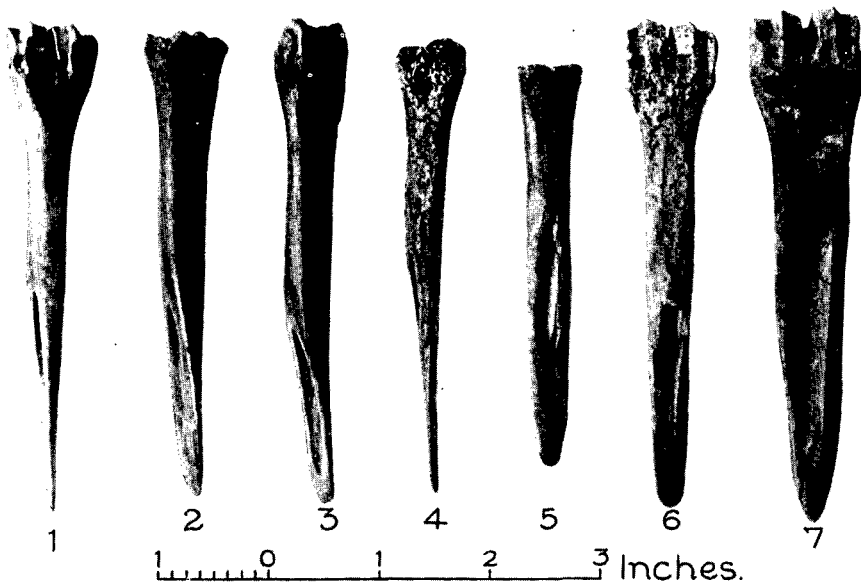


Fig. 27. Chisel-ended Implements of Bone.

(7) $4\frac{1}{2}$ inches long (fig. 27, No. 7). Sometimes the ends are sliced at right angles to the axis of the joint and sometimes parallel to it.

Two fine-pointed awls or borers formed from the ulnæ of sheep, $4\frac{1}{8}$ inches and $4\frac{1}{2}$ inches long (fig. 28, Nos. 9 and 10).

Borer formed from a splintered leg bone of a sheep, $3\frac{1}{2}$ inches long (fig. 28, No. 6).

Five pins or borers, 4 inches, $3\frac{3}{4}$ inches, $3\frac{9}{16}$ inches, $3\frac{1}{4}$ inches, and $2\frac{9}{16}$ inches long, the last two imperfect; four shown in fig. 28, Nos. 1, 3, 4, and 5.

Pin or borer made from the leg bone of a bird, $2\frac{3}{4}$ inches long (fig. 28, No. 2).

Part of a bone pin, finely made, $1\frac{1}{4}$ inch remaining.

Stout bone borer, 5 inches long (fig. 29, No. 1).

Bone borer, imperfect at butt end, $4\frac{1}{2}$ inches long (fig. 29, No. 2).

Two borers formed from splinters of leg bones, $3\frac{1}{8}$ inches and $2\frac{3}{16}$ inches long (fig. 28, Nos. 7 and 8).

Large splinter of the leg bone of an ox, its blunt point made smooth by rubbing, $5\frac{1}{16}$ inches long (fig. 30).

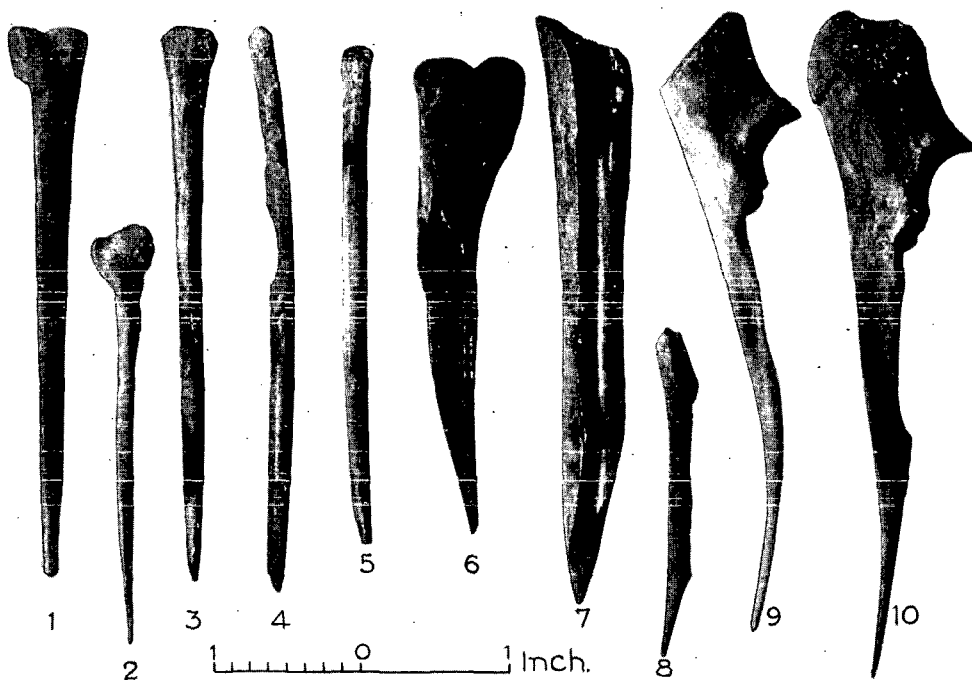


Fig. 28. Pins and Borers of Bone.

Small irregularly shaped splinter of bone, highly polished all over, $1\frac{1}{8}$ inch long.

Eight splinters of bone, several of spatulate form, ranging from $2\frac{1}{8}$ inches to $4\frac{1}{2}$ inches in length, much polished (fig. 31).

Part of the leg bone of an ox, split longitudinally, the proximal end rounded by rubbing, $4\frac{11}{16}$ inches long.

Two spatulate objects formed from the scapulæ of small animals, possibly sheep, $2\frac{3}{4}$ inches and $1\frac{5}{8}$ inch long (fig. 32, Nos. 5 and 6).

Three splinters of leg bones of ox showing slight signs of use.

Tube formed from the middle portion of the ulna of a large bird, such as the Wild Goose or Fish Eagle, measuring $6\frac{3}{8}$ inches long and $\frac{1}{2}$ inch in diameter (fig. 29, No. 3).

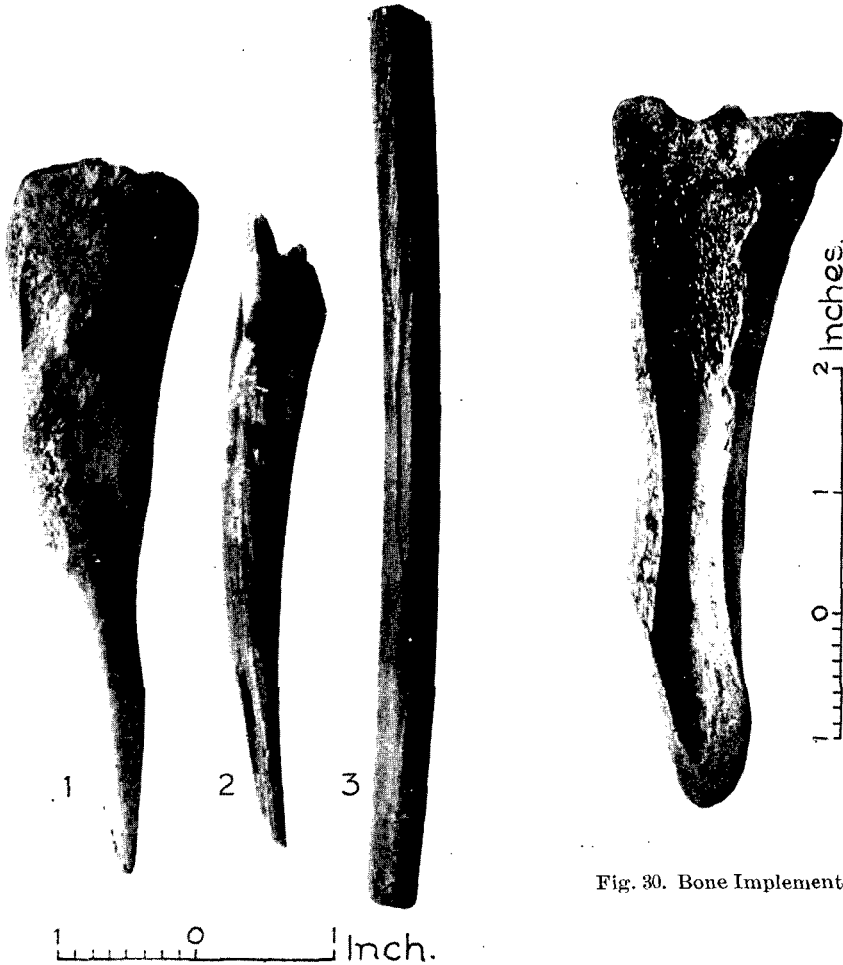


Fig. 29. Borers and Tube of Bone.

Vertebra of a small animal, the ends rubbed down, $\frac{3}{4}$ inch long.

Bead or whorl of cetacean bone of flattened spheroidal shape, chipped round the circumference and gnawed in places by a rodent, $1\frac{1}{4}$ inch in diameter and $\frac{7}{8}$ inch thick (fig. 32, No. 2).

Fig. 30. Bone Implement.



Half of the head of a pin of tooth or morse ivory, 1 inch in diameter, with a large longitudinal perforation and a vertical one for the iron stem.

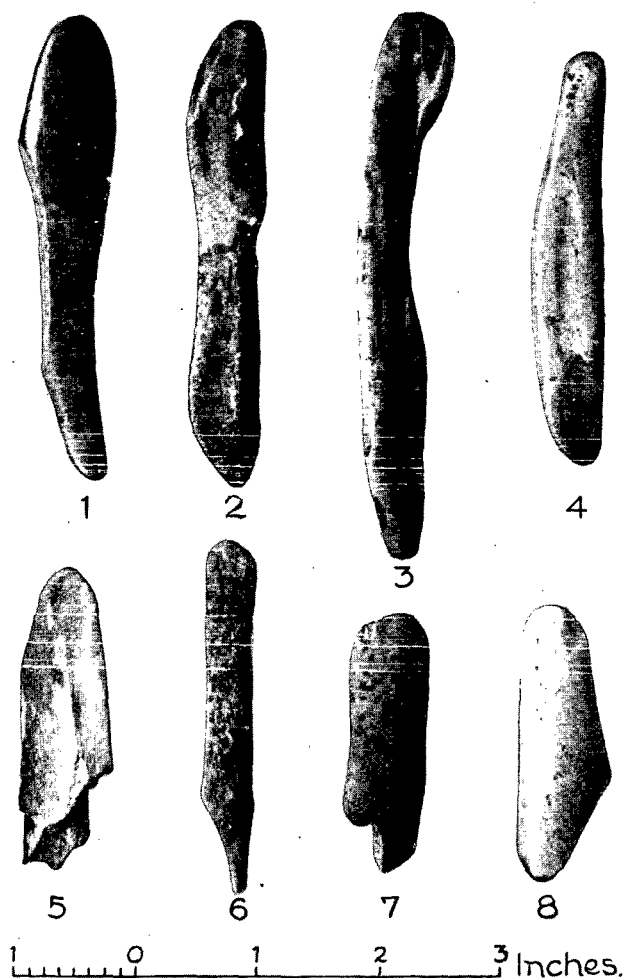


Fig. 31. Spatulate Bone Objects.

Three beads or whorls made from the proximal ends of femurs, the perforations in two being very small (fig. 40, No. 6).

Proximal end of an ox femur with a perforation begun from the under side.

Proximal end of an ox femur, roughly dressed to a bobbin-like shape.

Many animal bones as described in Miss Platt's report.

Large block of whale's bone, $12\frac{1}{2}$ inches long, $8\frac{3}{8}$ inches broad, and $5\frac{1}{2}$ inches thick, with an oblong and a rounded cavity on the top (fig. 33). Found outside the southern wall of the broch, 9 inches above the rock.

Large piece of cetacean bone, roughly squared at one end, $9\frac{1}{2}$ inches long by $1\frac{11}{16}$ inch by $1\frac{5}{16}$ inch at the broad end.

