II.

EXCAVATION OF THE VITRIFIED FORT OF FINAVON, ANGUS.

By Professor V. GORDON CHILDE, B.Litt., F.S.A.Scot.

The vitrified fort occupies the crest of the northernmost of the ridges of conglomerate that constitute Finavon Hill (fig. 1). This ridge runs

Fig. 1. Air-photograph of Finavon Hill.
(Royal Air Force Official—Crown Copyright Reserved.)

east and west, the highest point lying at the east end. On the north the ground slopes up continuously from the plain of the South Esk. On the south the descent from the ridge is precipitous, but the crest is separated

from the precipices by a level platform, some 80 feet wide, about 10 feet lower than the crest. The southern rampart of the fort does not stand on the edge of the precipice, but on the slope down from the ridge-crest. The platform accordingly lies outside the main enceinte, but is partially defended on the east by an outwork (fig. 2). The present western rampart of the fort stands on what was once a distinct hill separated from the main ridge by a ravine in which the crater-like depression

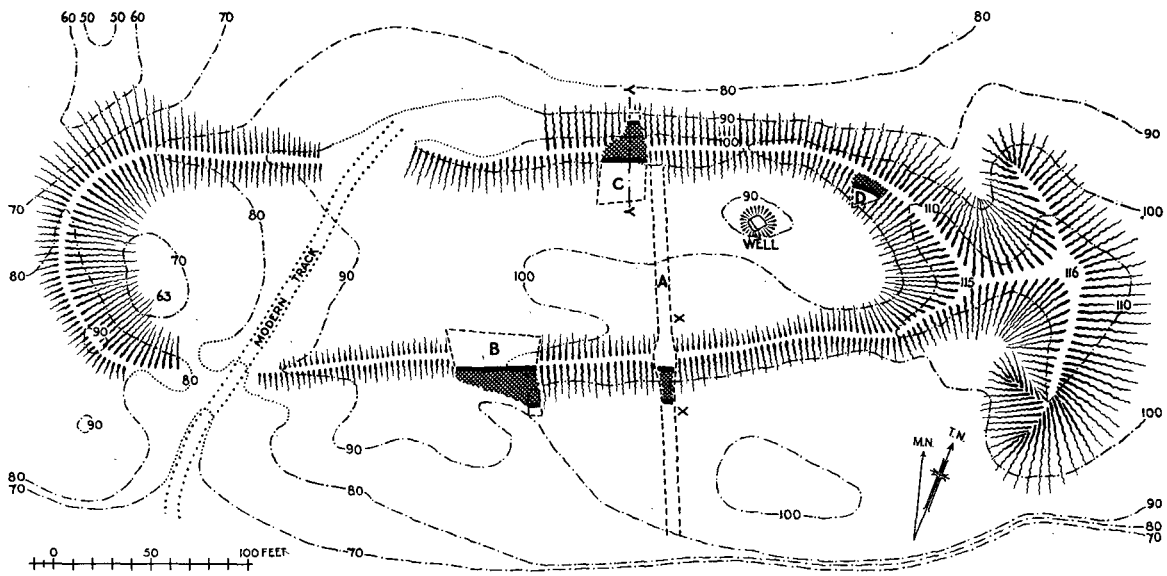

Fig. 2. Plan of Fort on Finavon Hill by Mr H. Fairhurst and Major Deedes.

round an old well is still visible. Descriptions of the fort at the beginning of last century[1] indicate that the well was then separated from the main enceinte, by a high wall, and the whole western section may have been a secondary addition. The partition wall has been destroyed by a road built across the hill, probably when the trees on it were felled. The same road has mutilated the rampart at the western end of the enceinte while the ramparts were also used as quarries for filling in the well seventy years ago and on other occasions. The monument was therefore no longer intact when we commenced operations.

In 1933 a section (A on fig. 2) was cut from the edge of the precipice on the south across the platform, through the south rampart to the inner

[1] Warden, *Angus or Forfarshire*, vol. v. p. 47.

base of the north rampart. The results then obtained to serve as a guide to future operations were as follows:—

(1) No signs of occupation nor of a fosse were observed on the platform outside the rampart.

(2) The rampart on the south is now represented by a bank over 30 feet wide and rising 12 and 6 feet above the turf at its outer and inner margins respectively. This bank is composed entirely of loose sandstone

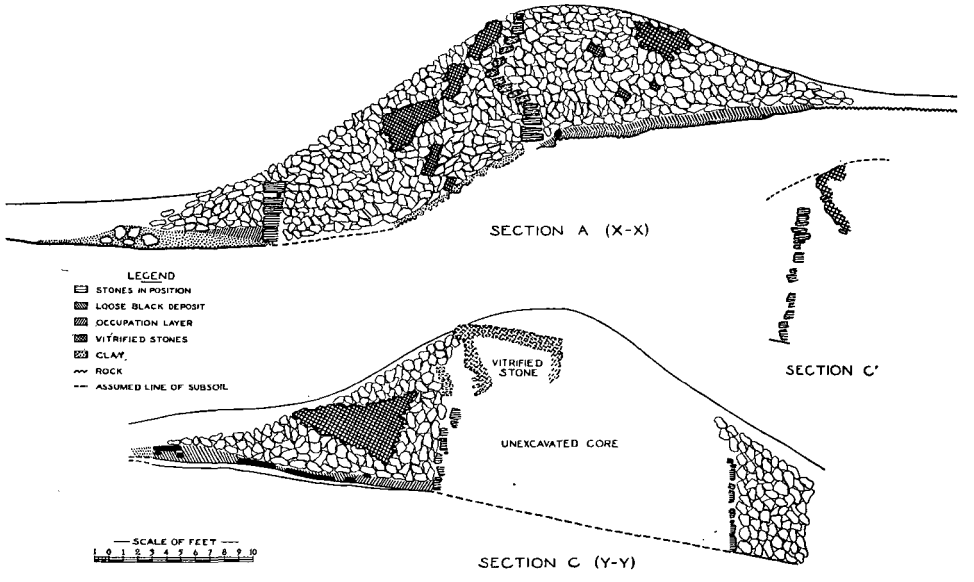

Fig. 3. Sections across the ramparts.

slabs, mixed with the products of their disintegration. Large blocks of vitrified stones are exposed at various levels on the outer slope and a few others project through the turf inside.

(3) The mass of debris results from the collapse of a built rampart, the faces of which were preserved for a few courses only. In section A they stand at the top and bottom respectively of a gentle slope where the bed-rock, dipping north, crops out in step-like ridges (fig. 3).

(4) The outer face at the base of the slope consists of four courses of large, quarried sandstone blocks, standing $4\frac{1}{2}$ feet high and nearly vertical. The foundation course comprises stones 42 inches long and 12 to 14 inches high. This wall is faced on one side only.

(5) The inner wall is also only one course thick and is built of rather smaller stones. At the point of section it had been standing 9 feet high

with a batter of 1 in 6. But only the lowest five courses (3 feet high) and the top four courses ($1\frac{1}{2}$ feet) retained anything like their original positions. The intervening courses had buckled outward so that they had to be demolished after they had been measured and photographed.

(6) Apart from one stone in the fourth course of the inner face which showed a blister, none of the stones of either face were vitrified. In the collapsed rubble inside the inner face the principal masses of vitrified stone were found 4 to 6 feet above virgin soil and 6 to 10 feet from the wall-face; smaller fused stones were discovered nearer the face and lower down. Between the two faces masses of stones fused together were found at all levels right down to virgin soil. All were discrete lumps that had evidently slipped out of position. No timbers were observed.

(7) Animal bones and remains of charred wood lay against the inner face. Extending about 19 feet inwards from the wall's foundations right to the crest of the main ridge the reddish sub-soil was covered with a purple sticky crust resembling clay. Upon this lay a stratum of black soil 6 to 8 inches thick. In the black layer, besides animal bones, the charred remains of logs (of willow or poplar), some with branches attached, could be observed. A whorl and a ? loom-weight of stone were found upon the purple crust. There was, in a word, an occupation layer under the debris of the rampart.

(8) In the interior of the fort, north of the crest of the ridge, no occupation layer nor any relics were encountered for a distance of about 65 feet. Thereafter to the base of the rampart the surface of the sub-soil bore a purple crust upon which lay a deposit 6 to 11 inches deep comprising large fragments of burnt logs and a few burnt animal bones.

Operations in 1934—Section B.

