

VI.

REPORT ON THE EXCAVATION OF A BROCH AT SKITTEN, IN THE KILMSTER DISTRICT OF CAITHNESS. BY CHARLES S. T. CALDER, A.R.I.A.S., F.S.A. SCOT. WITH A REPORT ON THE ANIMAL REMAINS, BY MARGERY I. PLATT, M.Sc., ROYAL SCOTTISH MUSEUM, EDINBURGH.

Read March 8, 1948.

The following report on the excavation of a broch at Skitten is submitted by permission of the Ministry of Works, on whose behalf I was privileged to undertake the investigation in the month of May 1940.

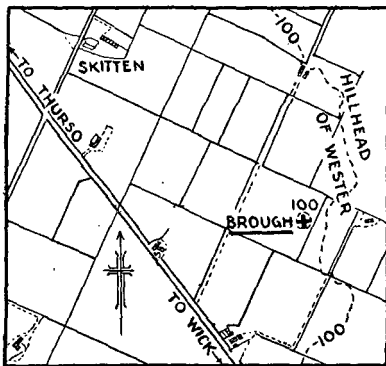


Fig. 1. Map showing site.

On land now occupied by Skitten Aerodrome, about $4\frac{1}{2}$ miles north-west of Wick, in the Kilmster district of Caithness, a "Brough" is noted on the Ordnance Survey map, Sheet No. XIX. Situated inland just over one mile from the sea, its location is on the 100-foot contour of the gently rising ground of the Hillhead of Wester, roughly 300 yards east of the main road from Wick to Thurso and 800 yards south-east of the croft of Skitten (fig. 1).

In 1904 it was partly excavated by Sir Francis Tress Barry, who exposed only the western half of the tower.¹ When operations began, the site appeared as a grass-covered knoll about 150 feet in diameter and 9 feet high on a stretch of otherwise flattish landscape, but it no longer exists as a geographical feature. Within an hour or two of the completion of the investigations the broch and its outworks were razed to the ground by bulldozers during the levelling process in the construction of a new aerodrome. Under the stress of war conditions, which made the speedy provision of airfields an urgent necessity, excavations had to be carried out with more haste than could have been desired. Nevertheless, making due allowance for the abnormal circumstances, a very comprehensive survey was made possible through the courtesy of Mr Gane, manager of Wimpeys, Ltd., in extending from day to day a previously arranged time limit of two weeks so far as was compatible with the course of his work.

¹ *Inventory of Monuments and Constructions in the County of Caithness* (1911), Art. 507, p. 146.



1. Outer face of revetment of original rampart with clay core behind.



2. Inner face of revetment of original rampart.

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[To face p. 124.]



1. Primitive Fireplace, Birsay, Orkney.

[*By courtesy of Mr. Robert Rendall.*]

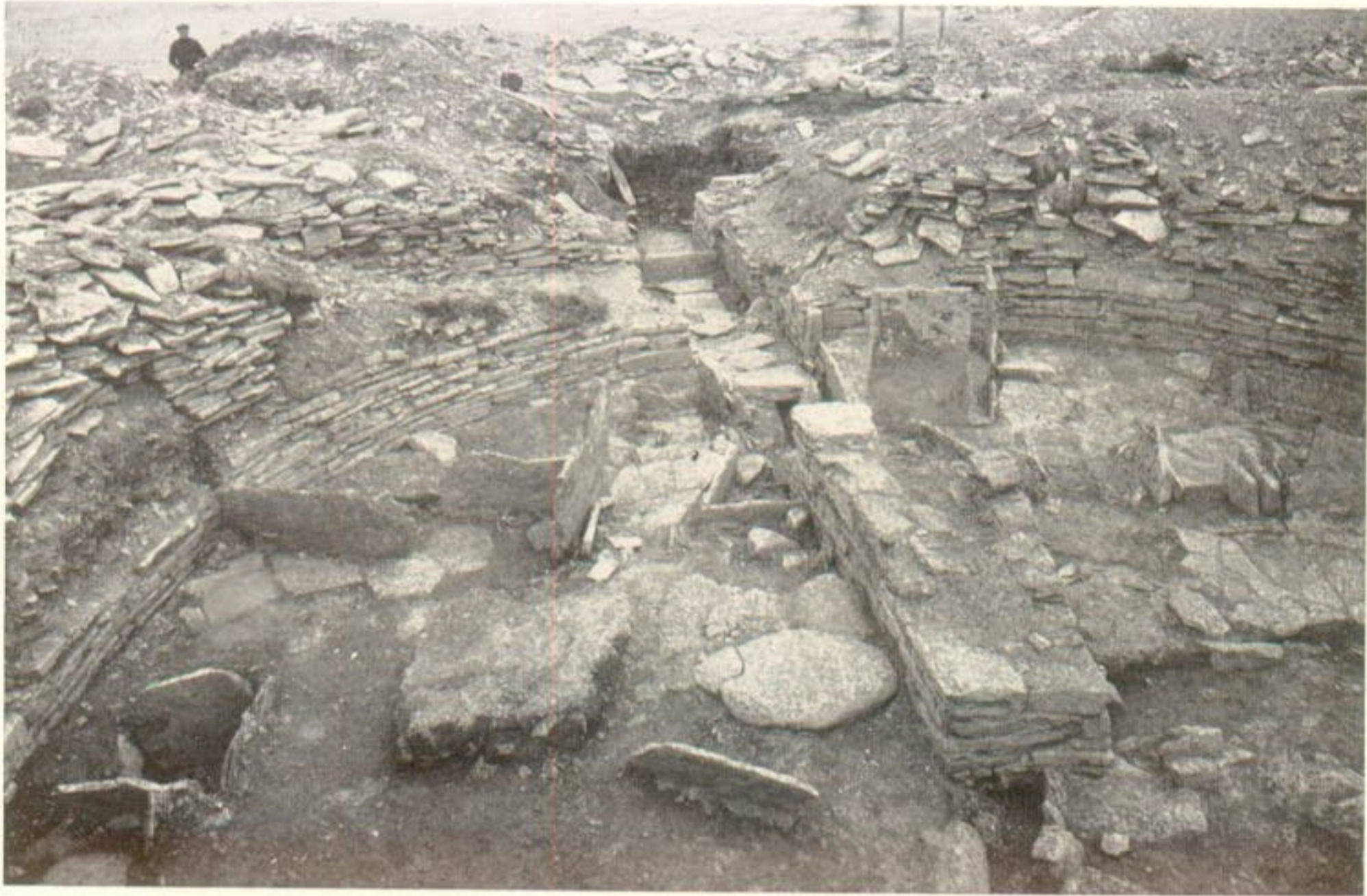


2. Radial Compartment No. 11, showing inserted packing-stones between broken wall of tower and side slab.



3. Wall of tower on right behind buttress, S; passage and revetment of addition to rampart behind.

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1. Interior of tower looking towards entrance; depth of peat ash indicated by square of ash left between hearth No. 3 and sunk box F.



2. Entrance passage, cell and interior of tower.

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1. Interior from central hearth looking north-east on sunk-box O, post-hole RX and stone-settings emerging from beneath pavement.



2. Interior in opposite direction after pavement had been further removed, showing sunk-boxes P and Q and additional post-holes.

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1. Radial compartments Nos. 10 and 11.



2. View toward rear of entrance, showing compartments Nos. 13 and 1 and end of south branch passage with kerb and pivot-stone *in situ*.

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1. Covered branch drain and radial compartment No. 14.



2. Inner end of main drain looking towards central fire-back.



3. Socket-hole behind north check of inner doorway in entrance passage.



4. Pit below hearths H1 and H3 on south side of central fire-back.

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1. Footing of wall of broch on north side of chamber No. I.



2. Chamber No. II: east wall of chamber and entrance passage on right.



3. Chamber No. I: south-east corner, showing wall of chamber abutting against original rampart and backed by core of addition to rampart.