Plate of cetacean bone with five perforations, two at one end and

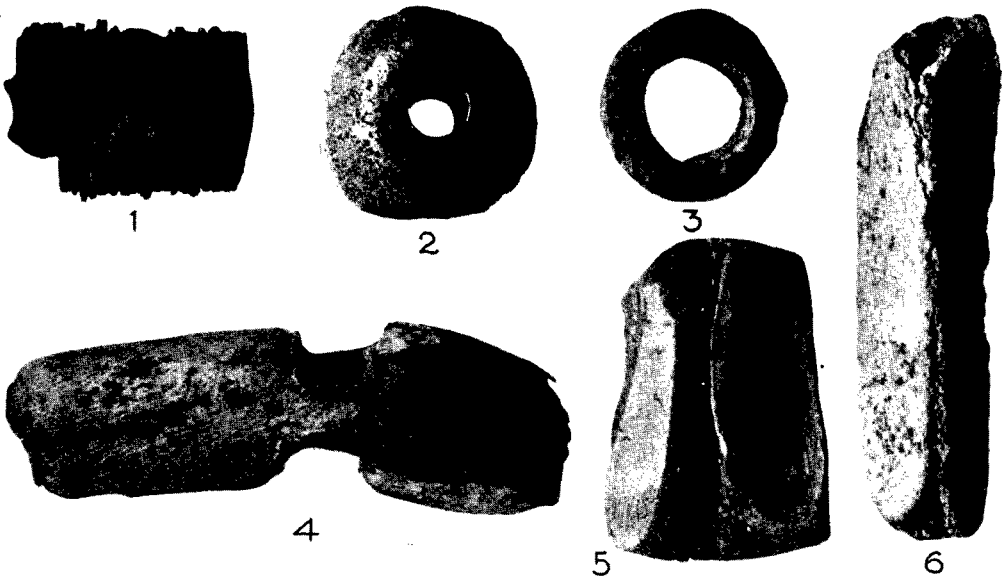


Fig. 32. Miscellaneous Objects of Bone. (1.)

three at the other, $9\frac{1}{2}$ inches long, $2\frac{3}{8}$ inches broad, and $\frac{1}{2}$ inch thick (fig. 34).

Y-shaped piece of cetacean bone, imperfect, $3\frac{1}{2}$ inches long.

Oval ring of cetacean bone, $1\frac{1}{16}$ inch and $\frac{1}{16}$ inch in cross-diameters and $\frac{7}{16}$ inch thick (fig. 32, No. 3).

Fragment of a plate of cetacean bone, $4\frac{1}{4}$ inches long and $\frac{5}{8}$ inch thick, showing part of the end and one side of a large rectangular longitudinal slot cut in it.

Hollowed piece of cetacean bone of semicircular section, $7\frac{3}{4}$ inches in length.

Small vertical section of a cup formed from a whale's vertebra, $5\frac{1}{2}$ inches high.

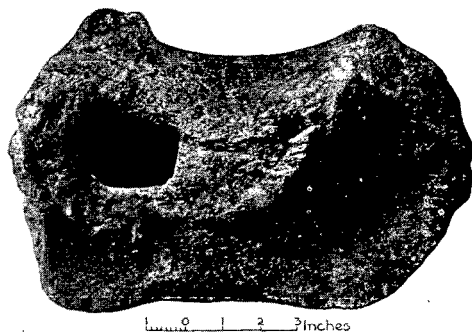


Fig. 33. Object of Whale's Bone.

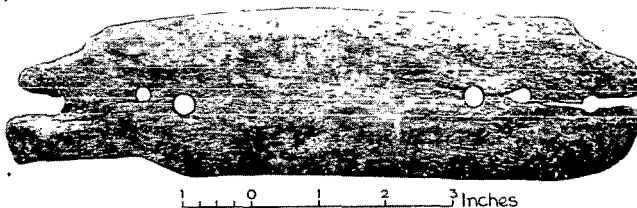


Fig. 34. Perforated Plate of Whale's Bone.

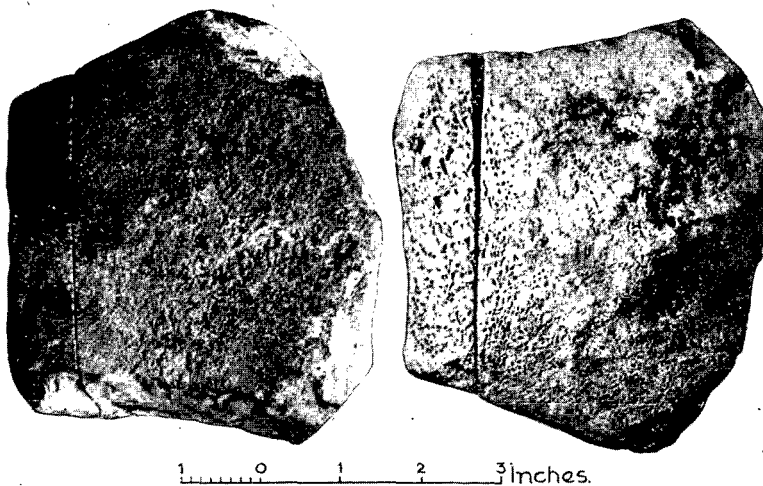


Fig. 35. Worked piece of Cetacean Bone.

Small edge fragment of the dorsal plate of a whale.

Two very dense and hard pieces of the paddle bone of a very large whale, 5 inches by $4\frac{1}{2}$ inches by $2\frac{1}{2}$ inches, and 3 inches by $3\frac{1}{4}$ inches by $2\frac{1}{2}$ inches, the latter rubbed flat in parts at one side. The first is illustrated in fig. 35, which shows a saw-cut made for examination purposes.

Eighteen boars' tusks, one measuring $7\frac{1}{4}$ inches in length.

Oyster-shells, one 5 inches in diameter, and many limpets.

OBJECTS OF DEER-HORN.

Hammer-head $2\frac{3}{4}$ inches long, $1\frac{7}{18}$ inch and $\frac{1}{18}$ inch in cross-diameters, the perforation $\frac{5}{8}$ inch in diameter with a small pin-hole bored lengthwise from end to end in the centre (fig. 36, No. 1).

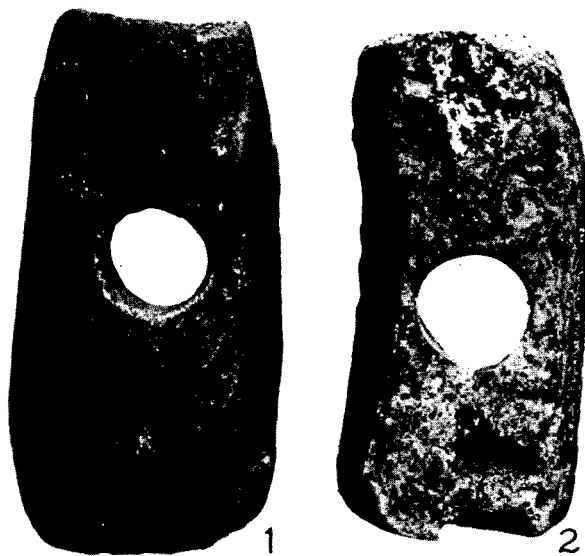


Fig. 36. Hammers of Deer-horn. (4.)

Half of a hammer-head split longitudinally, $2\frac{11}{18}$ inches long and $1\frac{1}{4}$ inch broad, the perforation $\frac{1}{2}$ inch in diameter (fig. 36, No. 2).

Thin flat plate slightly curved, $6\frac{3}{8}$ inches long and 1 inch in greatest breadth, with a pin-hole nearest the broadest end retaining its pin of bone, $\frac{1}{4}$ inch in diameter, and half of another perforation on the edge near the other end, $\frac{3}{8}$ inch in diameter, the outer surface covered with oblique scores (fig. 37).

Tine split longitudinally with two large perforations near the broad end, $6\frac{5}{8}$ inches long, probably part of a handle of some instrument (fig. 37).

Tine with a slot cut in the broad end and highly polished at the point, 10 inches long, doubtless the handle of some implement (fig. 37).

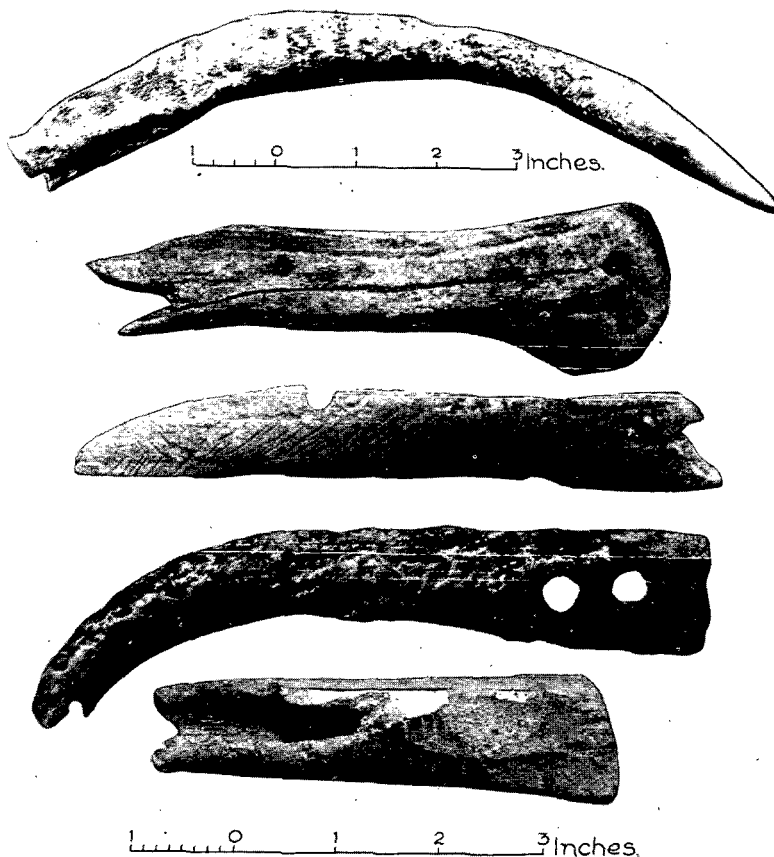


Fig. 37. Handles and Hafts of Deer-horn.

Haft-plate with two pin-holes in it, imperfect, $5\frac{5}{8}$ inches long (fig. 37).

Thin oblong plate $2\frac{1}{2}$ inches long, $\frac{13}{16}$ inch broad, with two perforations. Haft, the socket imperfect, $4\frac{1}{2}$ inches long (fig. 37).

Haft formed from a section of the beam of a very stout antler

7½ inches long, with a socket at the thick end 4 inches deep, and a large pin-hole on opposite sides near the mouth of the socket.

Nine deer-horn picks, the bay tine being cut off the antler in each case, the largest measuring 9¼ inches along the beam which serves as the handle; the brow tine is 8 inches in length. The end of the handle has been scooped out to form a socket 3½ inches deep. Most of them are imperfect. Two are illustrated in fig. 38.

Nine points of deer-horn tines from 4¼ inches to 9 inches in length, many worn at the point or showing marks of cutting or sawing.



Fig. 38. Deer-horn Picks. (3.)

Point of a tine, 1½ inches long, carefully sawn off.

Four segments of tines cut at both ends.

Two segments of the beam of very stout antlers cut at the ends, 4½ inches and 7¾ inches long.

Segment of an antler, 3½ inches long, cut across the ends and pared down on the under side to a D-shaped section.

Section of the beam of an antler, perforated and roughly dressed by cutting.

Part of the beam of an antler, 7 inches long, pared down at an acute angle to a chisel-shaped end, at least ten cuts of the iron tool having been required, the longest of which has penetrated ⅝ inch.

An antler, 22 inches long, with five tines.

Part of the skull of a red-deer with part of one antler attached; the beam has been partly sawn and then broken $4\frac{1}{4}$ inches from the burr, and the bay tine has been cut and then broken off. The second antler has been cut and broken off below the burr (fig. 39).

Fragments of six more antlers.