In June 1934 a section ultimately 50 feet wide was dug up to the face of the south rampart where section A had shown relics were to be expected. The section began at the base of the apparent slope of the rampart which approximately coincided with the crest of the main ridge of the hill and proved to be 19 to 21 feet from the foundation of the rampart's inner face. Excavation actually began about 100 feet west of section A. After the loose surface soil and the debris of the rampart had been cleared away, the underlying deposits were explored with trowels and brushes down to virgin soil in strips 15 feet wide. In each strip we advanced from the base line to the wall-face measuring and plotting logs and other features as they were exposed. Each strip, when thus cleared and noted, was used as a dump for the refuse from the next. By this means the occupation

layers under the collapsed rampart were thoroughly explored over an area of 1000 square feet, and a section of wall-face, 45 feet long, was exposed.

(9) Section B lies as a whole substantially lower than the corresponding strip of section A. There the crest of the ridge lay ·80 feet above datum, whereas in B it was found 3·30 below datum at the east end, and 4·60 below at the western edge. On the other hand the slope towards and under the rampart was gentle—2·80 in 18 at the western end and 5·50 in 16 at the eastern end; the latter incline continued under the rampart to the level of the platform on the south. At the top of the slope bed-rock cropped out in ridges dipping south. The inner face was uncovered for a distance of 45 feet and found to run dead straight.

(10) *The Rampart.*—For the first 12 feet from the western end of section B only the foundation course of the inner face survived. The higher courses and most of the material lying outside them had been entirely removed from the outside, perhaps in the course of tree-planting. The foundation was proved to be only one course deep with no trace of building south of the line of the facing blocks. The basal course consists of flat slabs of sandstone or conglomerate 24 to 30 inches long, 14 to 20 inches wide, and 10 to 9 high, and straight along the inner edge only. They are embedded 4 to 5 inches deep in perfectly sterile sub-soil, sometimes with wedgers in front of them, but the builders have made no attempt to reach bed-rock for their foundations.

In the last 20 feet of the section the wall was standing 7 to 8 feet high, but still only one course deep (fig. 4). The stones composing the higher courses are smaller and less carefully chosen than the foundations. Many are badly cracked, and some have completely disintegrated. There are conspicuous gaps between adjacent stones and courses, but these are generally now filled with chips of stone or sand formed from the disintegration of such. The lowest three or four courses, 2 feet odd in height, are the best preserved and exhibit an outward batter varying from 1 in 6 to nearly 1 in 4. The four to six courses between 2 and 5 feet above the ground slope backward as much as 3 in 8, but as the component stones are themselves no longer horizontal but tilted up, this deviation from the vertical may be attributed to slipping, While the stones in these intermediate courses are not normally more than 9 inches high, the tenth course comprises several blocks exceeding 1 foot in height. Between $4\frac{1}{2}$ and $5\frac{1}{2}$ feet from the ground the solider stones return to a more nearly horizontal disposition, the wall then running up almost vertically to a height of some 7 feet. At about the latter level a distinct ledge was observed in the easternmost 6 feet exposed; the sixteenth course is set

back fully 3 inches. This ledge need not, however, represent a scarcement, but may be merely due to distortion.

The impression produced by a prolonged scrutiny of the whole exposed face was compatible with the view that the wall had been built up in three or four tiers as a revetment against a core, presumably of rubble.

(11) Six feet of the outer face were exposed 21 feet south of the inner face at the eastern end of the section. Only the foundation course was

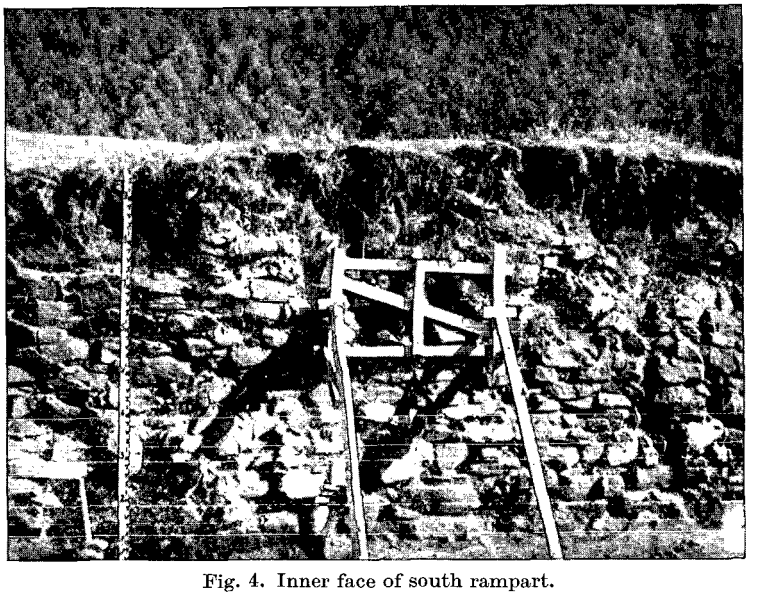

Fig. 4. Inner face of south rampart.

intact. It consisted of very large slabs, one being 3 feet long, $2\frac{1}{4}$ feet wide and $\frac{3}{4}$ foot in. It rested on pure sub-soil, not on rock. Two stones that had clearly belonged to higher courses were found $2\frac{1}{2}$ feet south of the foundation, but, judging by the small amount of debris, the rest of the outer face must have been quarried away. Behind (*i.e.* north of) the line of the foundation no trace of building could be seen, the bank, right down to virgin soil, consisting entirely of loose debris including many small pieces of vitrified stone.

(12) *The Occupation Layers.*—From the rock outcrops marking the original crest of the ridge to the base of the rampart's inner face, the loose reddish sub-soil resulting from the disintegration of the conglomerate is capped by a thin crust slightly more bluish in colour and distinctly less porous. It might represent a compaction layer resulting from tramping

about on the sub-soil and actually contains a little charcoal. It passes over almost imperceptibly into a very black and sticky "occupation layer" 5 to 7 inches deep. This is full of charred material, broken bones, pot-sherds, and other relics as well as bits of stone of all sizes, including obvious pot-boilers. A microscopic examination very kindly undertaken by Mr Wallace Thorneycroft reveals that this deposit consisted very largely of a true clay (particles between ·02 and ·002 mm. in size make up 67·6 per cent. of the fine material) coloured with organic matter and, perhaps, reduced iron oxides. A few lumps of such a clay, fairly clean, were actually discovered in the layer at various depths, but it almost certainly does not occur *in situ* on the hill. It has probably been brought up from the valley and seems similar to the clay used for making pottery.

As we approached the wall-face, the occupation layer was always observed to become deeper, extending to 18 or even 24 inches above the sub-soil about $1\frac{1}{2}$ foot from the wall. The uppermost 6 or 10 inches here, however, while indistinguishable in texture from the rest, comprised no sherds nor artifacts, but immense quantities of broken bones and some charred wood. This topmost black bone-bed does not usually extend right up to the wall-face but is normally separated therefrom by a space 4 to 6 inches wide filled with sand and stones mixed with bones. The bones near the top of the deposit against the wall are the most burnt. Pieces of charred wood may extend across the sandy belt right up to the wall. No continuation of the occupation layer nor of the underlying purple crust was observed south of the inner edge of the wall-face. All relics were obtained in the occupation level, but they might be expected at all depths in it.

(13) Above the true occupation layer dark soil still continues to a depth of from 3 inches, $16\frac{1}{2}$ feet from the wall, to 24 inches near the wall-face. Though sometimes sticky, this "upper black layer" contained no relics and proved on examination to be much more sandy than the clayey occupation layer. Various deposits were found interpolated in it.

(*a*) Beds of "pinkish clay" overlay the occupation level at various points. They frequently attained a thickness of 5 inches and might extend for a distance of 6 feet, though 2 to $3\frac{1}{2}$ feet was the average breadth for such a patch. The beds tapered off at each end and never reached the wall-face. Superficially this "pink clay" resembles the crust on the sub-soil. Mr Thorneycroft's microscopic studies show that this material really contains very little true "clay" and might well be due to the decomposition of sandstones such as are generally found lying near it.

(*b*) Stones and slabs, of all shapes and sizes and lying at all angles,

are embedded in the occupation layer and overlying deposits, but none exposed in section B was observed to be fixed in the sub-soil. From 3 to 10 feet from the wall-face beds of flat slabs, lying nearly horizontal and often so loose that gaps still yawned between them, were noted 12 to 9 inches above virgin soil. These slabs generally override beds of type (*a*) if such are present, but 12 or more feet from the wall they repose on or project into the occupation layer. The general inclination of the slabs under consideration is more nearly horizontal than that of the debris fallen from the rampart. They might once have belonged to some sort of pavement, but if so they have been too much disturbed by the collapse of the rampart to allow us to determine where and on what any such pavement might have stood.