Excavation revealed that the monument had consisted originally of the usual massive round tower, encircled eccentrically by a strong defensive rampart with a wide but shallow outer ditch, and that the rampart had been subsequently thickened on the inside by stout additional walling (figs. 2 and 3). Only the eastern half of the rampart and ditch remained, but enough was left to show that the space between it and the tower had widened appreciably on the north in a manner which indicated that the courtyard had attained its maximum width on the west or north-west section. In this area traces of the walls of intrusive chambers were discovered, and later erections were also observed within the tower itself.

Around the periphery the mound was demarcated by the edge of recent cultivation, which on the east extended over the ditch to the face of the rampart, and by encroaching into the courtyard on the west had accelerated the normal process of disintegration to the complete demolition of the defences. On the west side, too, the wall of the tower was at its lowest, but no doubt that condition had been hastened by the exposure of that portion by Barry, and also by thoughtless destruction at the hands of visitors.

The main features generally were extremely dilapidated, and the stonework of local shaly slabs had reached a stage of spalling and decay. Debris and earth compacted to cover the ruins to a height of 5 or 6 feet in places above the upper remaining courses of the interior face of the tower walls, and foundation courses of the original assemblage rested on the natural clay.

Tower.—On plan, the tower had been a ring of well-built masonry, now reduced to a maximum height on the eastern arc of 6 feet on the outside and 4 feet 3 inches on the inside. Diametrically opposite, the wall rose to a height of only 1 foot 6 inches at each end of the entrance passage, and the outer face had been removed entirely on part of the southern arc. The external and internal diameters averaged 62 feet 6 inches and 32 feet 6 inches respectively, and the wall measured from $14\frac{1}{2}$ to 15 feet at the base, but the thickness decreased as it ascended by a good batter of 14 inches in a height of 5 feet on the outer face and by a slight batter of 3 inches in a height of 2 feet 8 inches on the inner face. Around the exterior a double-stepped footing of large stones, each course from 3 to 5 inches thick, projected from 12 to 19 inches from the face (Pl. XXXIII, 1). Where freshly exposed the masonry showed good workmanship, and it was noticed that the better and larger stones had been reserved for the outer face, but all was built of comparatively thin slabs common in the local substratum. The only voids in the thickness of the walls were those of the entrance, and a cell in the position of a guardchamber.

Abutting on the outer face round the north-eastern arc and resting on the footings of the tower there was a thin facing-wall from 10 to 16 inches thick and from $1\frac{1}{4}$ to 3 feet in broken height. At its northern end a heavy

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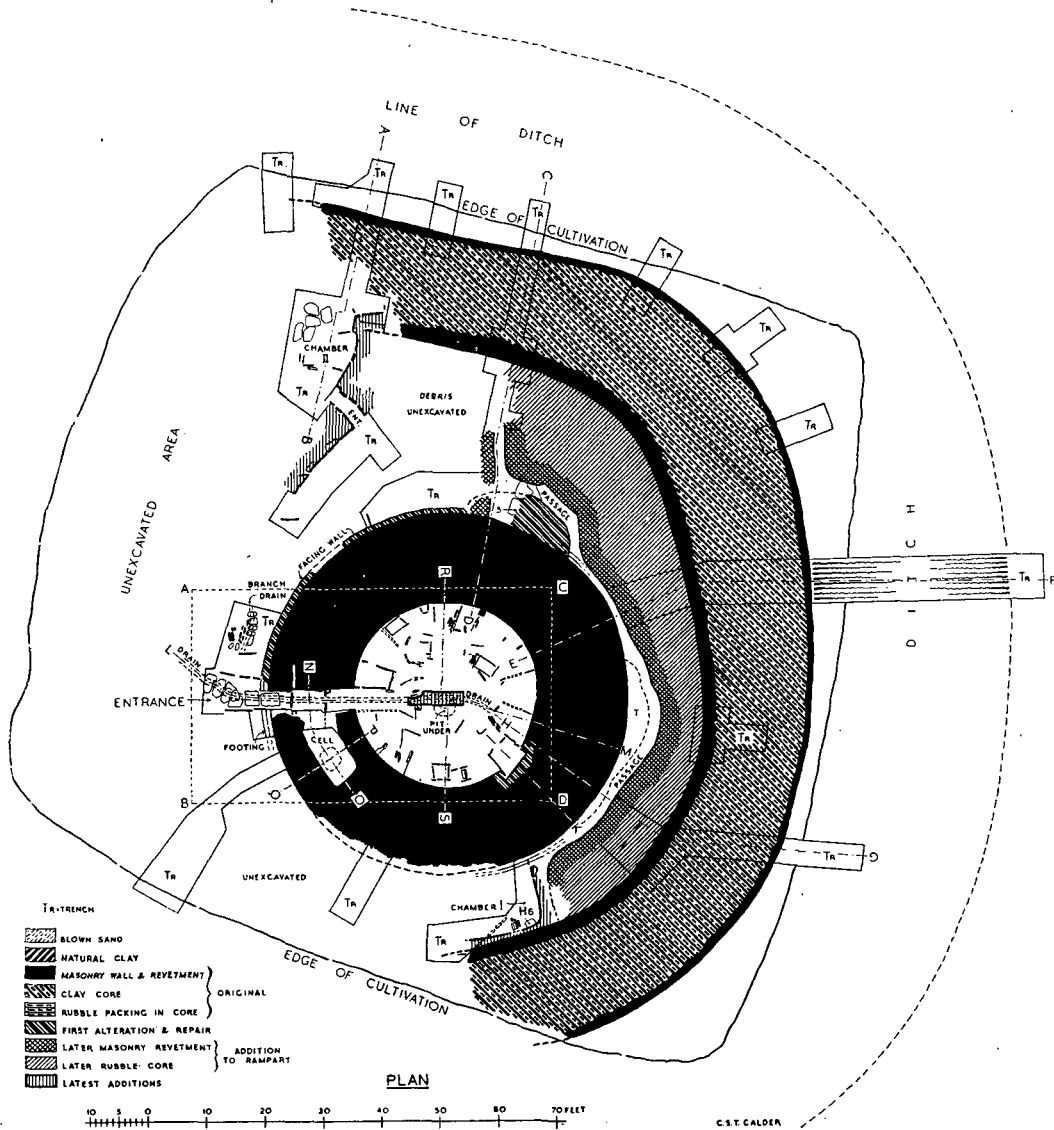
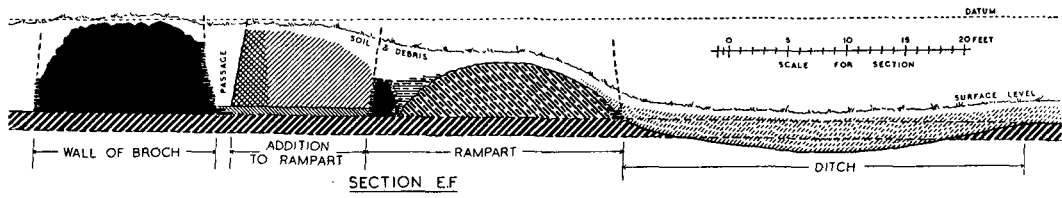


Fig. 2. Plan and Section E-F: north to the top.