Burr and brow tine of a large antler, the beam of which has been

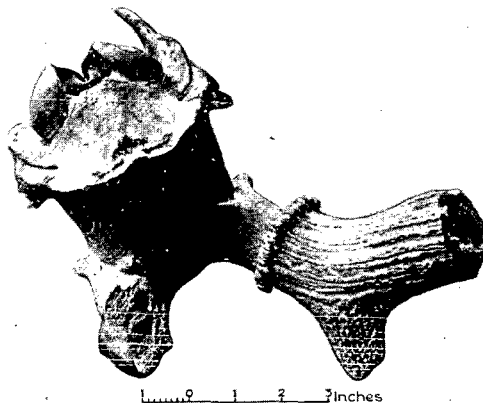


Fig. 39. Part of Skull and Antler of Deer-horn.

sawn off and the core hollowed out, the tine and the base of the burr showing cuts.

Curved object, 3 inches in length, 1 inch by $\frac{1\frac{3}{8}}{16}$ inch in cross-diameters, pierced lengthwise with a large perforation, and transversely with two holes $1\frac{1}{8}$ inch from one end, possibly a whistle (fig. 32, No. 4).

STONE OBJECTS.

Part of a shale or jet armlet, the section being flat on the inside and double curved on the exterior, $1\frac{3}{4}$ inch long.

Five whorls of flattened spheroidal shape, ranging from $1\frac{3}{4}$ inch to $1\frac{1}{4}$ inch in diameter, and half of another (fig. 40, Nos. 1 to 5).

Four whorls of irregular shape, the largest $1\frac{3}{4}$ inch in greatest diameter.

Perforated stone of flat, sub-oval shape, 3 inches long and $2\frac{1}{2}$ inches broad, the hole drilled straight through the centre (fig. 40, No. 7).

Perforated stone of irregular shape, $4\frac{3}{4}$ inches by $3\frac{3}{4}$ inches by $1\frac{3}{4}$ inch.

Round flat pebble partially perforated from both sides, but the holes not opposite, $1\frac{1}{4}$ inch in diameter.

Polisher or whetstone of pinkish quartzite, oval in shape and rubbed flat on one face, $2\frac{3}{8}$ inches by $1\frac{1}{2}$ inch by $1\frac{1}{2}$ inch.

Pebble, highly polished on one face, $1\frac{9}{16}$ inch by $1\frac{1}{2}$ inch by $\frac{1}{4}$ inch.

Whetstone, chipped along one edge and at the ends, $4\frac{7}{8}$ inches by $1\frac{5}{8}$ inch by $\frac{1}{2}$ inch (fig. 41, No. 1).

Four whetstones formed from irregularly shaped water rolled stones, measuring $5\frac{3}{4}$ inches, $5\frac{1}{4}$ inches, $4\frac{3}{4}$ inches, and $4\frac{1}{2}$ inches in length.

Whetstone, oblong and of rectangular section, worn on two faces

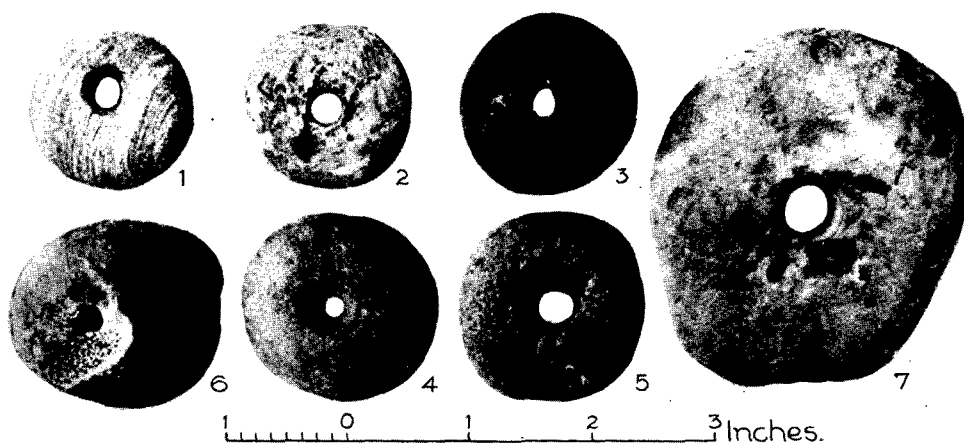


Fig. 40. Whorls and Perforated Objects of Stone and Bone.

and rubbed down at the ends, 5 inches long, $1\frac{1}{2}$ inch broad, and 1 inch thick (fig. 41, No. 5).

Two well formed whetstones of fine micaceous sandstone, $4\frac{1}{4}$ inches long, $1\frac{3}{16}$ inch broad, and $\frac{7}{16}$ inch thick and 3 inches long, $\frac{7}{8}$ inch broad, and $\frac{1}{4}$ inch thick (fig. 41, Nos. 2 and 3).

Whetstone, $3\frac{1}{4}$ inches long, $\frac{7}{8}$ inch broad, and $\frac{1}{2}$ inch thick (fig. 41, No. 4).

Two broken whetstones.

Implement of sub-oval shape, rubbed smooth at one end and along one edge, $3\frac{9}{16}$ inches long, $1\frac{1}{2}$ inch long, and $\frac{9}{16}$ inch thick.

Oval water rolled stone encircled lengthwise with a groove, possibly a sink stone, $3\frac{1}{2}$ inches long, 2 inches broad, and 2 inches thick.

Pendant or sinker, formed of a naturally broken stone with large

perforation at the narrow end, $3\frac{5}{8}$ inches long, and $1\frac{3}{8}$ inch by $1\frac{1}{4}$ inch at broad end.

Long, thin water-worn stone, the ends roughly broken off, $6\frac{1}{2}$ inches long.

Pot-lids of stone, all nearly circular, the smallest measuring $2\frac{1}{2}$ inches in diameter and $\frac{3}{16}$ inch in thickness, and the largest $13\frac{1}{2}$ inches by 1 inch. One measuring $5\frac{1}{2}$ inches in greatest diameter and $\frac{9}{16}$ inch in thickness was found beside the small pot illustrated in fig. 49.

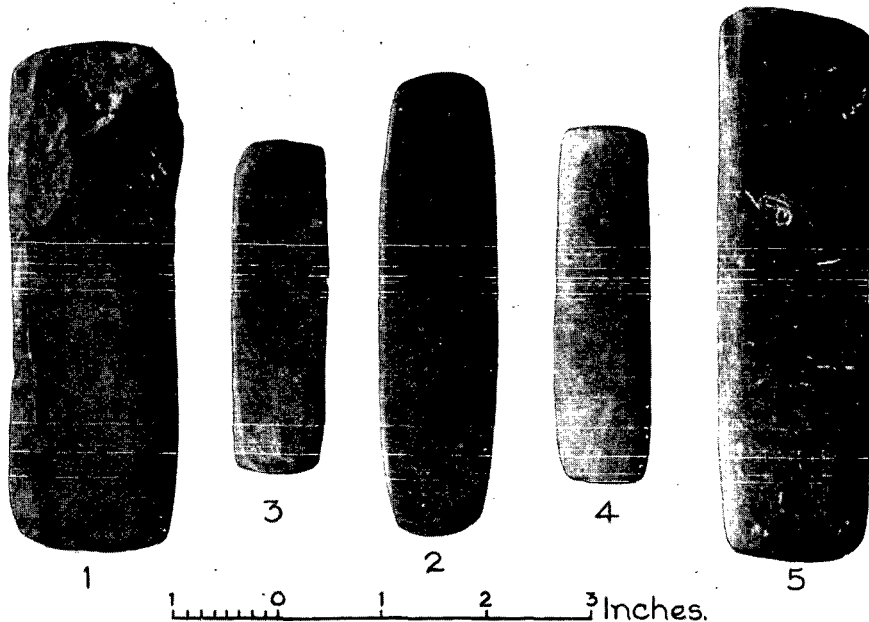


Fig. 41. Whetstones.

Hollowed stone of flattened spheroidal shape with a projection on one side, like a stone cup in the making, $5\frac{1}{2}$ inches in diameter and 3 inches in height.

Hollowed stone of sub-oval shape, possibly a lamp, $5\frac{7}{8}$ inches long, $4\frac{9}{16}$ inches broad, and $2\frac{1}{2}$ inches high.

Hollowed stone of triangular shape, probably a lamp, measuring about 5 inches long on each side and $3\frac{1}{8}$ inches high, thickly encrusted with soot outside the brim (fig. 42).

Twelve hollowed stones or mortars generally made from boulders, the largest measuring $22\frac{1}{2}$ inches by $19\frac{3}{4}$ inches by $11\frac{1}{2}$ inches (fig. 43), Nos. 1 and 2.

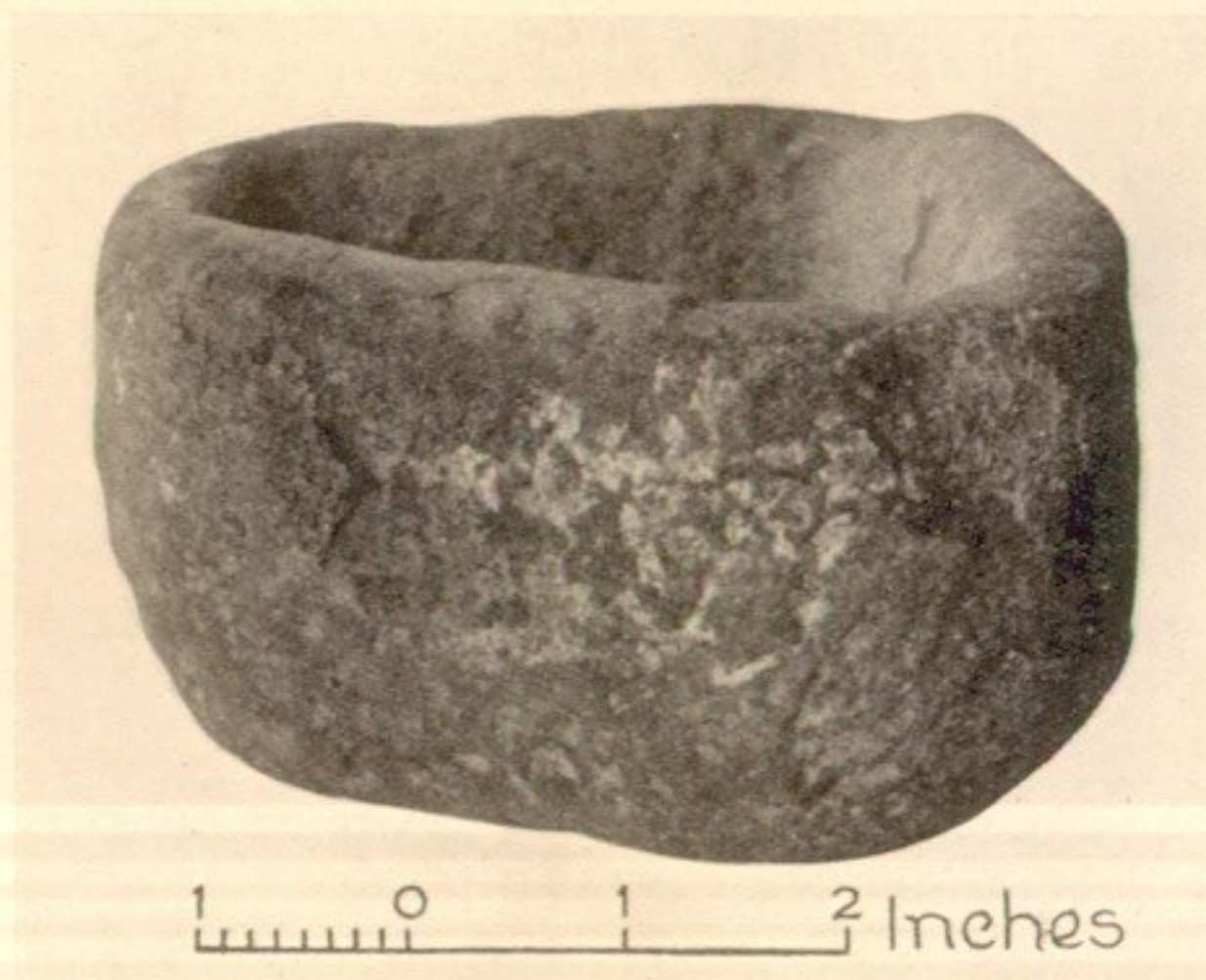


Fig. 42. Hollowed Stone, probably a Lamp.