(*c*) The upper black deposit evidently owes its colour mainly to carbon, and pieces of burnt wood occur in it everywhere. In places bits of logs or boughs were sufficiently preserved for the grain of the wood to be clearly recognised, but even these pieces were so soft that they had been squashed by stones or pierced by nettle roots; details of shape and thickness could not be determined with any great accuracy. The preservation of the timber presumably depended upon local circumstances. The best preserved logs were noted between the top of the slope and points about 8 feet from the wall-face; the logs here were of all sizes and some clearly showed boughs branching off. Most lay above the occupation layer. Two or three were included in the slab bed (*b*), between 9 and 10 feet from the face and $8\frac{1}{2}$ to 13 inches above virgin soil. Though all logs were carefully planned, no sort of order could be recognised in their disposition. The specimens examined belonged to willow or poplar and birch. The pieces of timber near the wall-base were generally smaller, only 3 to 4 inches thick, and included oak wood. Such might even rest against the wall-face as much as $28\frac{1}{2}$ inches above the virgin soil, probably where moisture collected. At one point three squashed logs or planks of willow or poplar were found lying parallel close together immediately above the occupation layer and 6 inches from the sub-soil.

(*d*) The topmost layers of black material are always loose and powdery and comprise neither relics nor solid pieces of charred wood. Such a deposit often overlies flat slabs as well as other deposits; in section B4 it was seen lying on a bed of loose powdery red sand and flat slabs with the stone bed described under (*b*) still lower down. There were gaps in the redder layer in which the black descended into layer (*b*).

(14) Above the layers just described, an immense accumulation of loose stones was piled against the rampart face. The stones were mainly sandstone slabs similar to those used in building the wall and lay at all

sorts of angles. Close to the wall are slabs resting against it almost vertically, while others at the base of the accumulation are nearly horizontal. Such may be regarded as occupying positions which isolated building stones would take up on slipping off the top of the structure. The rest give the impression of being the result of a sudden collapse when a mass of wall toppled inwards. In any case it is certain that this chaos of stones, burying an occupation layer rich in pottery and bones, has fallen inwards after the occupation of the area. Moreover, the stones can only have fallen from above the existing wall top: they represent the debris of tiers of masonry once rising above those still standing. But all need not have come from an upward continuation of the inner face. On the contrary, the rubble between the wall-faces would also fall inwards and even such courses of the outer face as rose above the level to which the inner face is preserved would, if falling towards the interior of the fort, be found within the inner face. Both in section A and in B comparatively little material slipped from the rampart was observed outside the line of the outer face. Hence a good deal of the outer face may really have fallen inwards to augment the debris against the inner face. The apparent crest of the rampart was often found to run inside the line of the inner face's foundations, and always lies inside the line of its present summit.

No stones in either face exposed in section B exhibited vitrifaction. Fused stones were found at various levels inside the inner face. But the bulk of the vitrified material, including all large blocks, lay from 4 to 8 feet in from the line of the wall and $5\frac{1}{3}$ to $6\frac{1}{2}$ feet above the virgin soil, often projecting through the turf of the bank. All of these blocks must have fallen from some point above the present top of the inner face and may be derived from outside it. The loose vitrified material behind the line of the outer face cannot be regarded as *in situ* and might have fallen in from higher levels.

The North Rampart.

The north rampart was tested in July and August 1934 by a section, C (fig. 2), 25 feet wide, immediately to the west of section A. Digging as in section B towards the rampart, the inner face was reached 21–22 feet from the base of the section and was uncovered to its foundations for a distance of 23 feet. A subsidiary trench on the outer slope exposed 5 feet of the outer face.

(15) The foundation course of the inner face was again composed of very massive blocks 16 to 33 inches in length and 9 to 13 in height. Allowing for the unevennesses of the edges, producing a divergence from straight

of not more than 4 inches, the wall ran dead straight 82° E of N for the whole length of 23 feet. The face was everywhere preserved to a height of $5\frac{3}{4}$ feet, representing 8 to 10 courses of masonry and deviating from the vertical 1 to $1\frac{1}{2}$ feet (fig. 5). The third course was composed of particularly massive slabs separated from the course below by conspicuous but quite irregular gaps. Twelve feet from the east end the wall was standing $9\frac{1}{2}$ feet high. The six courses from $5\frac{1}{2}$ to 8 feet above the ground stood practically vertical, and the top courses nearly vertical but set back

Fig. 5. Inner face of north rampart.

about 3 inches. These courses collapsed during the filling in. At the east end of the section the upper courses had been displaced forwards so much that they could not be preserved; at the western end the corresponding courses had already been broken down before we reached them. In this section too the impression of building in tiers is inevitable.

The outer face rests on virgin soil $4\frac{2}{3}$ feet below the foundation of the corresponding section of the inner face. It was preserved to a height of 5 feet and stands practically vertical. As on the north, the stones used are as a whole even more massive than those employed in the inner face (fig. 6). Gaps between the stones are noticeable, but in some cases at least they are due to the disintegration of component stones. On one stone of the foundation course what looks like a cup and ring mark is

visible in the photograph, but may be a purely natural feature in the conglomerate.

The outer part of the rampart on the north has undoubtedly fallen outwards and slipped down the hill. Under the turf the whole of the

Fig. 6. Outer face, north rampart.

existing slope of 1 in 2 up to the wall-face is composed entirely of debris from the rampart above it. This debris included a number of large blocks evidently derived from upper courses of the face, together with flat slabs from the core of the rampart. It may be regarded as certain that the outer face originally stood at least as high as the inner face, the debris now outside it all the way down the slope being easily sufficient to fill the missing courses. The debris piled against the inner face in section C must accordingly be derived in the main from that face itself and the core of the rampart immediately behind the fallen upper courses.

Actually the accumulation of debris inside the wall is less than on the south and scarcely extends more than 8 feet beyond the base of the rampart. Moreover, the crest of the rampart bank now is not above or inside the line of the inner face, as on the south, but 8 to 10 feet outside that line. It follows that, at its collapse, while part of the rampart fell forwards into the fort, its outer portion slid down the hill.

(16) No stone in either face exhibited any trace of vitrifaction. Inside section C large blocks of vitrified material, that had evidently fallen from higher levels in the rampart, were encountered only in front of those strips of face where the upper courses had been broken down. Behind the best preserved strip, 11 to 15 feet from the east end, vitrified stones project through the turf on the rampart's crest nearly 12 feet above the foundation of the inner face. When the upper courses collapsed during the filling in, they fell clean away from a large mass of fused stones. The base of this mass lay $7\frac{1}{4}$ feet above the wall's foundations and $3\frac{1}{3}$ feet back from the line of the face at that level. It spread out higher up so that its inner edge, about 11 feet above virgin soil, was only 20 inches back from the line of the face previously mentioned (fig. 3, C′). In this mass the stones near the top were entirely without order but firmly embedded in fused material. Lower down the stones—flat slabs of sandstone—seemed to have been once lying horizontal and were less completely fused. Below the base of the mass, though it was possible to penetrate 5 feet into the thickness of the rampart, no building nor fused slabs could be seen, but the underlying stones showed signs of exposure to heat. Near the east end of the section another block of vitrified material, shown by dotted lines in fig. 3, was exposed *in situ* behind courses of wall that collapsed during excavation. The base of the mass lay almost 7 feet above the wall-base and extended upwards to a height of $11\frac{1}{2}$ feet above virgin soil, being then about 2 feet back from the line of the face as determined by its basal course. The mass was followed back from its inner face through the crest of the rampart for a distance of 8 feet. This mass too tapered downwards at both ends and seemed less completely fused at its base than at its summit. It showed no evidence of having been fused on to the inner face and rested on loose horizontal slabs which, though somewhat cracked or contorted by heat, had not fused. On either side of this block were others which had fallen forward; one to the east blocked the northern end of section A in 1933, while that to the west is shown as it lay in the debris in fig. 3.

Near the west end of the section a large mass of fused stones was exposed behind the fallen upper courses, but seemed itself to have fallen forward and been responsible for the collapse of the masonry in front of

it. Elsewhere small pieces of vitrified stone were found at various levels in the debris, two minute fragments even turning up against the foundation course of the inner face. All the fallen pieces might, and most of them must, have come from positions near the crest of the rampart, 7 or more feet above its foundation. None of the stones visible through chinks in the faces has been fused, the core, as far as it can be discerned, consisting entirely of loose rubble.