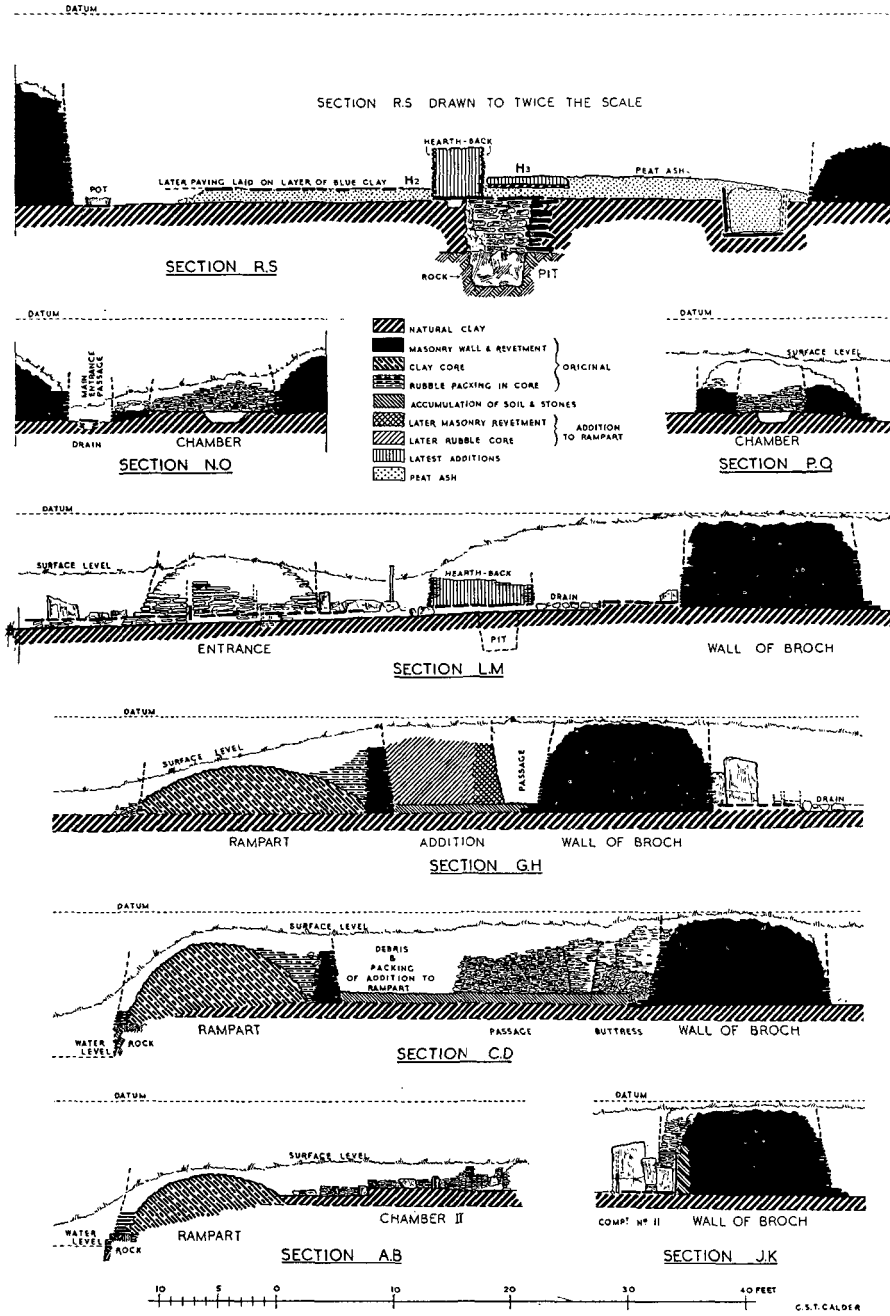


Fig. 3. Various Sections.

buttress, S, had been constructed, evidently to support a defective part of the tower, but as the building behind the buttress was in a good state of preservation, it is concluded that any fracture must have been in the higher stages (Pl. XXVIII, 3). Semi-oval on plan, the buttress originally may have measured 18 feet in length, but its western end had been demolished and the existing dimensions were 12 feet long, 6 feet 6 inches wide, and 2 feet 9 inches high. On the east a second buttress, T, 18 feet long by 4 feet wide,

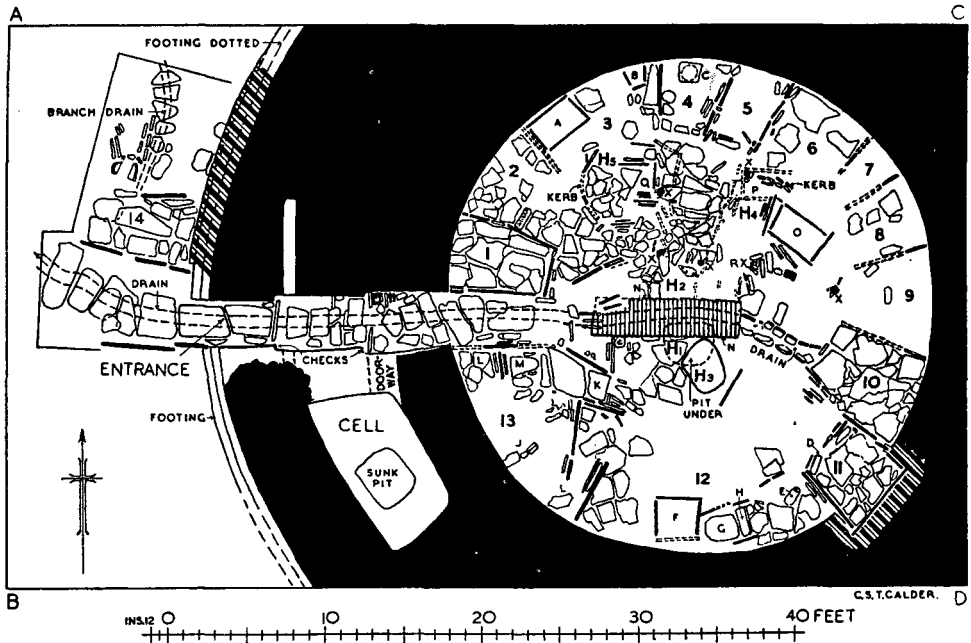


Fig. 4. Enlargement of portion of tower ABCD showing entrance passage and interior.

and a short length of facing wall continuing southwards, were indicated by a tumble of masonry, and more convincingly by the contracted courtyard space reduced to the width of a narrow passage, which followed a sinuous course to avoid the excrescences.

Entrance Passage.—The entrance passage (fig. 4, and Pl. XXIX, 2) pierced the wall of the tower through the western arc, and was divided into three stages in its length by the provision of two sets of door-checks. There were slight variations in the measurements of each side, but the average dimensions from the front along the axis were 3 feet 10 inches and 9 feet 6 inches respectively to the outer and inner door-openings, and 15 feet in total length to the rear. The mouth measured 3 feet wide, reducing to 2 feet 9 inches at the first doorway, where it increased by a rebate on either side to 3 feet 6 inches. From this point to the next checks the width narrowed

to 3 feet, and again widened to 3 feet 10 inches behind the second rebates before finally contracting to 3 feet 4 inches at the inner end. At a height of 2 feet 2 inches above the floor, a bar-hole 9 inches wide by 6 inches high remained on the north side in rear of the outer door-check, where the broken-down wall of the passage reached a maximum height of 2 feet 10 inches as compared with the height of 4 feet 4 inches in 1910 recorded in the *Caithness Inventory*.¹ The corresponding masonry opposite was reduced below bar-hole level, as was also the case at the inner doorway, where it may be inferred other bar-holes had also existed.

The passage was laid with paving-stones, which also served as covers to a central drain below, 10 to 12 inches wide by 7 to 9 inches deep. The pavement followed the run of the drain in a fall of 5 inches from back to front, and consisted of large slabs at the mouth but considerably smaller broken and disturbed stones in the remainder. The drain had been scooped out of the natural clay, and was in some parts loosely lined with small slabs on edge, and in others with two or three courses of stones on bed. It was observed to run on in a north-westerly direction under the rickle of debris some 6 feet from the entrance, where for lack of time the excavations ended.

At each door kerbs obstructed the pavement. The outer kerb consisted of a single slab, 3 inches thick and 15 inches deep, on edge between the checks, and it rose $8\frac{1}{2}$ inches above the floor. Its under-edge penetrated the top of the drain but did not obstruct the flow, and it appeared to be original. The inner kerb was formed of two smaller slabs rising from 6 to 8 inches set behind the checks one on each side of the drain. The northmost slab also formed one side of a socket-hole, 6 inches square by 1 foot 4 inches deep, sunk in the floor and constructed of slab sides and bottom strengthened by packing-stones. It may have been used as the socket for a door-post, and both it and the kerb seemed to have been inserted (Pl. XXXII, 3).