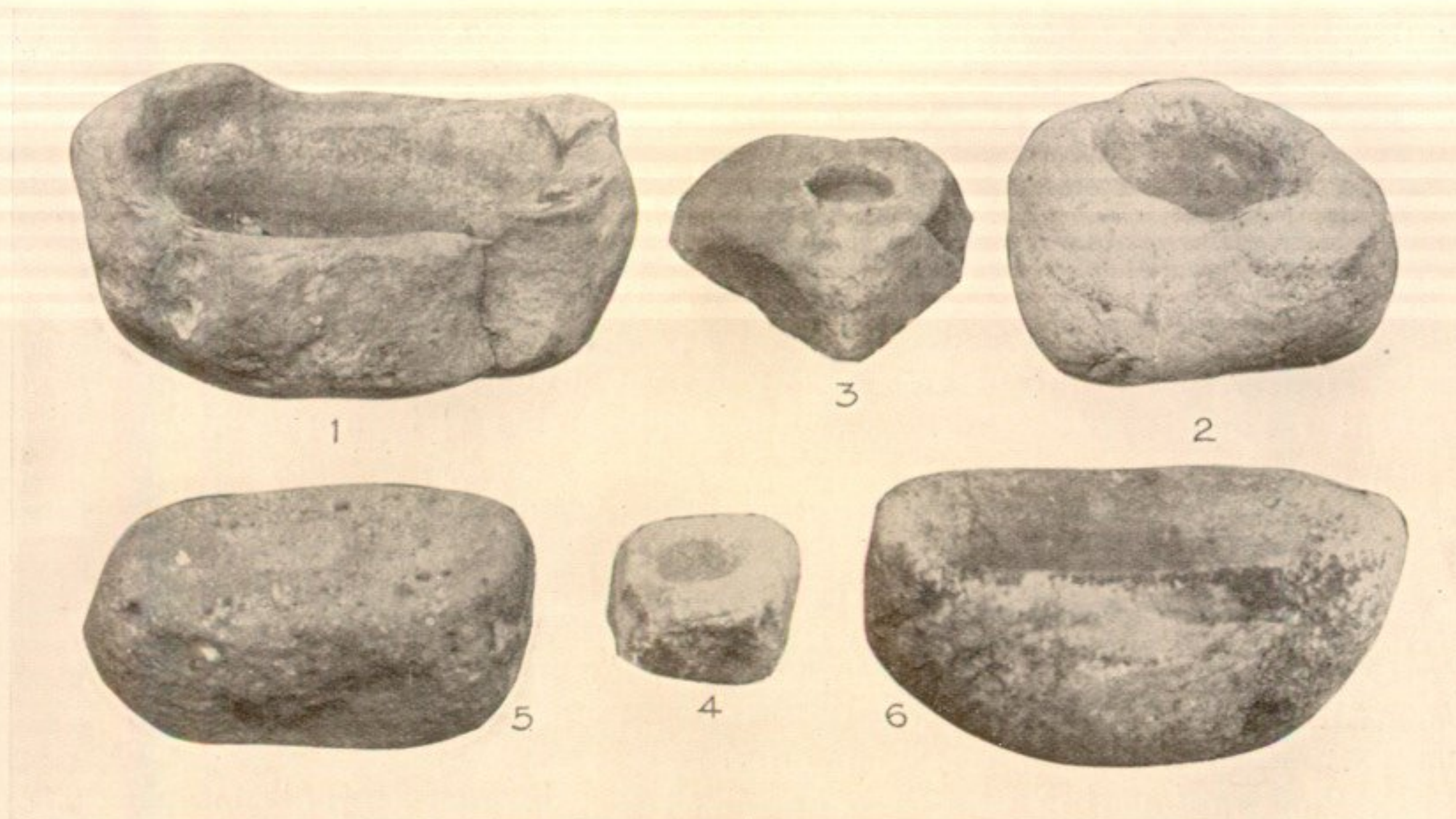


Fig. 43. Mortars (1, 2, and 4), Saddle Querns (5 and 6), and Socket Stone (3).

Twelve saddle querns, the largest which is broken being now $17\frac{1}{2}$ inches long and 12 inches broad.

Six upper stones of rotatory querns mostly broken.

Two lower stones of rotatory querns. In no case were the upper and lower stones of a quern found together.

Half of a perforated stone like the upper stone of a small rotatory quern $6\frac{1}{2}$ inches in diameter.

Twenty-three socket stones.

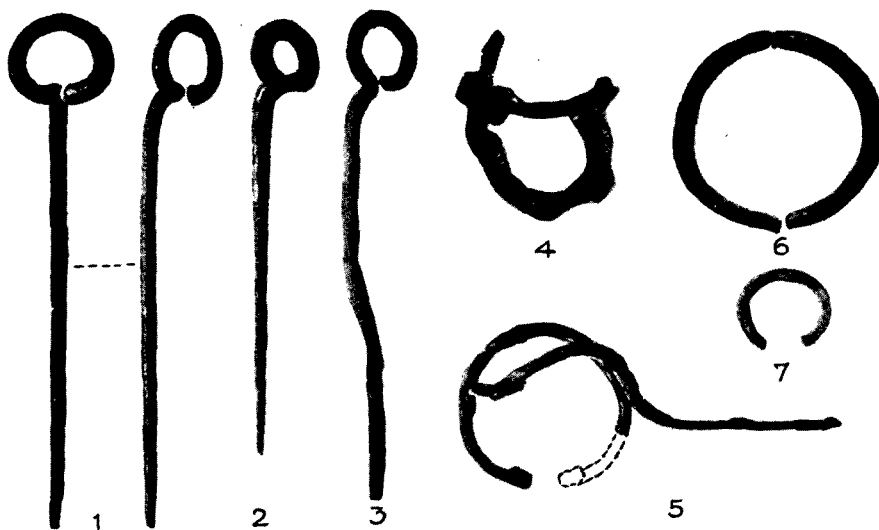


Fig. 44. Pins, Brooches, and Rings of Bronze. (†.)

Nearly one hundred hammer-stones or pounders invariably made of water-worn pebbles, the two smallest measuring $1\frac{1}{2}$ inch and $2\frac{1}{8}$ inches in length, and the largest 9 inches by $6\frac{1}{2}$ inches by $4\frac{1}{2}$ inches.

A well-made scraper of yellow flint $1\frac{1}{8}$ inch by $1\frac{1}{8}$ inch in cross-diameters.

METAL OBJECTS.

Three bronze pins with circular ring heads projected forward from the stem, $2\frac{11}{16}$ inches, $2\frac{1}{2}$ inches, and $2\frac{1}{4}$ inches in length (fig. 44, Nos. 1 to 3).

Stem of bronze pin $1\frac{7}{8}$ inch long.

Penannular ring brooch of bronze with large terminals cupped at the ends, $1\frac{1}{4}$ inch and 1 inch in cross-diameters. The pin, which has a

looped hinge, a very high bow and a long flattened point, measures 3 inches in length (fig. 45).

Small penannular ring brooch of bronze, broken into small fragments, with a bow-shaped pin, probably with spheroidal terminals, and about 1 inch in diameter (fig. 44, No. 4).

Greater part of a penannular ring brooch of thin bronze wire showing the surviving terminal turned back on the wire. It seems to have been at least 1 inch in diameter; and piece of bronze wire bent into bow shape and flattened near one end, $1\frac{9}{16}$ inch long, which has probably formed the pin of the brooch (fig. 44, No. 5).

Ring of bronze, broken, $1\frac{1}{8}$ inch in diameter; as it is hollow it must have been made by lapping over a thin plate of metal (fig. 44, No. 6).

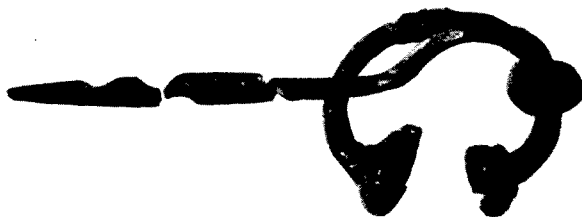


Fig. 45. Bronze Brooch. (†.)

Ring of bronze with a break in it, flattened on one side, measuring $\frac{7}{16}$ inch in greatest diameter (fig. 44, No. 7).

Fragments of a Roman patera of bronze which has measured $5\frac{1}{2}$ inches in external diameter at the lip, the bowl smashed to atoms, but the greater part of the handle surviving, one part at the rim having been patched.

Some small flakes of sheet bronze found beside the crucibles.

Two pieces of polished hematite, $2\frac{1}{2}$ inches by $2\frac{1}{4}$ inches by $1\frac{1}{4}$ inch, and $1\frac{1}{8}$ inch by 1 inch by $\frac{1}{8}$ inch.

A large quantity of iron slag found at the furnace in chamber G.

POTTERY.

All the pottery with the exception of a few very small pieces of unornamented Samian and dark coloured Roman ware is hand-made, and consists of:—

A pot of reddish clay, of sub-oval shape, with a short everted rim, measuring $11\frac{1}{8}$ inches in height, $7\frac{7}{8}$ inches in diameter at the mouth,

10 inches at the bulge, and $5\frac{1}{2}$ inches across the base. At the rim, which is flat on the top, the wall is only $\frac{5}{16}$ inch thick. The vessel is unornamented and has been restored (fig. 46).

More than half of an unornamented pot of very coarse reddish clay containing much crushed stone, some pieces of which are over $\frac{1}{4}$ inch in length. It is bucket-shaped and curves in slightly towards the rim.



1 0 1 2 3 Inches.

Fig. 46. Clay Pot.

It is $11\frac{3}{4}$ inches in height, 9 inches in diameter at the mouth, $9\frac{1}{2}$ inches at the widest part, and 6 inches across the base. The lip is flattened on the top and the wall is $\frac{5}{8}$ inch thick. The pot has been restored (fig. 47). Found beside the smelting hearth.

Unornamented pot of very dark clay with a short everted rim, swelling out in a flat curve to the shoulder and curving in to a relatively narrow bottom. It is $8\frac{3}{4}$ inches in height, $6\frac{3}{4}$ inches in diameter across the mouth, $6\frac{3}{8}$ inches at the neck, $10\frac{3}{8}$ inches at the bulge, and $3\frac{3}{8}$ inches across the base. The top of the lip is rounded and measures $\frac{1}{4}$ inch in thickness. It has been restored (fig. 48).

Pot of very dark coloured clay, unornamented, with a slight shoulder and a short, slightly everted lip, measuring 5 inches in height, $4\frac{1}{4}$ inches in diameter across the mouth, $5\frac{3}{4}$ inches at the shoulder, and 4 inches across the base. The rim is rounded on the top and measures $\frac{3}{16}$ inch in thickness. It has been restored. Lying amongst the fragments of the pot was a stone pot-lid (fig. 49).



1 0 1 2 3 Inches.

Fig. 47. Clay Pot.

Slightly less than half of the wall of a pot of dark clay, buff-coloured on the outside and inside, of sub-oval shape with a short everted rim. It measures over $9\frac{3}{4}$ inches in height. The lip, $\frac{1}{4}$ inch thick, is rounded on the top and at the most the wall is $\frac{7}{16}$ inch thick. The outer surface and the upper part of the inner is striated as if finished off by rubbing with grass.

Large quantities of shards of pottery, very few of which could be fitted together, were recovered. It was generally of dark colour in the inside and buff to red on the outside. Some pieces are black all through and some are red. Fragments of more than twenty rims and



Fig. 48. Clay Pot.