(17) As on the south, the sub-soil in section C sloped down towards the base of the inner face, but less steeply (the drop in 20 feet is 4·70 to 7·05 feet below datum at 8 and 4·35 to 6·18 at 22). Throughout the section the loose sandy product of the conglomerate's decomposition was covered by a harder skin, purple in colour. Near the wall this skin is barely $1\frac{1}{2}$ inch thick, but between 10 and 20 feet from the wall it attains a thickness of 4 to 6 inches. In places it was particularly hard and white on the surface, a phenomenon perhaps attributable to the effects of heat.

(*a*) Relics were rare throughout section C. Practically all the pottery was found within 10 feet of the wall. Between 5 and 20 feet from the eastern edge of the section no pottery and only minute scraps of bone were found inside this limit. A regular occupation layer, comparable to that described from section B, scarcely extended more than 5 feet from the wall. It was distinctly less greasy and sticky to the touch than in section B, and proved on examination by Mr Thorneycroft to contain a comparatively small proportion of true clay; only 11·2 per cent. of the finer particles fell under this head as against 67·6 per cent. in the occupation layer from B. The bulk of the layer in C consisted of sand (88·8 per cent. of the finer particles) coloured by organic matter. As in section B, bones were piled up against the base of the wall, the uppermost pieces having been burnt. However, the total number of bones from section C was only about one quarter of that recovered in section B which is just twice the area. A complete pot had been standing against the wall; its base was found, inverted, 19 feet from the east end. As before the layer comprised many pebbles from the conglomerate, cracked by heat, evidently through use as pot-boilers.

(*b*) Throughout the section the purple crust of the sub-soil was overlaid by a black deposit comprising large pieces of charred or carbonised wood. Save near the wall this layer, though 6 to 13 inches deep, contained no bones nor relics and is sandy in texture; apart from organic matter and stones it proves in fact to be composed to the extent of 92·4 per cent. of sand with only 7·6 per cent. of "clay." The remains of numerous charred boughs were discernible in the layer; those between 10 and 20 feet from the wall were still remarkably hard and attained a thickness

of over 6 inches in some instances; all examined were of oak. The remains of smaller branches growing out from them were noticed more than once. Two or even three superimposed stems (of oak) could often be distinguished, but a careful scrutiny of the intersections revealed no trace of trimmed joins. In one or two places the logs lay parallel to one another or intersected at right angles, but in general no plan nor deliberate arrangement

Fig. 7. Hearth A and oven in Section C.

could be discerned. The sub-soil immediately under timbers often, but not invariably, showed evidence of heating, and logs were piled especially deep over hearth A. Bits of logs were often found under stones and in contact with the sub-soil. Some of the latter exhibited a skin of unburnt wood on the underside, but none were firmly planted in the ground. About 5 to 6 feet from the wall birch bark was found in small patches right on virgin soil—presumably a sort of carpet. Charred grass and brushwood were also included in the dark sandy layer.

(18) While no structures had been detected in section B despite its wealth in relics, section C produced undoubted architectural remains (fig. 8). A hexagonal hearth, with a sort of oven behind it, was exposed

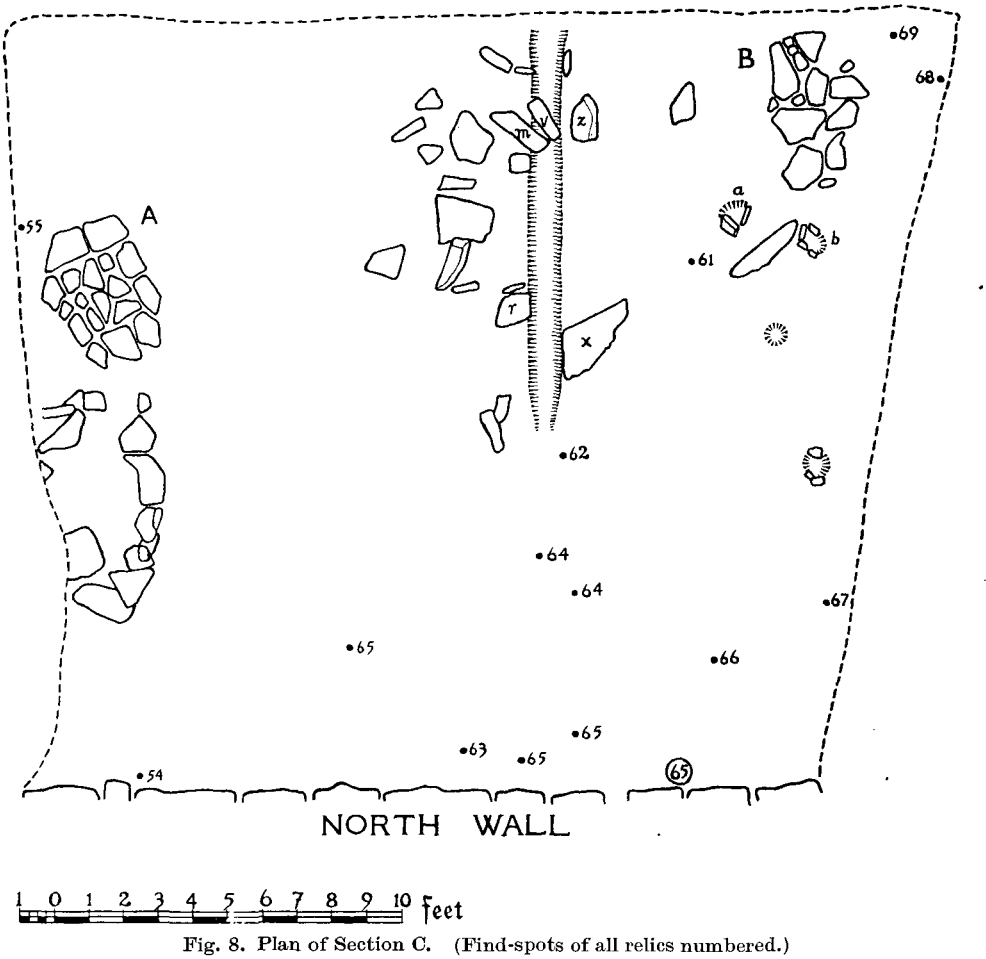

Fig. 8. Plan of Section C. (Find-spots of all relics numbered.)

in the easternmost strip first uncovered, and thereafter no stones that seemed to be in contact with the sub-soil were lifted till they had been planned. Since, however, stones fallen from the rampart covered the whole area, it was extremely difficult to decide which, if any, slabs were actually *in situ*.

The least ambiguous features were two hearths. Hearth A (fig. 7),

12 to 16 feet from the wall and 1 to 4 feet from the eastern edge of the section, was a hexagonal pavement composed of eighteen thin slabs, some cracked by heat, resting directly upon the blue crust. A mass of charred logs was heaped over the hearth and extended several feet west of it, but at its northern end twigs of brushwood were recognised. The soil under the hearth was white and hard, as if baked.

North of the hearth we found remains of a sort of oven, partly disturbed by a strut inserted to support the wall-face. The oven seems to have been about 5 feet long by 3 feet wide and is outlined by a low wall, only some 8 inches high, composed of small stones (measuring on an average 7 by 5 by 4 inches) resting on the purple crust. The oven was filled with sandy black soil including twigs of charred brushwood, but an unworked flint flake was found on its floor.

Despite a determined search for foundations no intelligible remains were found between hearth A and hearth B, 23 feet from the eastern edge of the section. In the intervening space a number of stones seemed at first to be set in the soil, but after photographing and planning most of them proved to cover charred wood or other remains. Nor were any post-holes discoverable. But a shallow trench, 10 to 15 inches wide and about 6 inches deep, runs across the section at right angles to the wall. It had been cut through the blue crust right down to the sandy red subsoil and was filled with dark earth and pieces of charred wood. The timbers found in it were lying at all angles so that the trench did not serve as a bed for prostrate logs. It is, however, possible that the narrow blocks, *m* and *v*, now tilted, had originally stood upright in the trench like low pillars, and even the thick slab *x* may once have stood on edge in it. The solid blocks, *r* and *z*, now standing about a foot high on the brink of the trench, may have fallen from the wall as the soil under them was black.

Hearth B, 17 to 21 feet from the wall, is again a pavement of thin slabs little over 2 feet wide. Charred logs were found over its northern end where the soil beneath and around the slabs once more showed signs of baking, but the southern end of the pavement rests on an outcrop of conglomerate.