Cell.—The cell or guardchamber entered off the south side of the passage, but the mutual wall, 3 feet 4 inches thick, had been destroyed down to the foundations, and only a few courses of the eastern jamb of the doorway, 3 feet 8 inches in from the interior, were in position to show access had been gained immediately beyond the inner door of the tower. A dimension of 2 feet was judged to be the approximate width of the entrance to the cell, and obviously the opening of 5 feet shown on Barry's plan is much too wide. He seems to have erred in fixing the position of its western jamb "1 foot 10 inches in rear of the door-checks," meaning the outer door-checks of the tower, which are the only ones he mentions. The lateral walls stood from $1\frac{1}{2}$ to $2\frac{1}{2}$ feet in height, and the outer and inner measured respectively 5 feet and 3 feet 10 inches in thickness. Towards the inner end of the chamber the upper courses bore the commencement of an inward beehive batter.

¹ *Inventory of Monuments and Constructions in the County of Caithness* (1911), Art. 507, p. 146.
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In the floor, which was made of clay and was raised 6 inches above that of the passage by a stone step at the entrance, a scooped-out oblong pit, 3 feet 6 inches by 2 feet 10 inches by 13 inches deep, testified to the former existence of the slab-constructed box described by Barry.

The cell dimensions averaged 10 feet long and 5 feet 4 inches wide, these actual sizes being at variance with the length of "some 15 feet" and width of "6 feet 6 inches" as stated in the *Inventory*.

Interior.—The internal area of the tower (fig. 4) was well filled with slab constructions either sunk in the floor or projecting above it, and with settings of small stones on edge. Many were so incomplete that their purpose could not be determined. The main features were paving-stones, radial compartments, sunk-pits, hearths, and the inward continuation of the drain (Pls. XXIX, 1, and XXX, 1 and 2).

Paving.—Two pavement levels in patches were met with in the northern half of the interior, but only one level in the southern. Originally the floor may have consisted solely of clay as was the case in the cell, since underneath the lower paving two sunk-boxes and a pit all filled with rubbish and peat-ash were found. Also the lower paving that survived had been laid mainly round the side of the interior and was only overlapped by the edges of the upper paving, no flags at all having been laid under the central part of the latter.

The lower rested on the natural clay, but the upper was bedded on a layer of puddled blue clay, $1\frac{1}{2}$ inches thick, which in turn had been spread over an accumulation of peat-ash 5 inches thick above the lower level. The upper extended northwards from a centrally situated built fire-back and westwards into two or three of the radial chambers, where both levels were discernible. It covered up some low settings of stones in which there had been post-holes. In a few of the radial chambers paving was well preserved. Some irregularities in the pavement levels tended to confuse the occupation levels, and may have been caused during the earlier excavations by Barry.

Drain.—A fall in the floor of 8 inches from east to west was evidently controlled by the fall of the drain, which continued inwards from the entrance in a direct axial line for most of its length, when it altered course to east-south-east for the last $5\frac{1}{2}$ feet to reach its end abruptly against a radial chamber at a point 6 feet 9 inches from the inner face of the tower (Pl. XXXII, 2). The drain was open from the angle of change to the inner and higher end, and also for some length near the entrance, but the cover-stones may have been removed. Between these open portions it was concealed under the central fire-back, in the masonry of which part of a stone ashet helped to confirm that the fire-back was not an original feature.

Radial Compartments.—From the inner wall-face, thin slab partitions from $1\frac{1}{2}$ to 5 inches thick and embedded radially in the clay divided a series

of thirteen compartments in a more or less continuous ring, broken only by the entrance passage, from which they are numbered clockwise on plan. No. 1 was entirely closed in front by a large high-standing slab, but a gap in the mutual partition between it and No. 2 may have made these two compartments intercommunicating (Pl. XXXI, 2). All the others opened direct from the interior, but some frontal slabs may have been removed, leaving unintentional gaps. Only in the case of Nos. 11 and 13, which were in a better state than the rest, could it be definitely said that a gap had been left for an entrance. Where complete the slabs attained a height of 3 feet 9 inches, but most of them were broken and reduced in range to as low as a few inches above the floor. Some were missing altogether, and there was no evidence that any of the compartments had ever been roofed over. No. 11 was the most intact, and it along with Nos. 1 and 10 was fully paved (Pl. XXXI, 1); Nos. 2 and 3 and probably No. 1 had a second layer of paving, and Nos. 5, 7, and 9 were unpaved, while the remainder were paved only in parts.

In the following details the average width between mutual partitions and length from front to back are stated in that order:—

- No. 1. 3 feet 10 inches and 6 feet 3 inches. A single frontal slab rose to 3 feet 5 inches, and side slabs ranged from 6 inches to 2 feet 4 inches high.
- No. 2. 6 feet 6 inches at back and indeterminate. The north partition was defined only by a groove in the clay where a slab had stood. Access was probably gained in similar fashion to that described for No. 13.
- No. 3. 9 feet 6 inches at back and indeterminate. A slab-constructed box, A, 3 feet 2 inches by 1 foot 11 inches and 2 feet deep, was sunk in the southern corner next the broch wall. Another, B, 13 inches square and 10 inches deep in the corresponding northern angle, was covered by a paving-stone.
- No. 4. 3 feet 10 inches and 5 feet: open-fronted and side slabs rising from 13 to 21 inches high. Resting on a paving-stone at the back of the compartment, fragments of pottery in a ring 11 inches in diameter comprised the lower portion of the wall of a clay pot, C, the bottom of which had disintegrated entirely.
- No. 5. 3 feet 6 inches and 4 feet 6 inches. A short low slab on edge marked the front.
- No. 6. 5 feet 6 inches and indeterminate: front open.
- No. 7. 2 feet 9 inches and indeterminate. Partitions only meagrely defined.
- No. 8. 5 feet and ? 4 feet. Two low slabs and a groove for another between them indicated the southern mutual partition.

- No. 9. 5 feet and 5 feet 10 inches. Much destroyed, but distinguished by a few broken slabs and grooves. The highest slab stood 12 inches above the floor, and a small one set at the north-west corner marked the front, which was otherwise open.
- No. 10. 5 feet and 6 feet 8 inches. Well defined by its paving and a small slab in the middle of the front.
- No. 11. 5 feet and 5 feet. The most complete, but differing from the others in being partly inserted to a depth of 1 foot 9 inches in the broch wall. A large thin slab on edge formed the back and a single one also closed its south side, but there were three in the partition on the north. Two slabs, one on either end of the front and now reduced to stumps, had been set with an interval of 1 foot 10 inches between their edges for entrance. None of the slabs was more than 2 inches thick and each partition rose to a height of 3 feet 9 inches. The courses of masonry of the inner face of the wall of the broch were irregularly finished against the side slabs, and the wider parts of the junction were closed by piecing-up with vertical packing-stones, all suggestive of a patch-up of the wall which had been broken to admit the compartment as an insertion (Pl. XXVIII, 2). A broken stone dish, D, incorporated in the paving also pointed towards later erection. Structurally, therefore, all the compartments are somewhat later than the broch, but from the absence of any pronounced occupation layer under the floor it would seem that their erection had taken place as necessary furnishing improvements at an early stage in the primary occupation.
- No. 12. 14 feet 7 inches and indeterminate. This area may be more accurately described as part of the main floor space. In it a box, F, 2 feet 6 inches square and 1 foot 10 inches deep, was constructed of thin slabs sunk in the clay. The south side of the box was missing, and its east end also formed the end of a shallower box, G, 2 feet 3 inches wide and 2 feet 10 inches long and 10 inches deep to a bottom which was almost wholly covered by a single stone. The sides had extended beyond the eastern end, which terminated in an outwardly sloping stone, H, rising to the level of the pavement in which a pivot-stone, E, had been reused.
- No. 13. 14 feet and 6 feet. This irregularly shaped compartment brings the series back to the main entrance (Pl. XXXI, 2). Barry shows it as one chamber with partitions complete where stones are now missing, but it may have been divided into two

at J. No surviving slab stood more than $1\frac{1}{2}$ feet in height. A passage-way, K, 3 feet long and 2 feet 3 inches wide entered off the main interior. At each end a slab formation partitioned off a small recess, L, and on the burnt pavement in the angle, M, between the north recess and the passage-way a layer of peat-ash indicated that a fire had been in use at some time or other.