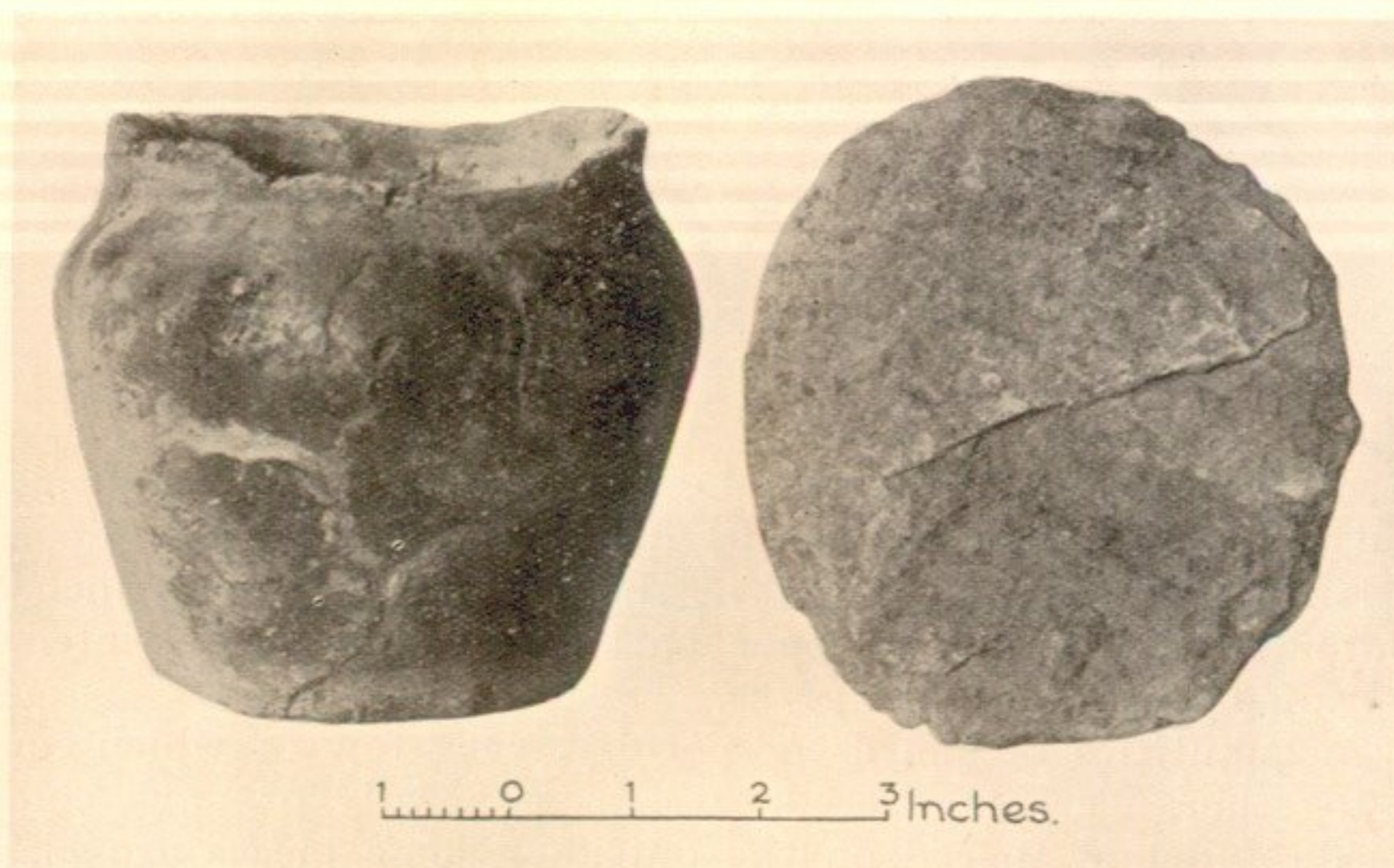


Fig. 49. Clay Pot and its Stone Pot-lid.

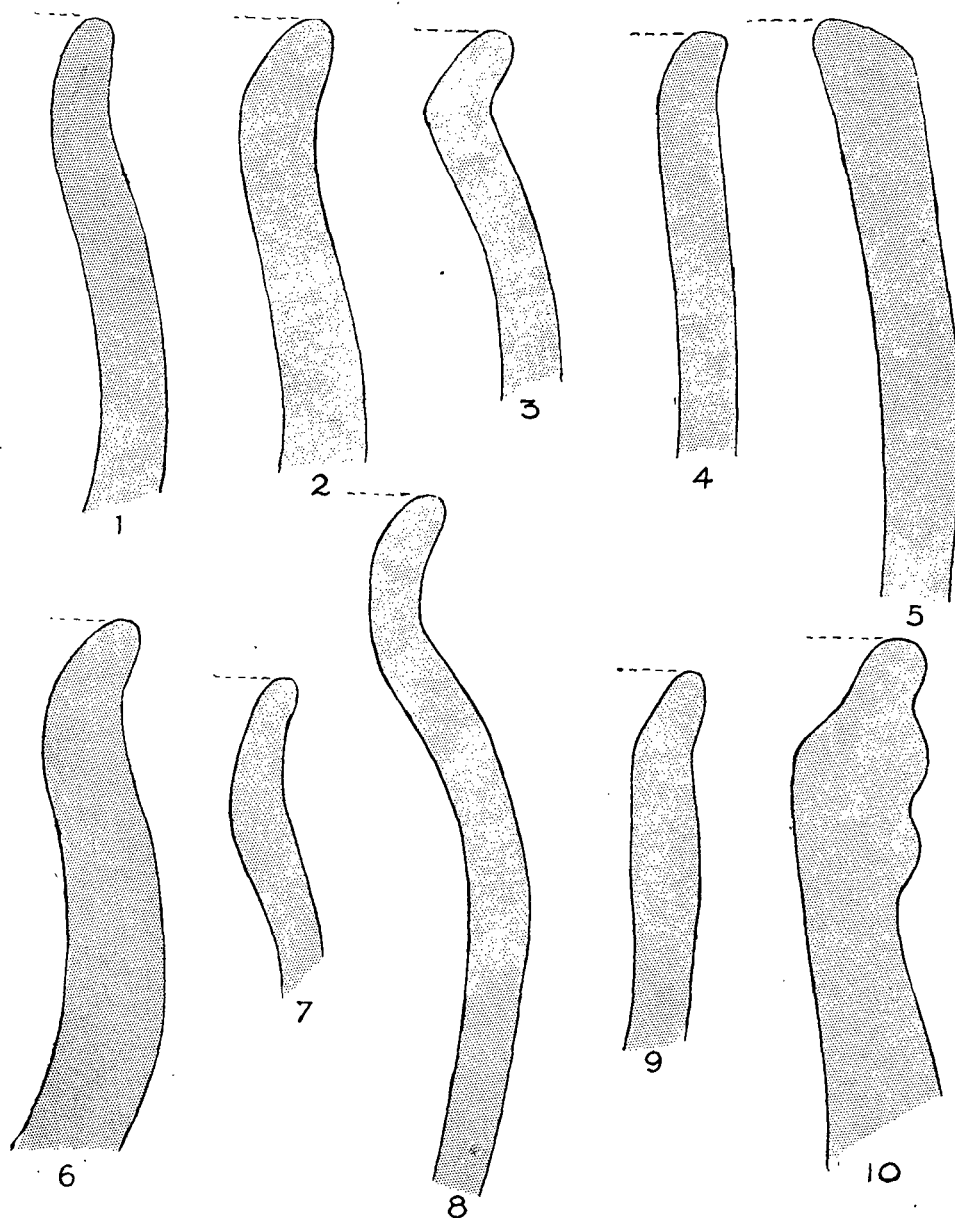


Fig. 50. Sections of Pottery from different parts of the Broch. (†.)

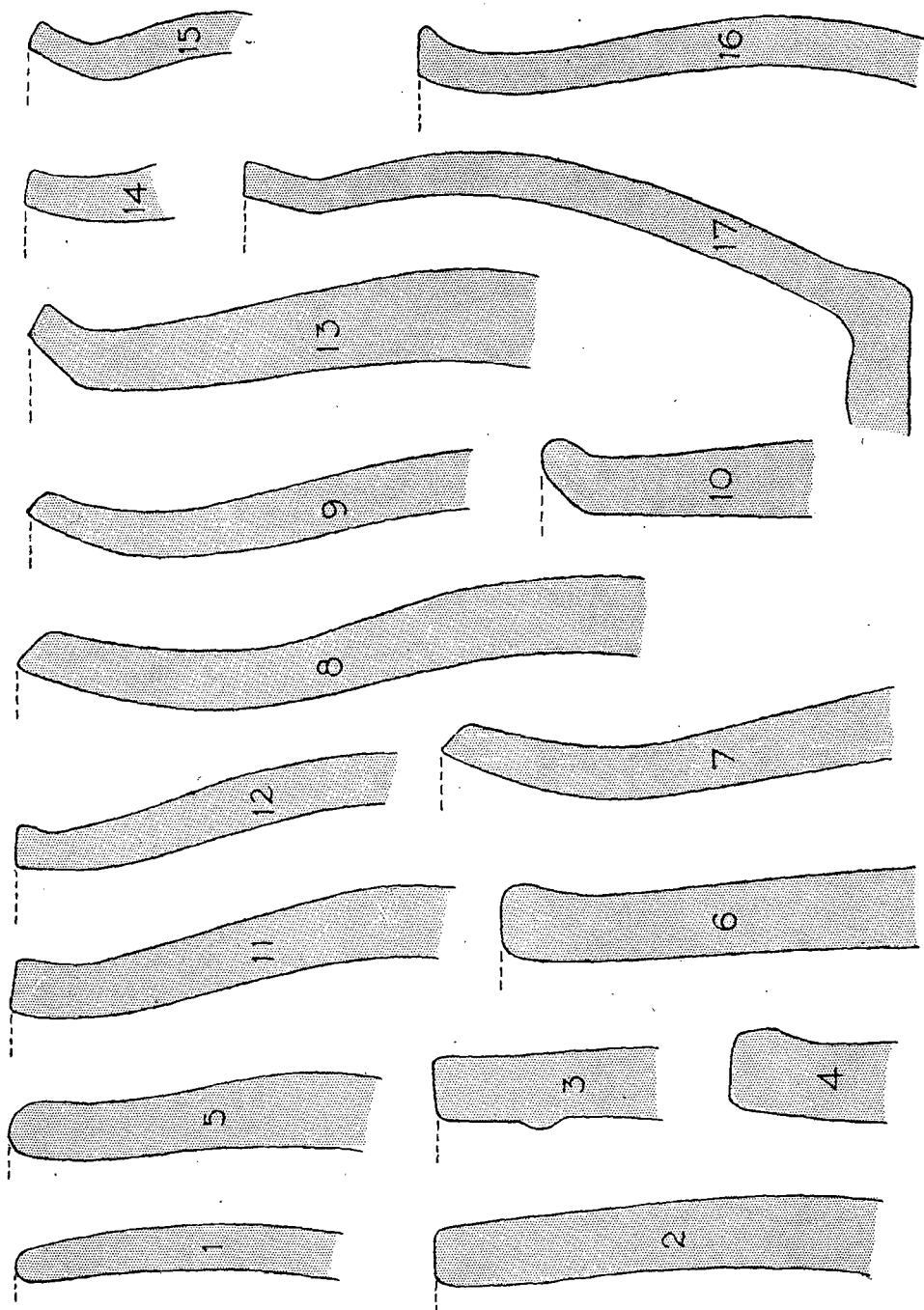


Fig. 51. Sections of Pottery found in the Cubicle. (4.)