North of the hearth two pits have been dug into the virgin soil to a depth of $8\frac{1}{2}$ inches (fig. 9). Both are lined with stones—pit *a* with two flat slabs on end, pit *b* with a thin slab on the north and two tiers of small stones on the south and east. In both cases the upper ends of the northern slabs are inclined inwards towards the hearth so that any post standing in these sockets would have leaned in that direction. Between the two pits a rectangular slab of conglomerate, 5 inches square in section,

rests on virgin soil. Nearer the wall are two shallower depressions, the first 2 inches and the second $4\frac{1}{2}$ inches deep. Only dark earth was found in these four hollows.

Fig. 9. Hearth B in Section C.

Section D.

The contoured plan (fig. 2) will show that there is a marked depression in the north-eastern corner of the fort, east of section A. Originally there must have been a shallow gully here running north-north-west from the axial ridge of the hill, but the rampart runs right across the depression masking its exit from the enceinte. A trial section, D, in the north-east corner of the fort, revealed the inner face of the rampart climbing up from this hollow to the higher ground on the south-east.

(19) Section D exposed a strip of rampart about 15 feet long and slightly curved. A straight line joining the edges of the foundation

stones at the extremities of the section represents the chord of an arc just over 9 inches high. Along this line (running 20° S of E) the sub-soil rises to the south-east $2\frac{1}{3}$ feet (from 10·33 feet below datum to 8). Beginning from the south-east corner the first six foundation stones are very large blocks, the sixth measuring 2 feet 9 inches in length and 16 inches

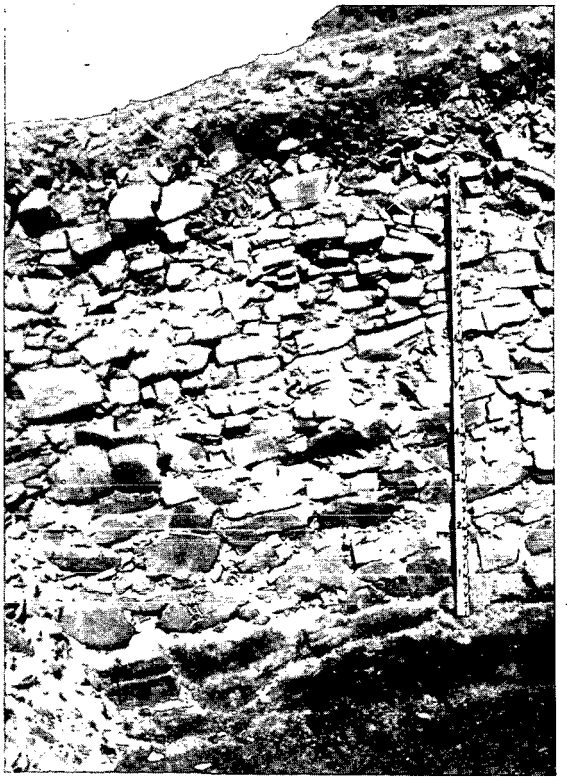

Fig. 10. Inner face of wall in Section D (the staff is truly vertical).

in height. All six courses slope up towards the south-east in harmony with the inclination of the sub-soil. The seventh foundation is, however, formed of two slabs, the surface of the uppermost being just flush with the top edge of the huge sixth foundation stone. Over both the sixth and seventh stones, the second (third) and remaining courses are set back as much as 8 inches behind their outer edges so that here the foundation course projects like a sort of plinth (fig. 10).

Throughout the section the wall is well preserved, standing well over 9 feet high, with a batter varying from $1\frac{1}{4}$ in 9 to $1\frac{1}{2}$ in 7. The topmost

courses were, however, too unstable to measure. Undoubtedly a great deal of debris has fallen in from above them. The usual pile of debris extends over 16 feet from the base of the rampart and includes large blocks of stones fused together that must have fallen from near the top of the wall. The apparent crest of the rampart now runs some 10 feet out from the line of the inner face and at the south-east corner is 14 feet 10 inches above the foundation course. The outer face may of course rest on appreciably higher ground than the inner, so that in the fall an exceptionally large proportion of the debris might have fallen inwards. Even so the inner face can hardly have stood less than 14 feet high. No stones in the existing face exhibit vitrifaction, and the fused blocks found inside the section must have fallen in from above the topmost surviving course. Vitrified stone is visible through the turf along the crest of the rampart outside the line of the inner face.

(20) It was hoped that the sunny and sheltered north-east corner would be a good place for relics. This hope was disappointed. The sub-soil was extremely wet and sticky and more yellowish in colour than usual. It covered the foundation courses of the north-west corner to a depth of 9 inches. It had perhaps been dug out to that depth, but disturbance could not be recognised with certainty.

A very few broken animal bones, some burned, were found against the wall-face, but there was no sign of a regular occupation layer nor even of a "purple crust" on the sub-soil anywhere in the section. On the other hand, a bed of large charred trunks and boughs, with branches and even twigs attached, rested on the sub-soil between $1\frac{1}{2}$ and 4 feet from the wall-face. Otherwise neither relics nor foundations were found in section D. Perhaps the slope was too wet to be inhabited.

The Eastern Well.

In 1933 a sounding at the deepest point in the depression east of section A had revealed the edge of an unsuspected well cut in the living rock. The shaft was cleared out in 1934 with the kind assistance of Captain Neish and his staff.

(21) The well at the mouth is an irregular oval some 17 by 16 feet across and has a maximum depth of 21 feet. On the north and east the walls of the shaft at first converge gently towards the centre for a depth of 3 feet and then more steeply for the next 9 feet. About 12 feet below the brim the walls become practically vertical all round and on the north-east even overhang (fig. 11). As the photographs show (figs. 12–13), the original excavators of the well have followed the natural cleavage

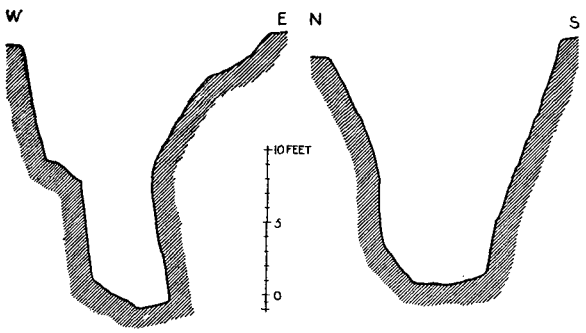

Fig. 11. Sections across the well.

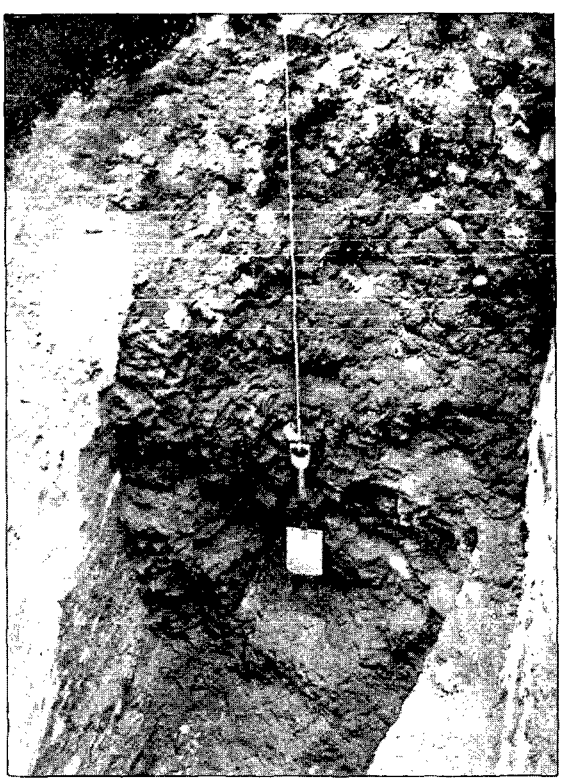

Fig. 12. View down well, looking south.

planes of the rock, what miners term backs. The actual bottom is a very irregular quadrangle about $5\frac{1}{2}$ feet by 5.