Another radial compartment, probably also one of a series on the outside of the tower beside the entrance, was uncovered and is figured No. 14 on plan. It was constructed in front of the facing wall at this part and measured 4 feet in width by 7 feet in length. Three slabs on edge, the highest being 1 foot 6 inches, bounded its south side, but only one 8 inches high was in position on the north, and all had been broken. It was floored with two pavements, one above the other, and the interspace of 6 inches was filled with loose stones and peat-ash. The lower was approximately on a level with that of the tower entrance, and the surface of the upper was 2 inches higher than the top of the tower footing. To the north of this compartment a very few paving-stones were noted at the lower level, and the principal feature was a row of coverstones over the curving length of a branch drain, 5 inches wide and $3\frac{1}{2}$ inches deep, which appeared to run under compartment No. 14 to connect with the main drain (Pl. XXXII, 1). The branch was channelled in the natural clay, and parallel to it on the west an indefinite setting of a double row of small stones were embedded alongside in a spread of peat-ash in which some calcined deer-horn was found. On the side south of the main entrance two slabs set end to end may have represented yet another compartment, as may also a radially set slab on the north-western arc of the tower. No doubt these compartments had been used as beds, larders, and stores, etc. In the lower paving of the interior two or three broken utensils had been used as paving-stones, and from this as well as the fact that a sunk-box in No. 3 compartment was covered by a paving-slab, it would appear that the radials were not primary features. A similar contention has also been made for radial compartment No. 11, but from lack of any measurable thickness of any occupation level below the paved floors, which seemed to sit immediately on top of the natural clay, it may be surmised that no great time had elapsed between the building of the broch and the construction of these compartments.

Remainder of Sunk Boxes.—Of the sunk-boxes not yet described one was complete and two were damaged. The first and largest, lettered O, measured 3 feet 6 inches by 2 feet 2 inches and 2 feet 1 inch deep. An extra slab from 3 to 5 inches from its western end may have been the end of another, but more definitely there were the remains of a second box, P, with one end missing. It was 1 foot 9 inches wide by probably 3 feet 2 inches long, that size being the length of the largest side slab, and it was 1 foot 2 inches deep. Two sides of the third box, Q, were in position under a hearth in front of compartment No. 3. Length and breadth were indeterminate, but it was 1 foot 2 inches in depth. All three boxes were filled in with rubble, earth, and peat-ash, purposely at least in the case of P and Q. On the surface of the infilling of box P a curving row of water-worn stones, presumably the remains of a kerb for a hearth, were embedded, and box Q was covered by the remains of another hearth (Pl. XXX, 1 and 2).

Central Hearth Fire-back.—Between the first and last compartments interiorly the main entrance passage continued for a further 9 feet 3 inches, where its direct advance was obstructed by the end of the central hearth fire-back, N, over the drain (Pl. XXIX, 1). The interruption made a bifurcation necessary for separate admittance to each half of the interior. Each branch was short, and at its narrowest measured only 1 foot 7 inches in width. The southern ended, in line with the access to compartment No. 13, in a kerb 6 inches high, behind which in the angle between kerb and fire-back a pivot-stone deeply set in the floor was *in situ*.

Extending diametrically inwards for a distance of 9 feet 4 inches, the fire-back, 2 feet 6 inches thick, rose to a broken-down top from 1 foot 3 inches to 2 feet above the floor. On each side the facing-stones were much discoloured by burning, and a similar condition obtained in the respective hearths, which were simply the paving-stones without a confining kerb. That the hearth, H1, on the south side had been in use to a greater extent than the one on the north, H2, was borne out by a much thicker layer of peat-ash which had accumulated to a height of 10 inches and covered the whole of the floor on that side right to the inner face of the broch wall between compartments Nos. 11 and 13. In its spread the ash filled and concealed the sunk-boxes in No. 12. Embedded level in the ash above the hearth H1 a large water-worn stone constituted the hearth H3 (Pl. XXIX, 1). It measured 3 feet 2 inches long by 2 feet 4 inches wide and 4 inches thick, and was evidently a renewal of the lower when the peat-ash had gathered to an inconvenient height for the latter's use. It is interesting to note that this type of hearth, with a fire-back which is assigned to the latest occupation of the tower, was still being used in modern times. An example of such a primitive hearth is now exhibited as a museum piece in a cottage at Birsay in Orkney (Pl. XXVIII, 1). It is identical in construction with the hearth

in the broch, and suggests the persistence of the type for approximately 1500 years.

Other Hearths.—Other two hearths on a level corresponding to the lower pavement in the northern half of the interior proved to be of secondary construction, from the fact that they had been placed over destroyed original sunk-boxes. As already mentioned, it was in the eastern one, H4, that part of a row of kerbstones existed in the infilling (Pl. XXX, 1). These kerbstones were each broken at their embedded end to maintain a fairly regular total height of 9 inches, and were set on a curve suggesting an oval-shaped finish with axial diameters of approximately 5 feet and 4 feet 6 inches. Other dislodged stones of this kind were found alongside, but the hearthstones themselves had been destroyed.

Several hearthstones, however, remained in position within the broken kerb of the western hearth H5, which was of much the same size and shape as the other. In the formation of the kerb several rubbing-stones and pounders had been reused and well burnt. On and around the area of both hearths peat-ash covered the lower paving and extended under the upper paving in the centre of the interior.

Pit.—Below the hearths H1 and H3, and also oversailed for a width of 12 inches by the masonry of the fire-back, an earlier and original pit, shown dotted on plan, was discovered. Suboval in shape, it measured 4 feet 9 inches by 3 feet on the axes and it was 3 feet 8 inches deep. The lower 1 foot 4 inches was cut out of the solid rock, and the upper part consisted of the natural clay faced in part with masonry. Almost a third of the hole was filled with a black earthy substance, amongst which there was a large quantity of sheep bones and a few fragments of pottery. From this material upwards, boulders, rubble, and clay had been thrown in to consolidate the foundations of the fire-back (Pl. XXXII, 4).

Post-holes and Stone-settings.—A series of six post-holes were disposed as indicated by the letter X on plan, showing the four southmost in rough alignment in a length of 11 feet 6 inches, the one marked RX being the best preserved. The western three were found under the existing pavement, and the northmost actually appeared in the infilling in the angle of the sunk-box P.

A setting of small stones also emerged when the upper pavement was removed, and it ran from the fire-back to the front of the radial compartments on the north. In their arrangement there was a suggestion of smaller post-holes as if for the studs of a timber partition (Pl. XXX, 1 and 2). A few isolated stones embedded in the floor were too disconnected to be worth further mention.

Rampart.—A length of 300 feet still survived between the broken ends of the original rampart, which was massive in its proportions and varied from 18 to 22 feet in thickness, and from 2 feet on the outside to 5 feet on the

inside in height at the highest points (Pl. XXVII, 1 and 2). The space between it and the tower had been narrowest at its southern end, where it measured 12 feet 8 inches across, and widest at the northern, where its dimension was 28 feet. The rampart consisted of a clay core confined between well-built revetting walls of masonry from 10 to 19 inches thick in the outer and from 1 foot 7 inches to 3 feet 6 inches in the inner. Each outer face of the revetment rose with a batter, mostly from the natural clay on which it was founded, but in places the foundation was on a rocky substratum. In cross-section the clay core appeared outlined as a deep segment of a circle with a rise from 3 to 5 feet. It is probable that it alone constituted the primary defence, the retaining walls being built later, as the angle formed between the surface of the clay core and the inner wall had been filled with rubble after the clay had been thrown up.

Ditch.—On the surface the ditch was barely traceable, as it had been completely covered in blown sand and almost obliterated by ploughing operations. Excavation disclosed that it had been dug through a layer of top soil 10 inches thick, a bed of clay 1 foot 10 inches thick, and into a substratum of shaly rock to a depth of 1 foot, making a total depth of only 3 feet 8 inches in the middle of its width of 34 feet 6 inches. Although acting as a defence, the shallowness makes it appear as if its principal purpose was that of a borrow-pit.