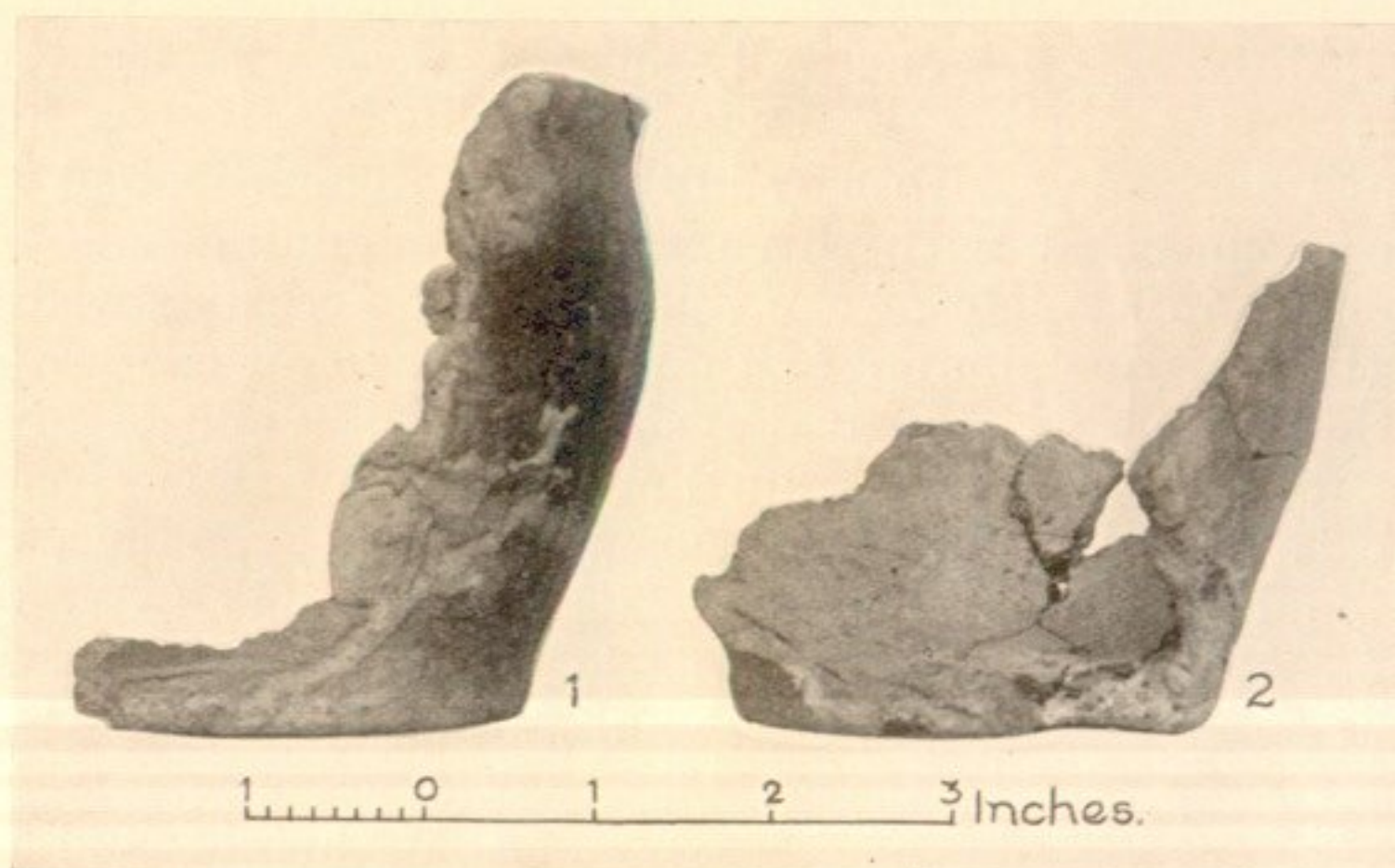


Fig. 52. Clay Pots.

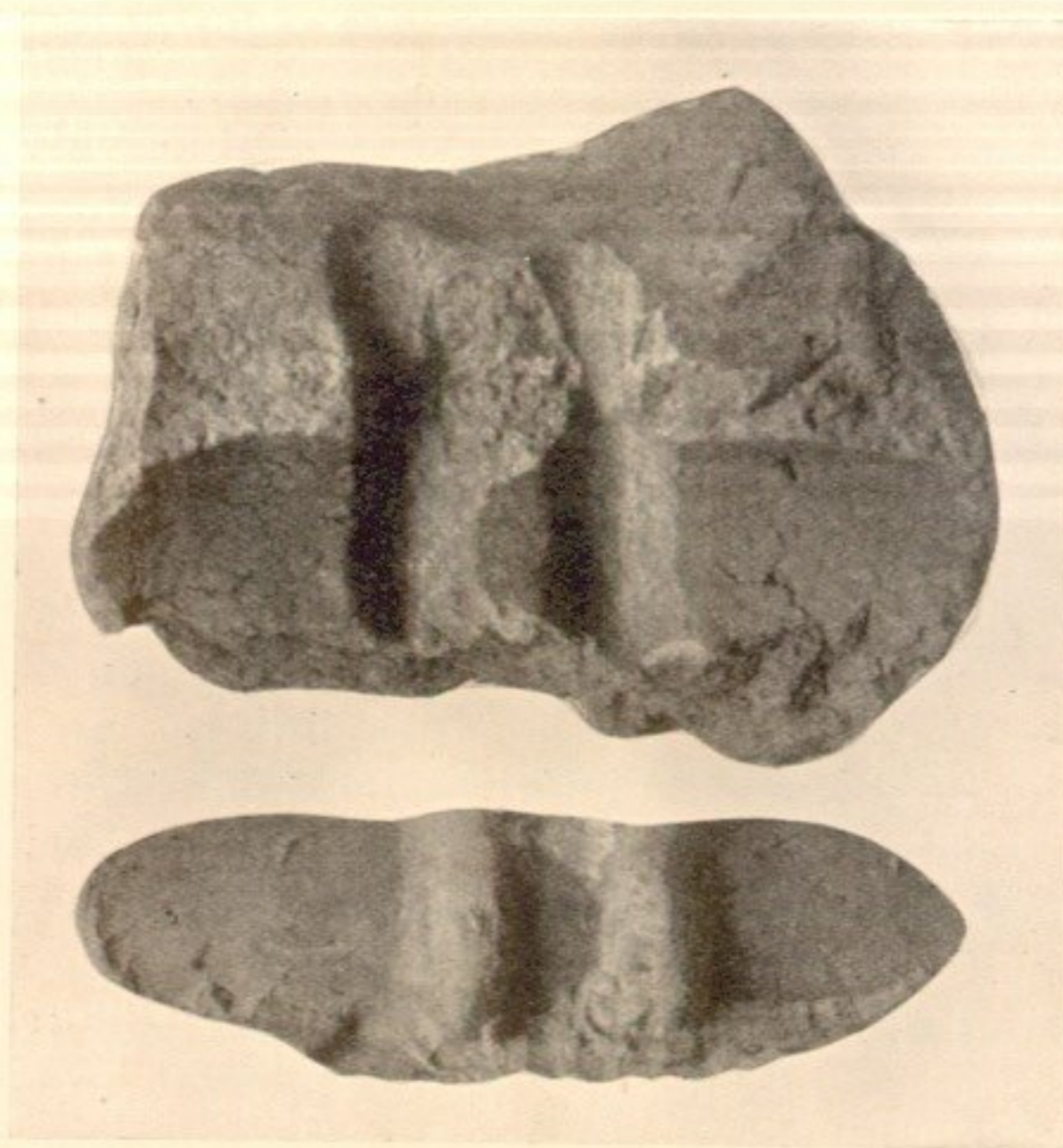


Fig. 53. Clay Mould and Plaster Cast made therein. (†.)

as many bases, measuring from $2\frac{3}{4}$ inches to 6 inches in diameter, were identified. The great majority of the vessels had had slightly everted short rims. Only one ornamentally shaped piece was secured, and it consisted of a rim portion, $3\frac{1}{2}$ inches long and $2\frac{1}{8}$ inches high, of a vessel of hard dark clay with a reddish tinge. The rim had been vertical and was encircled with three rounded mouldings outside and a concavity on the inner side of the lip. Several pieces showed traces of wiping on the exterior similar to that referred to on the large section of one of the vessels previously described. Figs. 50 and 51 give a good idea of the forms of the rims and the thickness of the ware.

The shards found in the cubicle weighed $37\frac{1}{2}$ pounds, but very few pieces could be fitted together. It was possible to restore only portions of two small vessels of dark ware (fig. 52, Nos. 1 and 2).

One showed a complete section of the wall and base. It measured $3\frac{5}{8}$ inches in height and $2\frac{3}{8}$ inches across the base. In fig. 51 is seen a selection of the sections of the rims of the vessels.

Fragments of seven or eight small crucibles of hard well-baked clay for casting bronze.

Part of one valve of a mould measuring $2\frac{1}{2}$ inches by $1\frac{7}{8}$ inch by $1\frac{3}{8}$ inch, for casting a slightly curved

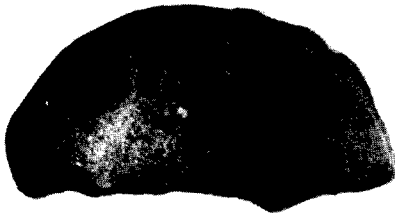


Fig. 54. Hollow Object of Clay. (½.)

cylindrical object showing two raised transverse mouldings near the centre (fig. 53).

Half of a flat hollow object, 2 inches in diameter and $\frac{9}{16}$ inch in thickness, with oblique incisions round the edge on the upper side (fig. 54).

The fragment of the small-toothed hair-comb, with teeth on both sides, represents a class of relic which has often been found in brochs. There are thirty-seven of them in the National Museum, most of which came from brochs in Orkney and Caithness, but a few were found in earth-houses in the latter county and the Outer Hebrides. All those which came from brochs had their component plates clasped by rivets of iron, in a few of the others they were made of bronze.

The ten weaving combs were made of cetacean bone, the favourite material for making these implements among the broch builders and the occupants of the Hebridean earth-houses. Only one bears ornamentation, and that consists of a simple incised saltire (fig. 26, No. 7). The two unfinished specimens are of special interest, as they exhibit two

methods of cutting out the teeth. In one (fig. 26, No. 10) they are only partly cut, this having been done with a pointed knife or other instrument; in the other (fig. 26, No. 9) they have been sawn, but with a saw which must have been fairly thin and not very deep, as the cuts do not follow a straight line. This is surprising when we consider the small-toothed combs in which the teeth have been sawn by very thin tools that have kept straight and true. These saws probably were deeper. In the Museum there are eighty-three weaving combs of bone mostly cetacean and a few of deer-horn, more or less complete. The ten from Midhowe and one from the adjacent broch at Broch bring the number recorded from Scotland up to ninety-four. Forty-nine were found in Orkney, seven in Shetland, thirteen in Caithness, all in brochs; four in a cave in the Stewartry of Kirkcudbright; twelve from earth-houses in the Outer Hebrides; six from two Roman forts; one from a hut-circle in Perthshire; one from a rock-shelter in Argyll; and one with no locality.

Associated with the weaving comb in the manufacture of fabrics is the spinning whorl, but only ten of stone, three of bone, and half of one of clay were found. This seems a small number compared with that of the combs. But the same thing is to be seen elsewhere. The broch of Burrian in Orkney gave eighteen combs and thirty-nine whorls, and the earth-house at Bac Mhic Connain, in North Uist, yielded four combs and only a partially made whorl. A possible explanation of these discrepancies may be that much of the spinning would be done in the open air by girls and others while tending their flocks and herds, and many of the whorls would be lost. The Midhowe whorls are generally poor specimens, most being simply of flattened spheroidal form and only two ornamented.

The occurrence of seven implements formed from metatarsal and metacarpal bones of sheep, of rounded chisel shape at the distal end, is unusual, although a considerable number of such bones tapering to a sharp point have been found in Scottish earth-houses and brochs. There are only six with chisel-like ends in the Museum; two came from brochs, one in Orkney and one in Shetland; one from a cave in Ayrshire; one from a crannog in Wigtownshire; one from an earth-house in Orkney; and one from an occupied site on a rocky islet in the Firth of Forth. Five of those from Midhowe and the same number of the others were sharpened in the same plane as the axis of the proximal joint of the bone; but one from Midhowe and the one from the other Orkney broch were cut at right angles to the axis of the joint. The purpose of these implements has not been explained.

There was nothing of special importance in the stone objects

discovered. Relics such as whetstones, whorls, saddle and rotatory querns, pot-lids, lamps, and mortars may be expected in any broch. But the number of socket stones, twenty-three, of which six remained in their original positions, is unusually great.

Although the presence of six or eight small crucibles and part of a mould of clay showed undoubtedly that the manufacture of ornaments of bronze was one of the crafts plied here, only nine objects of this metal were found. We have a parallel to this in the earth-house¹ at Bac Mhic Connain, North Uist, which, although it contained a furnace for melting bronze and yielded crucibles and moulds, it produced only one bronze object, a very fine pin.