The shaft was filled to a depth of 3 feet from the turf with black soil and stones, including a few pieces of vitrified material; a few bones and

Fig. 13. View down well, looking north.

pieces of charcoal were recovered from this deposit, but no relics. Between 5 and 10 feet below the rim the filling consisted mainly of large stones with little earth between them. Small fragments of a human skull, terribly crushed and largely decomposed by the acids of the soil, were found among the stones about 8 feet down and, some 2 feet lower, a thick jet ring. The lowest 12 feet were filled with red soil, similar to the sub-soil of the district, but very wet and clayey and comprising some large stones.[1] This sticky material was spread out on the grass to dry, and subsequently broken up by hand. It yielded no relics save a few

[1] A stout block of hazel wood was on the ledge on the western side of the shaft.

minute but quite characteristic pot-sherds and hopelessly decomposed traces of bones and teeth. No water was found at the bottom, but a little seeped in at crack in the very deepest corner of the north side.

It seems then as if the well was a disappointment to its original diggers as to us. The fort-builders had recognised the gully in the hill side, near the head of which the well was sunk, as a likely place for striking a spring. But their expectations proved vain, and the useless shaft was filled in. The lowest 13 feet at least must have been filled in while the fort was still occupied, and it is most probable that the original filling came up very nearly to the brim of the shaft. Perhaps the well in the gully at the west end of the fort that still contained water in 1812 [1] had been dug when the failure of the eastern well became patent. The enceinte may at the same time have been extended by the addition of the rampart connecting the western peak with the main ridge and enclosing the western well. This successful well was in any case dug at the head of a natural gully running out northwards, just as the eastern one had been.

The Relics.

(22) Pottery was very abundant throughout section B; in section C sherds were found only in restricted areas, as noted in paragraph 17, but were identical in character with those from section B, as were the few sherds from the well. The vases seem to have been made from a greenish-yellow clay, said to be found in the plain of the Esk at the foot of the hill; unbaked lumps of this clay were found in section B. In the vessels it is mixed with large fragments of angular grit. The vessels made from this material were almost exclusively coarse cooking-pots. The walls frequently exceed 1 cm. in thickness, and bases may be over 3 cm. thick. All vessels have been built up by hand in successive rings, the edge of the lower ring having been bevelled before the next tier was applied; fracture along such joins which have been allowed to dry too soon yield the "false rims" familiar also from Skara Brae and other sites.

The firing has in all cases been imperfect, the heat applied barely exceeding 700° C. Often only a skin on the surfaces has been raised to the temperature necessary to drive out the "water of constitution" and convert the clay into earthenware; the core in such cases is dark and crumbling and disintegrates in water. The majority of the sherds are greenish-yellow on the outside and very soft. A smaller number of sherds are pinkish in hue and rather harder; the same pinkish aspect may be induced on the commoner yellow ware by rebaking, so that the difference

[1] Warden, *Angus, loc. cit.*

in colour must be due merely to variations in the temperature of firing. The interior is often blackened, doubtless through impregnation with organic matter as Mr Thorneycroft has demonstrated.

Owing to the soft and crumbling nature of the ware no vessels could be restored. The dominant form seems to have been a flat-based pot in which the walls expand slightly from the base upward only to contract again at the mouth. The complete base, found in section C, was $8\frac{1}{4}$ inches in diameter and $1\frac{1}{4}$ thick. From the small segments surviving other bases may have been only 5 or 6 inches in diameter. Sometimes

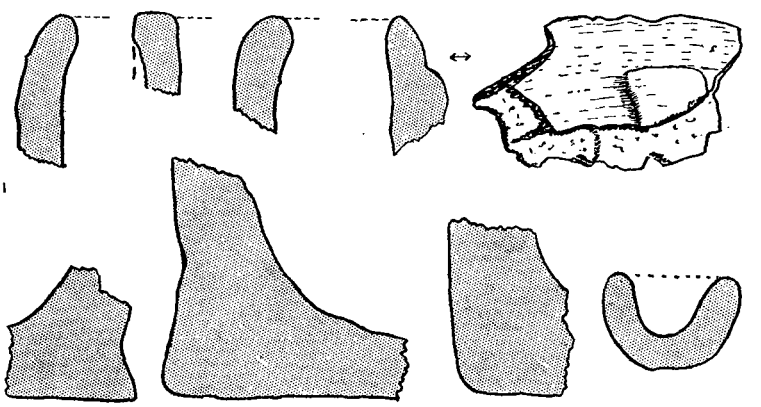

Fig. 14. Sections of rims and bases and of crucible. ($\frac{1}{2}$.)

the bases are markedly splayed, but in other instances the walls expand continuously from the base. Of the 25 rims recovered, 24 are quite simply rounded off; only one (found close to hearth B in section C) is slightly flattened on the top. There is a low rudimentary lug below one rim (fig. 14).

Several coarse pots from both sections B and C bear on the walls irregular grooves. Though generally shallow, such grooves may be as much as ·8 cm. wide. In several instances irregularities in the cross-section of the grooves show that they have been produced either with the end of a rough stick or by the impression of a stalk of straw or grass. The second explanation is the more probable, for sometimes a skin of clay projects over the edges of the impression. The grooves are generally horizontal but form no sort of pattern. It looks as if strands of straw or grass had been wrapped round the pot while it was being built up and these strands burned away in the firing. Only so can the clay overlapping the grooves be explained (fig. 16).

Such coarse pottery is naturally of small diagnostic value. It may be compared with the pre-Roman ware from Castlelaw, Abernethy, Bonchester Hill, and Dunagoil that is equally coarse and badly fired, but also with the post-Roman sherds from Pant-y-Saer, Anglesey, that are nearly as bad.

In the same greenish-yellow ware as the cooking-pots we found in section B one globular crucible and fragments of three others. The

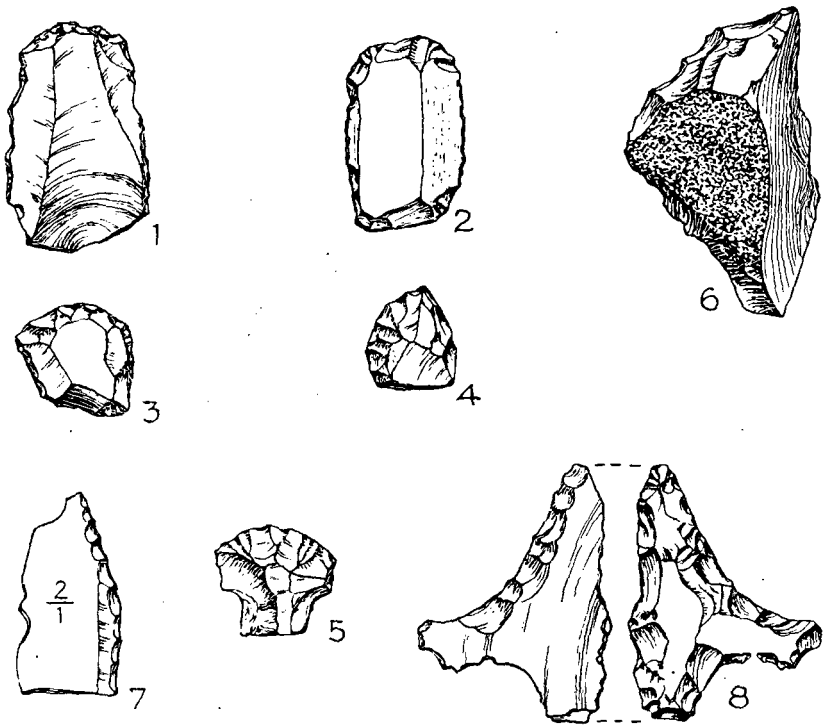

Fig. 15. Flint Implements, all ½ except No. 7, which is ⅔.

complete specimen is 3 by 2·8 cm. (1·20 by 1·15 inch) wide, 1·5 cm. deep and 1 cm. thick. Our crucibles agree with those from many Iron Age sites, including Dunagoil.

(23) The only objects of metal recovered were a thin iron ring found in the debris of the rampart in section C and a hopeless corroded iron blade found near hearth B in the same section.

(24) Flint flakes and implements (fig. 15) were common all over the site and may even be picked up in rabbit-scrapes. Translucent or opaque white flint as well as yellow and orange-red occurs. The material is

presumably flint pebbles from the boulderclays and may have been worked on the spot. A core was found $1\frac{1}{2}$ inch above the floor level in section C. It is a quarter of a pebble of translucent orange flint with the cortex still adhering on one side. Two sides are flake-scars, the fourth has been trimmed by the removal of six short flakes and used as a scraper (6). Ten other completed implements were recovered. Three (Nos. 3, 4, 5) are "microlithic" thumb-nail scrapers 1·2 to 1·5 cm. long and 1·4 to 1·5 cm. wide along the edge. No. 5 lay 7 inches above virgin soil in the occupation layer, whereas No. 3 was found only just above virgin soil at the base of the occupation layer.