Addition to Rampart.—Against the inner face of the original rampart an additional strengthening wall had been erected. It varied in thickness from 8 to 18 feet, and increased the total thickness of the defence to as much as 40 feet at the widest existing portion. The space between rampart and tower was thereby contracted to a narrow passage, in places only 1 foot 3 inches wide at the footing, but increasing to 3 feet 4 inches in an ascent of 6 feet to the broken-down wall-heads by a batter on the respective wall-faces (Pl. XXVIII, 3). In its course the passage skirted around the irregular excrescences made by the buttresses. The addition was founded on an accumulation of soil and debris, 7 to 9 inches thick, above the natural clay at a level in line with the top of the footing of the tower, and in one or two places rested on paving-stones which projected into the floor of the passage. It was built with a rough core confined within a retaining wall. In this instance the core, from the bottom upwards, consisted of a layer of top-soil approximately 2 feet thick, merging into a layer of clay 1 foot thick, above which it was packed with shaly rubble loosely thrown in. This arrangement of the infilling is in inverse relation to the strata of the ditch, from which the material was probably taken during a secondary widening and deepening. The masonry of the retaining face, built of smaller stones, and of inferior workmanship to that of the tower, rose with a batter of 1 foot 3 inches in a height of 6 feet 3 inches at its highest part (Pl. XXVIII, 3). The face at the southern end curved

round as if intended to return to the inner face of the rampart, and beyond that all was debris, under which the remains of the walling of a later chamber was found. The northern end returned similarly for a distance of 9 feet or so and formed one side of a gap or passage 1 foot 9 inches wide; the other side was represented by the lower two or three courses of a facing-wall which ran in a broken line on plan perpendicular from the wall of the tower and at the same time cut through the earlier buttress at this part. The passage led nowhere in particular, but finished in a rickle of debris about half-way through the strengthening wall.

Later Chambers.—At a distance of 2 feet 5 inches from the southern end of the strengthening wall, the later chamber, No. 1, occupied the space between the tower and the original rampart. It had measured 11 feet 6 inches wide and was 13 feet in broken length. Only parts of its east and south walls remained to heights varying from 1 foot 4 inches to 2 feet 2 inches, and to thicknesses from 7 inches to 2 feet. Built as facing-walls, the eastern had a large boulder in its composition, and was backed by loose stony debris, but the southern abutted against the inner face of the original rampart (Pl. XXXIII, 3). The floor was unpaved and was on a level with the top of the tower footings, which point was 6 to 9 inches higher than the interior of the broch but 3 inches lower than the base of the strengthening wall. A broken slab on edge, 8 inches high by 1 foot 10 inches long and firmed by packing-stones, projected at right angles from and just clear of the south wall-face and 4 feet 3 inches distant from the east wall. In the recess formed by slab and east wall the only paving-stone found was much shattered by burning, and had evidently been used as a hearth, H6, on which was a considerable quantity of peat-ash. At a height of 1 foot 6 inches in the infilling of this chamber peat-ash was also seen, and a later row of slabs on edge indicated a later construction of indeterminate purpose.

The remains of another chamber, No. II, or maybe two connected by a short passage, were uncovered in the courtyard on the north-north-west side of the tower (Pl. XXXIII, 2). Comparatively short lengths of their inner facing-walls backed against the debris only were left, and these petered out without trace of their ultimate shape and size. The masonry of the chamber rose from a few inches on the north to 2 feet in the passage above a floor which was mainly clay with only a few paving-stones at the north end, and which lay on practically the same level as the general interior of the tower. Slab construction was incorporated in the walling, which was undoubtedly of the latest period of building, as the chambers had encroached through the debris of the strengthening wall right into the original rampart when these had become ruinous and no longer required. Nearest the tower a length of wall-face survived 15 feet long and from 1 foot 8 inches to 2 feet 7 inches high. At its northern end a paved passage, averaging 2 feet 1 inch wide, with door-checks at its inner end, ran north-westwards for a length of

7 feet to open into the chamber. From its inner end the chamber wall ran northwards in a slight curve to a point 12 feet 8 inches distant, when it returned eastwards for 5 feet and became lost. Four slabs on edge of no great height projected at intervals from the wall-face. The two nearest the door were 6 feet 6 inches apart, and may have been the end stones of a box-bed. Two other low slabs on edge in the floor formed a right angle, inside which a quantity of peat-ash indicated that the slabs were probably kerbstones of a hearth, H7. Two hammer-stones of lighter type than those found in the tower were picked up from the floor, which was less than 2 feet below the surface. Other chambers had no doubt existed, but time did not permit of full and further excavation.

Relics.—No particularly outstanding relics were recovered, nor were any metal objects found. What there were consisted of deer-horn, many animal bones, broken pottery, and a number of typical broch implements and utensils of stone. Pounders and smoothing-tools predominated, and the others included dishes, knocking-stones, pivot-stones, anvils, tether stones, a saddle-quern, several rubbers, circular querns of post-Roman date, pot-lids, a pestle and a whorl.

Animal remains are described in a separate Report at the end of this article. A detailed list of the stone fabrications which, unless otherwise stated, are made of sandstone, is here appended.

Dishes.

Part of an ashet shaped by pecking, approximate length when complete 15", walls $1\frac{1}{2}$ " to 2" thick, finished with rounded rims or edges, depth of bowl 5".

Part of another with rough outer surface and bowl only shaped by pecking, bowl had been over 18" long and walls from 3" to 4" thick.

A dish, $9\frac{1}{2}$ " \times $8\frac{1}{2}$ " \times $4\frac{1}{2}$ " thick, rough on outside, and bowl, $6\frac{1}{2}$ " \times $5\frac{1}{4}$ " on axes and $1\frac{3}{4}$ " deep, shows pecking near brim but bottom smoothed by rubbing.

Knocking-stones.

A knocking-stone formed out of a boulder, approximately 17" \times 15" on top and 12" thick; bowl 10" \times 9" \times 7" deep with rounded rims and walls $3\frac{1}{2}$ " to 4" thick (fig. 5, A).

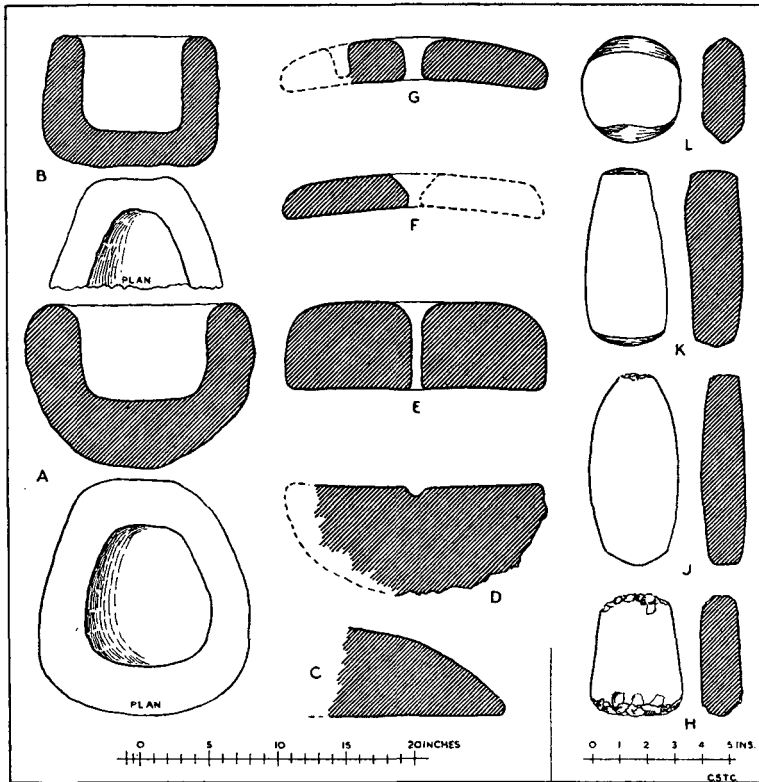
Part of another, similar, $12\frac{1}{2}$ " wide \times $9\frac{1}{4}$ " thick; bowl 8" wide \times 7" deep, walls $2\frac{1}{4}$ " thick (fig. 5, B).