One of the bronze penannular brooches from Midhowe has an unusually long pin and relatively large cup-shaped terminals in the ring; another of slight make has also a long pin and the ends of the ring turned back on it, a primitive type.

The three pins with unornamented projecting ring-heads display a feature that we have never before seen referred to. It seems to have been taken for granted that such objects found previously had been cast; but there is a break in the ring where it rejoins the top of the stem, which shows that the straight wire of which this class was made had simply been bent into form. An examination of other pins of this class in the National Museum shows that they were made in a similar way, though this does not seem to have been noted.

The mould, of which only part was recovered, must have produced a fairly stout casting, quite different from the small personal ornaments which we are accustomed occasionally to find in brochs. We have not been able to determine what the object was meant for.

From the large quantity of iron slag which were found on and around the smelting hearth, it follows that the broch people were quite accustomed to the manufacture and use of iron. But not a single weapon or tool of this metal was discovered. One can hardly imagine that the rock-cut cellars or wells of considerable depth, in this and other Orkney brochs, could have been quarried out without iron implements or tools, and although we have shown that wooden wedges could have been used to detach slabs on the sea-shore (fig. 55 shows one skinned area) it is quite possible that iron ones were used.

The presence of whetstones shows that, at least, knives if not larger cutting or thrusting weapons, which required to be sharpened, were part of the equipment of the broch people. These would probably be made of

¹ Our Scottish earth-houses were contemporary with the brochs, so in discussing the relics found in the one class of structure continual reference must be made to those found in the other.

iron and not of bronze, as the latter would not disappear through natural agencies like the former. Besides we have no evidence that bronze was used for such implements in any of our brochs and earth-houses. That good strong cutting metal tools were in use at Midhowe is evident, because one of the antlers found showed a cut $\frac{5}{8}$ inch deep on the slant.

The question arises: What has become of these tools? They could not all have been carried away, and our only suggestion is that those that happened to be left must have disintegrated completely. The process of decay would be accelerated in Midhowe, as in other brochs



Fig. 55. Midhowe Broch: View from the Broch towards the Atlantic, showing rocks skinned of slabs.

and earth-houses on the shore, by being drenched from time to time by sea-water in the form of spray, during the centuries that have passed since the buildings were abandoned.

Fragments of pottery were found in great numbers in many parts of the broch, and it has been found possible to restore completely three vessels, and partially three more. This constitutes the finest collection of clay pots recovered so far from a broch. These are bucket-shaped or shouldered, and bear a resemblance to some of the vessels found at All Cannings Cross, in Wiltshire.¹

The cache of shards found in the stone box is an unique discovery for Scotland. The cubicle lay only 16 feet away from the edge of

¹ Mrs Cunningham, *All Cannings Cross*, pls. 38, 2; and 42.

the Geo, but, as the pieces of pottery were deliberately collected and retained and not thrown into the water, there must have been some reason for this. The only explanation we can put forward is that these fragments had been preserved for the purpose of being ground down and mixed with fresh supplies of clay when a new batch of pottery was being made. There were $3\frac{1}{2}$ lbs. of fragments of rims, 7 lbs. of bases, and 27 lbs. of walls— $37\frac{1}{2}$ lbs. in all.

In mixing the clay, as a rule, the potters seem to have been satisfied with the natural mixture of small stones which it contained. Generally there does not appear to have been any crushed stone added to it, as is seen in cinerary urns of the Bronze Age.

It is remarkable that there was practically no ornamentation on the vessels; only one or two small pieces showed an attempt at decoration, and this consisted of simple incised lines.

That the Midhowe folk, like those in some other brochs, were in contact with Roman civilisation is seen in the few shards of Samian and dark-coloured ware and the broken bronze patella.

The occurrence of two cup-marked stones built into the broch is important, as rock sculpturings in the form of cups and rings or spirals are very rare in Orkney. Rings detached from cups, as in one of our stones, are not commonly met with in Scotland, though such markings have been recorded from Kilmartin, Argyll; Knappers, Kilbowie, Dumbartonshire; and Kinneff, Kincardineshire.

Periods of Occupation.—Two distinct major reconstructions have been detected in the buildings of the broch, but we cannot say definitely that the secondary constructions within the tower can be correlated with those outside it, although we offer some suggestions.

Originally the broch consisted of the central tower and the strong outer wall with its outer and inner ditches, the main entrance being possibly located at the north-western end of the wall.

The second period is indicated by the outer chambers E, F, G, and H, which belong to a later time. This is seen clearly in chamber H, as part of the inner face of the outer wall of the broch has been removed to a depth of at least 5 feet in places to make room for the north side of the chamber, and the bottom of the inner ditch has been filled in to level up the floor. At the place where this was tested, just within the south wall of the chamber, a depth of 2 feet 6 inches had been made up. The character of the building in the four chambers, which have common separating walls, is good and homogeneous, though different from that in the broch proper.

The caving in of the north-west segment of the tower must have occurred after these chambers were built, because the buttressing

erected on the outside of its wall to support it, is inserted between it and the south and south-east walls of the chambers, blocking up the entrances into them. This may be taken as the third period, and it is possible that, at this time or a little later, the sub-division of chamber H and the covering up of the cellar in its floor, the erection of cubicles outside the entrance to the tower, in the south-west corner of chamber H, and at the back of chamber G, were carried out. The masonry in these is much inferior to that shown in the earlier structures.

We have not been able to link up with any one of the three periods, though they are doubtless later than the first, the fragments of buildings within and without the entrance through the south end of the outer wall, nor of those lying outside the south arc of the tower. Neither have we been able to date the two sections of very poor walling that have been thrown across the south end of the inner ditch. As for the paving in the northern part of the outer trench it was laid down subsequent to the outer wall being built, because for the greater part of its length the flags are laid against the wall 1 foot above the foundation.

So much for the out-buildings. If we are right in assuming that the casing wall and alcove erected against the inside of the north-west part of the tower were built when the buttressing was constructed on the outside and the lower gallery in the wall of the broch blocked up, then the casing wall and alcove belong to the third period. Judging from the cavities cut out to receive the ends of the suggested lintel over the door into chamber C, it seems quite probable that the erection of the wall of upright slabs dividing the inner court of the tower into two compartments was carried out when the casing wall was built, and so this divisional wall would belong to the same time.

The insertion of the upper mural cell in the east side of the tower, which closed up the higher gallery, and the erection of the stair leading up to it within the inner court, may also have taken place during this period.

Presumably the lower hearths in compartments C and D belong to the time when the divisional wall between them was set up, and the hearths superimposed on them must be later.

The rectangular structures formed of slabs set on edge in the floors recall those of similar shape discovered in the earth-houses at Skara Brae in the adjoining island.

The time taken to excavate the broch lasted for five consecutive summers and a few winter months, and practically the whole work of clearing out the structures was done by Mr James K. Yorston. It has been computed that he wheeled out from fifteen hundred to two thousand tons of fallen stones and debris. We should like to express

our great appreciation of the careful way in which he carried out the work. We are also indebted to Professor Low, Miss Platt, Professor Ritchie, and Dr Calman for their reports on the bones submitted to them.¹

REPORT ON HUMAN BONES. By Professor ALEX. LOW, M.D.,
F.S.A.Scot., University of Aberdeen.

The bones received consist of a human frontal bone with fragments of a lower jaw. The frontal bone is almost complete, the sutures connecting it with adjacent bones have been open, thus allowing of easy separation. The bone is smooth and delicate, with the forehead vertical, frontal eminences prominent, the glabella and superciliary arches slight, and the supra-orbital margins finely cut—characters indicating the skull of a female. The attached nasal bones are narrow, straight, and projecting, such as is seen in a Nordic type of skull.

Though the bone has belonged to a young individual the crowns of the molar teeth, present in the fragmentary lower jaw, are much worn so that the dentine is exposed.

REPORT ON ANIMAL AND OTHER BONES. By MARGERY I. PLATT,
M.Sc., Royal Scottish Museum, Edinburgh.

The bones examined included:—

Horse, ox, pig, sheep, red and roe deer, two jaws of wolf or dog, wild cat, common fox, Orkney vole, two humeri and part of tibia(?) of seal, and left lower jaw of grey seal.

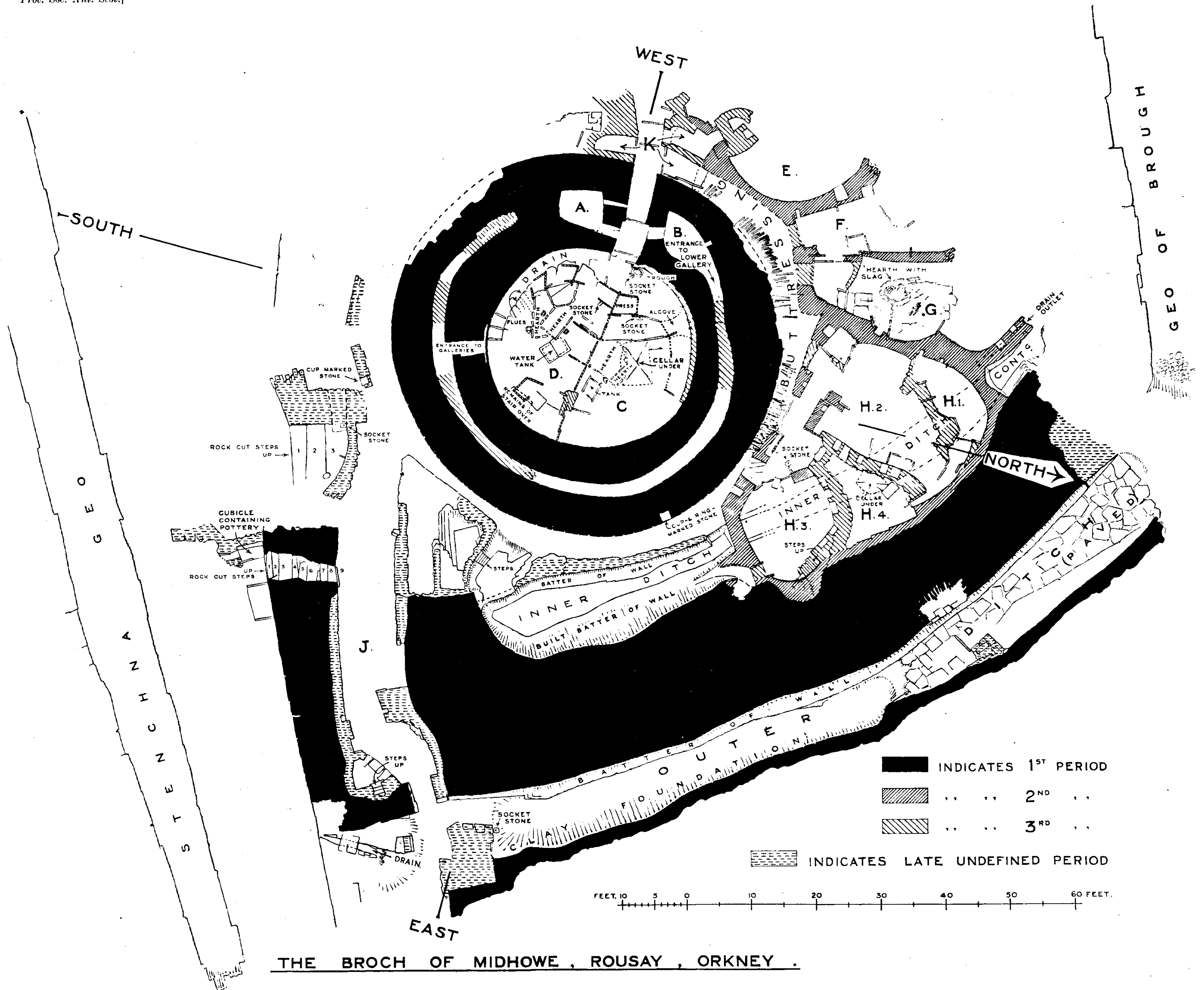
Goose, duck, common fowl, gannet, shag, heron, and mandible of a bird similar to oyster-catcher.