Two, Nos. 1 and 2, are double end-scrapers on "microlithic" blades 2·8 to 2·4 cm. long. No. 2 lay 7 inches above virgin soil in the occupation layer near the wall in section B. In No. 1 the bulb is still in place and the edges as well as the ends show fine secondary retouching. No. 52 is an irregular chip, found 5 inches above virgin soil, one edge of which, 1·2 cm. long, has been retouched to make a scraper. No. 8 is a double hollow scraper found just under the turf near the centre of the fort in section A. I would compare it to the so-called shaft-smoother found in the "Hallstatt" settlement on Castle Hill, Scarborough.[1]

Finally No. 7 is a broken lunate, now 1·2 cm. long; the convex back is blunted with delicate retouches in microlithic style.

In addition to the implements, 22 chips, flakes and unworked blades were unearthed at Finavon. Considering the positions in which many of the implements were found high up in the occupation layer, there is no reason to doubt their fabrication and use by the builders of the fort or to regard them as relics of earlier visitants to the hill. Scrapers have constantly been found on Iron Age sites (including the post-Roman hut at Pant-y-Saer); even a lunate was found on Traprain Law. The "microlithic" appearance of the industry is to be explained by the poverty of the material available in Scotland.

(25) Though animal bones were found in enormous numbers and a fair state of preservation, only three pieces had been worked. These are (1) a marrow bone of sheep or deer, split obliquely and rubbed down to a point. The butt had been broken off in antiquity. Two fragments of the marrow bones of oxen have been polished for use as implements but badly shattered before we reached them. In one the bone had been split obliquely and the splintered end rubbed down to a point.

Antler was not common at Finavon. But one section had been sawn off at both ends as if to make a knife handle. The spongy interior has not, however, been hollowed out.

[1] Kendrick and Hawkes, *Archæology in England and Wales*, fig. 60, 8.

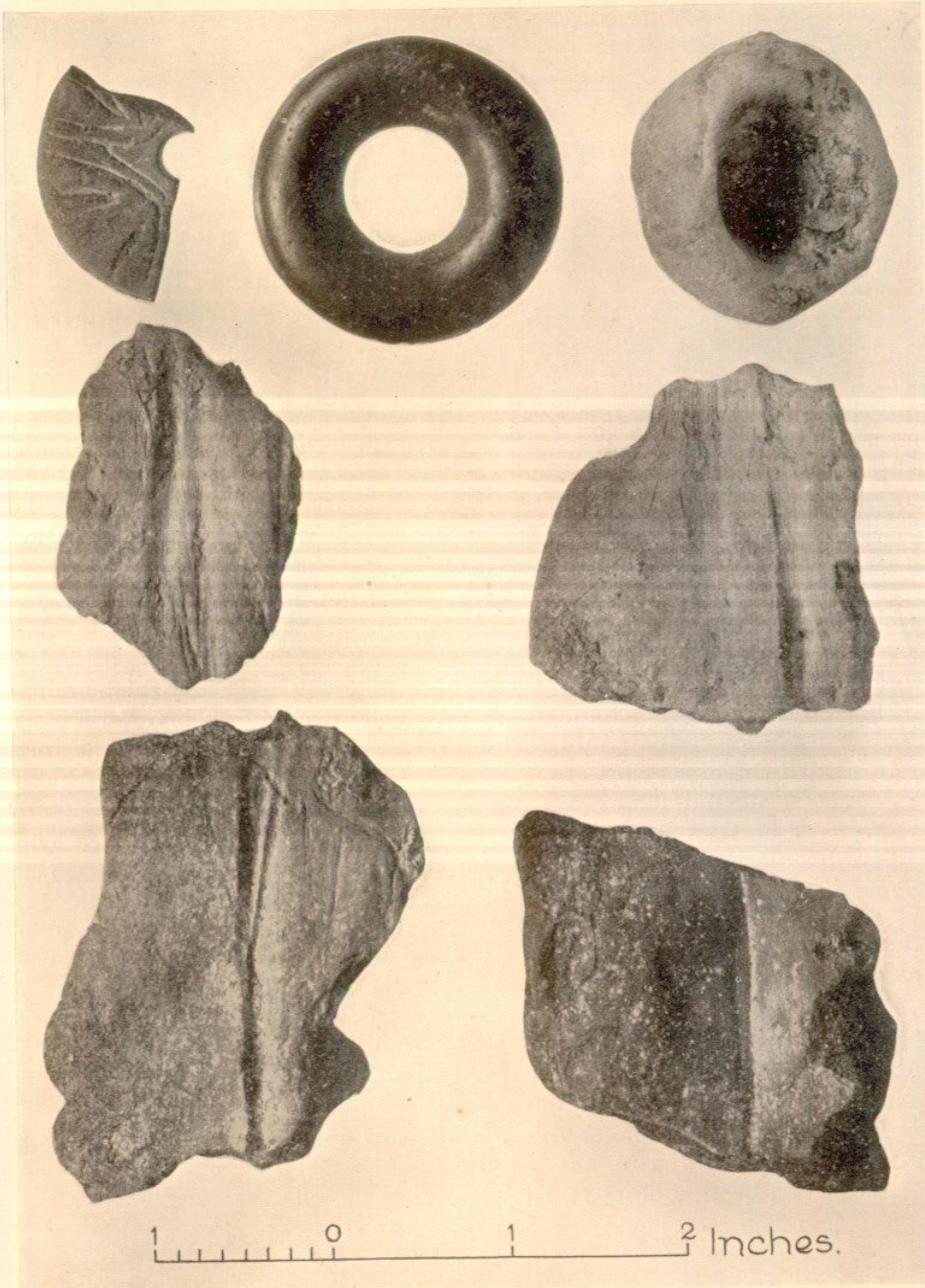

Fig. 16. Jet Ring, Ornamented Whorl, Crucible, and Incised Sherds. (½.)

The poverty of the bone industry, and in particular the total absence of the textile appliances so characteristic of the English Glastonbury complex and allied Scottish material from Borness Cave and the brochs, must be regarded as highly significant.

(26) That a textile industry was actually practised on the site is demonstrated by the discovery of no less than six spindle-whorls. All were flat discs of fine-grained stone, 7 to 9 mm. thick, and all were found in the occupation layers under the shelter of the southern rampart. Only one (fig. 16) is decorated with finely engraved lines.

A stone disc, 4·1 inches (10·2 cm.) in diameter and $\frac{3}{4}$ inch (1·7 cm.) thick, found under the debris of the south rampart in section A may be regarded as a loom-weight. The edges of the perforated, which is 1·2 cm. wide and has been bored from both sides, are, however, quite sharp.

(27) It is remarkable that our excavations produced only one incomplete quern stone. It was found among the debris from the south rampart. The fragment of conglomerate belongs to the upper stone of a rotary quern with a possible diameter of 20 inches. It is now at most $2\frac{7}{8}$ inches thick, but none of the upper surface survives so that the original thickness and shape cannot be determined. It is indeed just possible that our fragment belongs to a quern of the pre-Roman beehive type, though such querns at Glastonbury do not appear to have exceeded 18 inches in diameter.

Several sandstone slabs exhibited hollows pecked or gouged out on one or both faces, but few finished articles survived. The following may be mentioned:

Very rough triangular block of sandstone, $1\frac{1}{2}$ inch thick, $4\frac{1}{2}$ inches long and 3 inches wide at the base. On one face an oval hollow, $2\frac{1}{2}$ by $1\frac{5}{8}$ by $\frac{3}{4}$ inches, has been hammered out; there is a ledge in the hollow at the end nearest the triangle's apex. This might have served for the wick if the whole object had been a lamp. The sides and the base have been left rough and irregular.

A quarter of a stone dish was found in the occupation level in section B. The slab of black stone from which it has been made must have been a rectangle, not quite $1\frac{1}{2}$ inch thick. An oval depression had been hammered out to a depth of nearly 1 inch. The side walls are $\frac{1}{3}$, the base $\frac{2}{3}$ of an inch thick, and the whole fragment now measures 3 by $1\frac{1}{2}$ inches.

A rough slab of micaceous sandstone, $7\frac{1}{2}$ by $2\frac{1}{3}$ by 1 to 2 inches, bears irregular depressions on both faces. The bottoms are very uneven.

Another fragment of sandstone proved to be part of an open mould for casting bronze bars such as are common on Iron Age sites. The groove which formed the matrix for the bar has been carefully smoothed.