Pivot-stone.

Roughly conical boulder with pivot-socket, $2\frac{3}{8}$ " diameter by $\frac{5}{8}$ " deep, in the wider end; length 14", girth at socket $21\frac{1}{2}$ ". Another, reused as part of the pavement in compartment No. 12.

Cupped Stone.

A stone, $10\frac{1}{2}'' \times 9'' \times 5\frac{1}{2}''$ thick, with a percussed cup, $2\frac{3}{4}''$ diameter by $\frac{7}{8}''$ deep, on one side similar to pecked-cupmarked stones found in other brochs. The purpose is unknown, but some authorities think the cup might have been formed through use as a small anvil.



A & B DISHES OR KNOCKING STONES C TO G QUERNS H TO L HAMMER-STONES AND RUBBERS

Fig. 5.

Anvils.

Boulder, $2' 9'' \times 2' \times 8''$ thick, peck-marked on one side.

Another, $1' 4'' \times 9'' \times 5''$ thick, peck-marked on one side.

Tether-stones.

Slab tapering to a pointed end broken through a hole, $3''$ diameter in wider end, $1' 8''$ in broken length, $13''$ at wide end and $1\frac{1}{2}''$ thick.

Another, also tapering and similarly broken, $15''$ long by $13''$ wide and $1\frac{1}{4}''$ thick, hole $4''$ diameter.

Fragment $6''$ long, $2\frac{5}{8}''$ wide and $2\frac{7}{8}''$ thick, with rounded outer edge merging into remains of a biconical hole on the inside, made by pecking, and

of probable narrowest diameter $1\frac{1}{2}$ ". In appearance like part of a stone ring but more likely to have been part of a tether.

Querns.

Upper grinder of circular quern, 17" in diameter and 3" thick at centre, with convex upper face and concave lower, and with central hole and cavity for handle (fig. 5, G).

Part of another, 19" in diameter and $2\frac{3}{8}$ " thick at centre (fig. 5, F).

Greater part of another, $17\frac{3}{4}$ " in diameter and $6\frac{3}{8}$ " thick, with top flattened by pecking (fig. 5, E).

Portion of another of granitic stone, $6\frac{1}{2}$ " thick, reducing by convex upper side to a rounded edge $1\frac{1}{2}$ " thick (fig. 5, C).

Part of another, probably an under grinder, also granitic, $16\frac{1}{2}$ " \times 13" in broken length and width and 8" thick. A small cavity, $1\frac{1}{2}$ " diameter and $\frac{5}{8}$ " deep at its true centre, may have held a gnomon (fig. 5, D).

A water-worn boulder, approximately 16" \times 15" \times 5" thick, rubbed to a slightly concave face by use as a saddle-quern.

Grain-rubbers.

The following grain-rubbers have all been made from water-worn stones and the rubbed surface shows a slight convexity in both length and breadth. The greatest dimensions are: (1) $15\frac{1}{2}$ " \times $9\frac{1}{2}$ " \times 3" thick, (2) $12\frac{1}{2}$ " \times $8\frac{1}{2}$ " \times $4\frac{1}{2}$ " thick, (3) a granitic stone 15" \times $8\frac{1}{4}$ " \times $4\frac{1}{2}$ " thick.

Pot-lids.

Five pot-lids of local shaly stone were all found in the excavations in the courtyard. Dimensions respectively in average diameter and thickness are: (1) 13" and $1\frac{1}{4}$ ", (2) $6\frac{3}{8}$ " and $\frac{5}{8}$ ", (3) $5\frac{1}{8}$ " and 3", (4) $2\frac{3}{4}$ " and $\frac{3}{10}$ ", (5) $1\frac{5}{8}$ " and $\frac{1}{4}$ ", the last may have been a gaming piece.

Pestle.

A water-worn stone, $6\frac{1}{4}$ " long, tapering from an oval cross-section 3" and $1\frac{3}{8}$ " on the axes to a round section $1\frac{3}{4}$ " diameter. Both ends rubbed to a convex surface (fig. 5, K).

Smoothing Implement.

A stone, $6\frac{1}{4}$ " long between broken ends and $2\frac{5}{8}$ " and $1\frac{1}{2}$ " on axes of oval cross-section, found in the courtyard; fashioned all over to a smooth surface, and traces at one end of a high polish indicate very fine rubbing action and also suggest a narrowing axe-edge termination.

Grinding or Smoothing Implements.

Circular water-worn stone, 4" diameter and $2\frac{3}{8}$ " thick, highly polished and flattened on one side; edges on either side smoothed convexly all

round by rubbing; traces of later use as hammer-stone. Found beside a hearth and discoloured by heat. Presented to Wick Museum.

Another, $4\frac{5}{8}$ " and $2\frac{1}{8}$ ", similar in every respect except that the rubbed edges occur only on axes of the circumference diametrically opposite, and it was not put to later use. Presented to Wick Museum.

Another, $3\frac{5}{8}$ " and $1\frac{5}{8}$ ", similar to last but not polished on side (fig. 5, L).

Another, $3\frac{3}{8}$ " and 2", similar to the one above, but edges rubbed only on part of the circumference and hammered on part diametrically opposite. Presented to Wick Museum.

Another, 8" long and $3\frac{1}{4}$ " and $1\frac{3}{4}$ " on axes of oval cross-section, rubbed on edges of both ends. Presented to Wick Museum.

Another, $6\frac{3}{4}$ " and 3" and $\frac{1}{2}$ ", similar to above but rubbed on one end only. Presented to Wick Museum.

Another, 5" and $3\frac{1}{2}$ " and $1\frac{3}{8}$ ", as above. Presented to Wick Museum.

Another of quartz, $6\frac{1}{4}$ " and 4" and 3", rubbed on both edges at one end and hammered at the other.

Another of sandstone, $5\frac{3}{4}$ " and $3\frac{3}{4}$ " and $1\frac{1}{2}$ ". Presented to Wick Museum.

Another, $6\frac{7}{8}$ " and $3\frac{1}{4}$ " and $1\frac{5}{8}$ " (fig. 5, J).

Another, $5\frac{1}{2}$ " long, and tapering from $3\frac{1}{2}$ " to $2\frac{1}{8}$ " and from $1\frac{3}{4}$ " to $1\frac{1}{8}$ " respectively on axes of cross-sections, rubbed at narrow end and hammered at wide end.

Pounders.

Water-worn stones, hammered at one end: (1) $8\frac{3}{8}$ " \times $3\frac{7}{8}$ " \times $1\frac{7}{8}$ " thick, (2) 5 " \times $3\frac{1}{4}$ " \times $1\frac{1}{8}$ " thick, (3) $5\frac{1}{4}$ " \times $3\frac{1}{4}$ " \times $1\frac{1}{4}$ " thick, hammered at both ends; (4) $6\frac{1}{2}$ " \times 5" \times $1\frac{3}{4}$ ", (5) $3\frac{7}{8}$ " \times $3\frac{7}{8}$ " \times $1\frac{5}{8}$ " thick, (6) $4\frac{1}{2}$ " \times $3\frac{3}{8}$ " \times $1\frac{1}{2}$ " thick, found in northmost chamber next rampart (fig. 5, H); (7) $3\frac{3}{5}$ " \times $2\frac{1}{2}$ " \times $\frac{7}{8}$ " thick, found likewise; (8) shaped flat-sided poulder, broken at one end 2" square and hammered at other $3\frac{5}{8}$ " \times 2"; length $3\frac{5}{8}$ ".

Whorl.

Whorl, $1\frac{1}{2}$ " diameter and $\frac{5}{8}$ " thick, with percussed biconical hole $\frac{3}{4}$ " diameter reducing to $\frac{3}{10}$ ".

Only one small nodule of flint and one small flake were found.