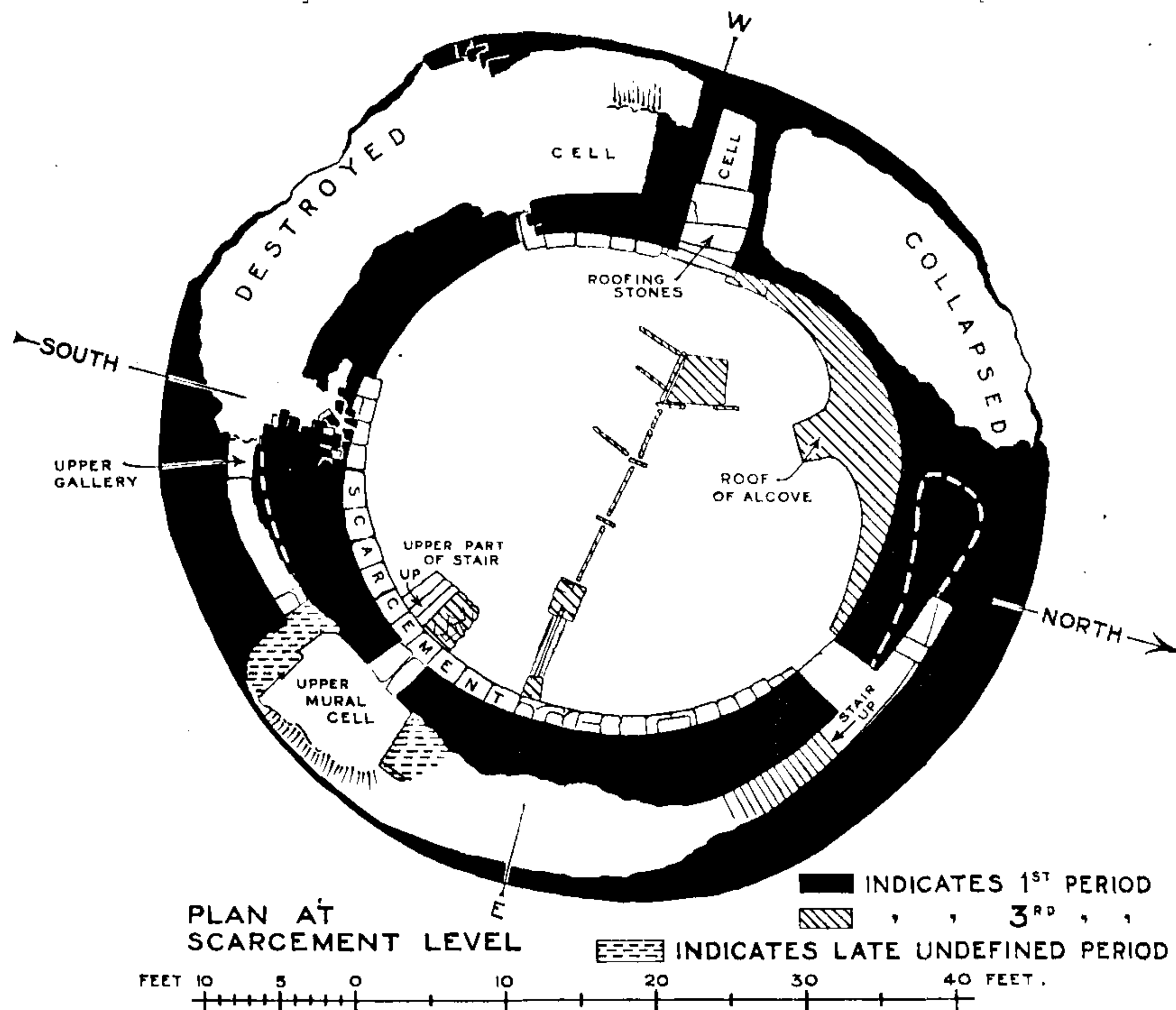
A small fragment of a fish jaw.

Ox, *Bos frontosus*.—Regarded as a whole the Midhowe skull gives the general impression of belonging to a small-sized ox of extremely sturdy build. In spite of its smallness the bones agree in thickness with those of a Urus skull. The shape of the skull is more nearly reminiscent of that of *Bos frontosus*, Nilsson, a fossil ox of Scandinavia, than that of any other type (fig. 56).² Of course there is a discrepancy in size; that of *Bos frontosus*, judging by a cast to be seen in the British Museum

¹ Mr Grant has handed over the broch to H.M. Office of Works, who are now carrying out the work necessary for its preservation.—J. G. C.

² "Notes on the Skull of an Ancient Ox from Rousay, Orkney." M. I. Platt in *Scottish Naturalist*, 1933, p. 17.





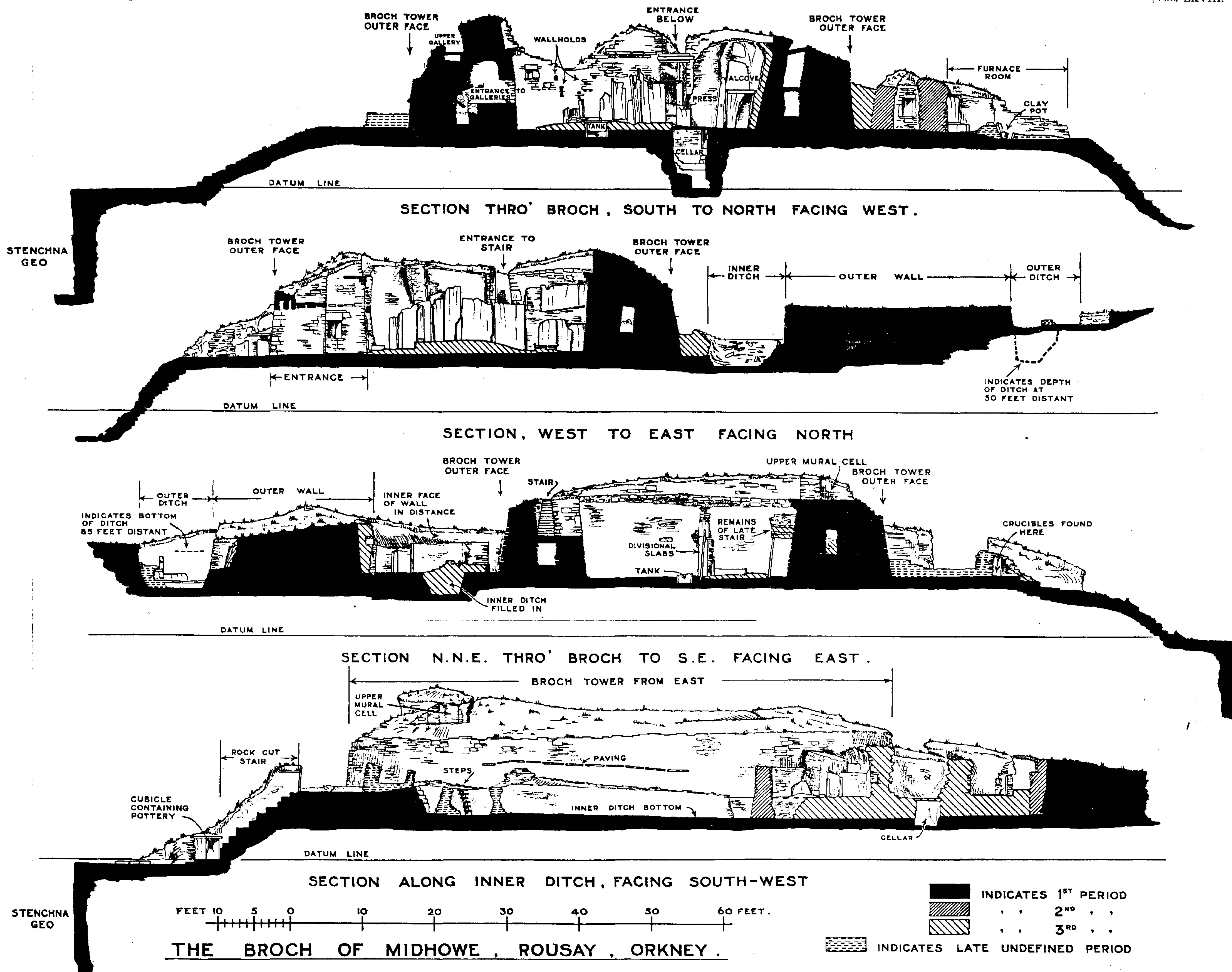
THE BROCH OF MIDHOWE, ROUSAY, ORKNEY.

J. GRAHAM CALLANDER and WALTER G. GRANT.

[COPYRIGHT. WALTER G. GRANT.]

PLATE VIII.

[To face page 514.



(South Kensington), is very much larger; but characteristics such as the shape of the forehead and the set and trend of the horn-cores are very similar. The skull is associated with archæological remains typical of the Broch Period, such as long-handled weaving combs, spindle whorls, hammer stones etc., and with other animal bones. The latter comprise an ox humerus, also small sized and sturdy (probably belonging to the same animal as the skull), the lower jaw of a seal, several pig's teeth, sheep and bird bones, and also the lower jaws of a dog which are in size and detailed measurements comparable with dogs' skulls of prehistoric date in the British Museum (actually specimen E 161., which



Fig. 56. Skull of the Midhowe Ox, *Bos frontosus*.

are the lower jaws of a dog from a Swiss Lake Dwelling). Judging from these facts, the animals present must have belonged to an age long past; an age when a culture was being formed in Orkney similar to that which was formed on the Continent in the Swiss Lake Dwelling Period. The particular ox in question may have been introduced at a previously early date from Scandinavia, and as a result of conditions different from those on the Continent from which it had been transported had, as time went on, diminished in size, as all island races tend to do, and yet still retained the characteristics of its root stock, the larger *Bos frontosus*, so widespread on the Continent in early times. This seems to be the first of its kind recorded from Great Britain.

REPORT ON BONES OF OX. By Professor JAMES RITCHIE, D.Sc.,

F.S.A.Scot., University of Aberdeen.

The single fragment of an ox skull shows that the skull had been cleft through the centre of the forehead, presumably for the extraction of the brain. In almost every respect the fragment resembles the

unique skull of a small sturdy type of ox, described also from a fragment recovered from Midhowe Broch, by Miss Margery Platt, M.Sc., as representing a Scandinavian wild ox, *Bos frontosus*, in one of its domesticated varieties.¹

The present fragment, which consists of the upper part of the forehead and top of the skull, with one horn-core, shows that the vertex of the frontals lay almost in line with the upper surface of the horn-cores. The angle at the vertex between the frontal and occipital regions is about 65°; the horn-core is oval in section, flattened slightly in a front and back direction, measuring 18.3 cms. in circumference at its base, but so abraded that its original length cannot be estimated. In one respect the fragment differs from that described by Miss Platt, namely that the breadth of the forehead, measured between the bases of the horn-cores (and estimated from the almost complete half) was approximately 21 cms. against the 13 cms. of Miss Platt's specimen, where possibly sufficient allowance has not been made for an intervening fracture.

With the skull is an axis or 1st cervical vertebra, which probably belonged to the same animal, and which shows marks of hacking with a metal implement.

Dr W. T. CALMAN, Keeper of Zoology, British Museum (Natural History), to whom the hard pieces of whale's bone and the tube formed from the leg-bone of a bird were submitted, states:

"(1) The pieces of dense bone which you not unnaturally supposed to be ivory were examined by Mr W. P. Pycraft and found to be parts of one of the paddle bones of a very large whale. None of us had any idea that any parts of a whale's bone were so dense as these. Most of them are almost spongy in texture.

"(2) The bone pipe has been studied by Mr P. R. Lowe, who says 'it appears to consist of the middle portion of the ulna of some large bird, such as the wild goose, or, possibly, the fish eagle (*Haliaeetus*). The cortex and cancellous tissue have been almost entirely removed, either by natural decay or artificial means. The bone, in fact, has been so treated that practically all its characters have disappeared, and this makes it impossible to express any decided opinion as to the species of bird to which it belongs.'

¹ "Notes on the Skull of an Ancient Ox from Rousay, Orkney." M. I. Platt in *Scottish Naturalist*, 1933, p. 17.