Pottery.—The pottery has been examined by Mr R. B. K. Stevenson. Not more than a score of vessels are represented, many by single sherds. He notes that some are characterised both by the lumpiness of their surface and by their hardness. Such is the rim, fig. 6, *a*, which resembles in rim diameter and fabric a vessel from the White Broch, Caithness, which stands over 16 inches high and is the same in diameter. There is a close resemblance also to sherds from the lower levels at Traprain Law, some of which, like the White Broch vessel, have finger-tip decoration in the hollow outside

the rim. The Kilmster rim with several sherds of the same fabric, and the thinner rim, fig. 6, *b*, came from the slab of the latest hearth in the centre of the broch. Again similar are sherds forming most of the lower part of the walls of a vessel of hard grey fabric with a buff surface, which had been about 14 inches in diameter at the base, clearly comparable with the remains of a vessel from Barrock Broch. They were found in radial cell 4, while sherds, possibly of the same vessel, lay in the sunk pit at the centre of the broch covered by a later pavement and hearth. Fig. 6, *c*, came from the broch floor.

The rim shown in fig. 6, *e*, bears two incised lines that might be intentional decoration. It has a smooth, buff outer surface, and was found low down on the broch floor, as was a sherd of vivid red soft fabric. In the entrance

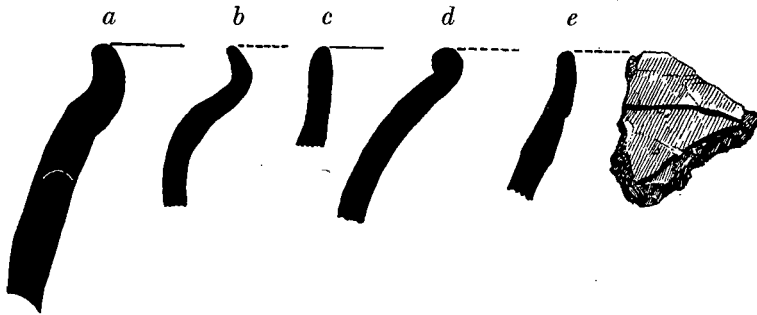


Fig. 6. Rim fragments of pottery.

passage were several sherds, including a flattened rim, without large grits or lumpy application of clay finish; this is the fabric which seems to have entirely superseded in course of time the "cinerary urn tradition." Fig. 6, *d*, whose shape is paralleled in a number of brochs and to some degree at Traprain, is a brick-red soft micaceous ware.

The following relics from Sir Francis Tress Barry's excavations are deposited in the National Museum, viz.: Bone needle, HD 431; Bone, HD 432; Pot, GA 908.

In conclusion I desire to acknowledge my indebtedness to the Ministry of Works for permission to publish this account, to Dr James S. Richardson, Inspector of Ancient Monuments for Scotland, for making the necessary arrangements for me to carry out the work, to Mr R. B. K. Stevenson, M.A., Keeper of the National Museum, and to Miss Margery I. Platt, M.Sc., of the Anatomy Department of the Royal Scottish Museum, for their Reports on the Pottery and Animal Bones respectively. I have also to express my grateful thanks to Mr Murdo M. Mackenzie, Schoolmaster, Kilmster, for his kindly interest and help during the operations.

REPORT ON THE ANIMAL REMAINS.

By MARGERY I. PLATT, M.Sc., Royal Scottish Museum, Edinburgh.

From Interior of Broch.

Red Deer.—Left angle of lower jaw. The head of a femur was found in the space between the earlier and later pavements.

Pig.—Tusk (canine) from lower jaw.

Fox.—Many bones of a young individual of this species occurred here: femurs, tibia, pelvic fragments, and lumbar vertebræ. (Like the rabbit, the fox is a burrowing animal, and these remains may have been intruded at a later date than the others. They cannot therefore be of great prehistoric significance.)

Ox.—A horn core, head of a rib, and phalanx of a young animal were present.

A "pin-point" found in the broch is a bone of fine lenticular structure, and is reminiscent of implements carved from the bone of a whale. It is impossible to state which species.

From Pit under Central Hearth.

These consisted for the most part solely of sheep, many young, and all of a slender horned variety.

One rib of the ox occurred.

From Entrance Passage.

Sheep.—The remains here comprised many bones of the average-sized sheep, which species was the most abundant. These were indicated by vertebræ, teeth, long bones, ribs, and phalanx bones, and by fragments of scapula (one calcined).

Ox.—An ox of small size was represented by cannons, ribs, vertebræ, distal part of a tibia and fragment of pelvis.

Shells.—Many shells common on a rocky beach, e.g. *Littorina littorea* and *Patella vulgata*, were present, and probably supplemented the diet of the broch people.

From Late Chamber to N.W. of Tower.

Ox.—Bones of young animals were indicated, chiefly by teeth and long bones.

Sheep.—Part of a skull, teeth, and cannons of an average-sized sheep were present here.

Red Deer.—Represented by split cannon bones and fragments of vertebrae.

From Late Chamber on S.S.E. of Tower

Pig.—There are two fragments of skulls from different animals, one young, the other showing the left upper dentition of an adult. A tusk found in the chamber on the S.E. side against the outer wall is a lower canine tooth of a pig, not very large in size, with the worn biting surface extensive and denoting quite a mature animal.

Ox.—Judging from the cannon bone fragment and the worked rib, an ox of small-sized breed is indicated.

Sheep.—A small calcined bone is probably that of a sheep.

Fish.—One fragment—too small for identification.

From Area of Radial Chamber outside the Entrance.

Red Deer (Cervus elaphus scotticus, Lönnberg).—This is represented by antlers of large size, fragmentary, not complete, the largest piece being the proximal end from which the brow tine has been sawn off. Many small tines occur, one extensively worked by man, hollowed out at the base with the point abraded and polished.

Shells from Constructions in Courtyard.

Two shells commonly found on the shore within the tidal zone were present in large numbers, namely, *Littorina littorea* and *Purpura lapillus*. The fragment of a much larger shell—*Cyprina islandica*—found here is from shallow water round the coasts of the North Sea. It is often thrown up by the tides on the beach, and due to its large size and hollow valves may have been used to hold water or oil.

Outer Wall Trench.

The axis vertebra of an ox of very small race was represented here.

Bones throughout Debris.

This was a mixed assembly of human bones, those of domestic stocks, wild species including Red Deer and various birds, used for food and other purposes; together with numerous shells of edible shellfish, and lastly bones of burrowing animals, probably intruded at a later date (mole and rabbit).

Human.—Many fragments of the human species occur from both sides of the body, though the majority are from the left side. There is nothing

approaching a complete bone. They comprise two parts of left radius; proximal articulation and a separate distal fragment of the left ulna; 3rd digit of manus of the left side and end of 4th metacarpal; metatarsals of the 2nd and 4th digit, left side, the former fairly complete, the latter distal end missing; the cuboid of the right pes; the proximal portion with the capitulum separate of the right femur. All these remains indicate an individual of rather small stature.

Sheep.—Fragments of all parts of the skeletons of this species are numerous. Young and adults are present, and the latter have particularly long, slender cannon bones, indicating animals of deer-like proportions.

Among these remains is a slender metatarsal which has been worked for some reason. On both anterior and posterior surfaces a groove about $\frac{1}{16}$ inch wide has been made along its length.

Ox.—Fragments of the skull, long bones, and almost every other part of the skeleton of an ox of small yet adult size are represented.

Pig.—Remains are sparser than the other domestic breeds, but skull fragments and teeth show that both young and adult pigs are present.

Red Deer.—Relics of this species also are not numerous. Tines, teeth, fragments of cannons, and a carpal (unciform) can be identified.

Birds.—These include wing bones of Common Fowl and also of a Capercaillie (*Tetrao u. urogallus* L.)—one humerus of each, the tarsometatarsus of a Raven (*Corvus c. corax* L.) and the carpometacarpus of a Gannet (*Sula bassana* L.). Bones which are possibly intrusive at a later date include humerus of Mole (*Talpa europæa* L.), and the right lower jaw of a Rabbit (*Oryctolagus cuniculus* L.).

Shells.—Many shells of edible shore varieties were present, e.g. *Cardium edule*, *Patella vulgata*, and *Purpura lapillus*.

One fish-bone occurred, probably that of a Cod, *Gadus callarias* L.