(28) The finest relic obtained during the excavations is the jet ring from the well, which is almost perfect. It is 4·3 cm. in diameter outside and 1·3 cm. thick. Plainly it cannot have been worn on the finger. A very similar ring was found in the Gallic fort on Castlelaw, Abernethy, which yielded a La Tène I brooch, while rings equally thick have been found in La Tène I graves in Switzerland.[1]

The relics just described unfortunately provide no precise indication of the age of the fort. The total absence of all Roman pottery, glass, brooches or coins would seem incompatible with a date between A.D. 80 and 200. The rotary quern would on the other hand point to a Roman or post-Roman date. Nevertheless, the nearest parallel to our thick ring of lignite comes from Castlelaw, Abernethy, which is definitely pre-Roman. The pottery again has analogies in the same and other pre-Roman sites. The quality of the flint work too might argue a date before the Bronze Age traditions had been blunted by the cheap iron of the Romano-Caledonian epoch.

Conclusions.

A. Excavation confirms the peculiar elongated plan of the enceinte with almost straight walls. The builders of the fort have adhered to this plan quite regardless of the contours of the hill and in defiance of purely strategic considerations (leaving for example a wide platform on the top of the southern precipice). Surface indications suggest similar peculiarities in the lay-out of other vitrified forts, Craig Phadrig, Cnoc Farril, Dun Macuisneachan, Dunagoil, Carradale, Tap o' Noth. Such a plan is in striking contrast to that generally observed in hill-top towns, small forts and duns where the ramparts are accommodated to the contours of the land. It might have been dictated by tradition or, as Mr Kennedy has suggested to me, merely by a desire to economise material and labour, a straight wall being shorter than one following the sinuosities of the hill. Section D has shown that Finavon was a trapezoid rather than a rectangle.

B. The walls of Finavon were 20 feet thick with built faces, not less than 12 feet high internally and 16 feet externally. These walls are accordingly far stronger than those of any normal hill-top town or dun in Scotland, and can only be compared to the stone and timber ramparts of Burghead, Abernethy and Forgandenny.

C. The vitrifaction was confined to the tops of the walls extending down into the core only 5 or 6 feet, a fact noted by the anonymous writer

[1] *E.g.* at Andelfingen, grave 17, Landesmuseum, Zurich.

quoted in Warden's *Angus*, vol. v. p. 47.[1] The sub-soil under the rampart, exposed near the western end of section B where the inner face had been broken down, showed no trace of the action of heat. Nor were the faces themselves vitrified, so that the Rev. Headrick's statements quoted in the first volume of the same work are inaccurate. No positive evidence as to the method of vitrifaction was, however, obtained. In the wide sections of the wall-faces exposed we could see no indications of timbers bonding the faces, such as are quite conspicuous at Forgandenny and Abernethy. Dr M'Clintoch of the Geological Survey, London, who examined microscopic sections of vitrified stones for Mr Thorneycroft does "not think that any flux was used beyond that provided by the impurity in the sandstone." Mr Thorneycroft's experiments with the sandstones used in building the ramparts show that a temperature between 1100° and 1150° C. was needed to produce the effects observed on the vitrified samples. Such a very high temperature might have been produced if the space between the walls were converted into a sort of furnace, *i.e.* if piles of wood, mixed with rubble, between the faces were set on fire as suggested by Mann in the case of Dunagoil. An adequate draught would, however, be essential, and the furnace must have been sealed down on top by clay or turfs. Mr Thorneycroft has calculated that half a cwt. of air-dried wood or almost 4 c. feet of cord wood would be required for each cubic foot of rock vitrified.

Positive evidence in support of this account was not obtained; though there were gaps between many stones of the faces, none could certainly be regarded as a deliberately contrived vent-hole to allow access of the draught presupposed by the theory. Nevertheless it must be remembered that the only relevant sections of the walls, the upper courses, were in no case well enough preserved for such vent-holes to be recognisable.

It is tempting to connect with the vitrifaction the masses of burnt wood found inside the walls all round the fort, even in section D where there were no indications of habitation. The position of the charred trunks, above all other remains of occupation but at the base of the debris from the rampart, is compatible with the belief that they had fallen in from the top of the walls; some, however, in section C and the north end of section A lie rather too far out for this explanation to be plausibly applied to them. Mr Sutherland has suggested the possibility of a breast-work or palisade of stout timbers planted along the rampart tops and plugged with cotton grass or lint beneath a mask of turf.

D. The citadel enclosed within these ramparts was regularly inhabited.

[1] Vitrification seems to have been confined to the upper courses, also at Tap o' Noth, Dun Skeig, Caisteal Aoidhe, Christison, pp. 171–172.

A row of dwellings provided with fixed hearths must be imagined under the shelter of the north rampart. Pot-making, spinning and metal working (crucibles) were carried on under the lea of the south wall, though no built fire-places nor other architectural remains were exposed on that side of the fort.

E. The relics give no conclusive evidence for the date of the monument within the Iron Age, but they are not incompatible with the view that it was erected by an early band of Celtic colonists from the Continent.

In conclusion I have the pleasant task of recording my deep gratitude to many friends and helpers without whose practical assistance the work could not have been carried through. Col. A. D. G. Gardyne, and his tenants, Sir Kirkman Finlay of Finavon Castle, and Mr Findlay of Bogardo Farm, very kindly gave permission for the excavations and rendered practical help by lending tools and extending to us other courtesies. We were fortunate in securing the expert assistance of Messrs Angus and Sutherland throughout the two campaigns. They were assisted in 1933 by Messrs Dixon (Forfar) and Robertson (Tannadyce), and in 1934 by Messrs Craik and Milne (Tannadyce). Miss Stewart, Messrs H. Fairhurst and W. Henderson of the League of Prehistorians, Major and Mrs Deedes (Wiltshire), Mr Mansfield D. Forbes (Cambridge), Mr and Mrs Millett (London), Mr Basil Megaw (Belfast), and Mr John Witt (London) undertook many days of laborious trowelling, and between them rescued most of the relics. To Major Deedes and Mr Fairhurst we owe the excellent contoured plan of the site, reproduced here. Captain C. F. C. Neish of Tannadyce House throughout took an active interest in our work, not only joining himself in the excavations but lending us tools, and on several days the assistance of his whole staff. The Air Ministry very courteously allowed an R.A.F. plane from Leuchars to take photographs of the site, one of which is reproduced here. Mr W. Thorneycroft also gave us the benefit of his practical experience, and has had various tests carried out in his laboratories. We were honoured by a visit from Judge Pryce of Dublin, who helped us for several days, as well as from the Director of the National Museum, and we have to thank the Director of Royal Scottish Museum and the Regius Keeper of the Royal Botanic Gardens for reports by Miss Platt on the animal bones, and by Mr M. Y. Orr on the wood. The costs of the excavation were in part defrayed by supplementary grants for expenses to myself as the Munro Lecturer from the Munro Fund of the University of Edinburgh.

REPORT ON THE ANIMAL BONES FROM THE VITRIFIED FORT OF FINAVON, ANGUS.

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

The animal bones found in this fort consist almost entirely of the domestic varieties. Considerably over half of them are ox, whilst pig and sheep take a subsidiary place and are numerically equal in importance to each other. Among the wild animals represented are the roe and red deer. A single mandible of the long-tailed field mouse completes the wild species, and has no prehistoric significance because of its burrowing habits.

Ox.

Although the bones of this animal are numerous, only one approaches completeness, the rest being mere fragments. This whole bone is a hind cannon, measurements of which are recorded below, and for comparison those of a female ox of small Shetland race.

	Finavon.	R.S.M., Shetland.
Metatarsal:		
Maximum length	205 mm.	204·5 mm.
,, width of proximal end .	42 ,,	45 ,,
,, ,, ,, distal end .	53 ,,	49·5 ,,
Minimum ,, ,, shaft . .	26·5 ,,	25 ,,

The two kinds compare very closely. It is difficult to draw any conclusions as to the breed of cattle here present on such slender evidence. All the bones as indicated by the fragments are undersized, but this might merely indicate immaturity. Among the numerous teeth collected, however, are many last molars considerably worn, indicating that adult animals were present. In addition a more complete fragment of an adult lower jaw was measured and found to be more slender and not so deep at the level of the last molar as that of a domestic ox preserved in this Museum. The horn cores of the Finavon cattle are rounded in section, short and rapidly become pointed. Hence, so far as scanty evidence goes, the type of ox present in this fort was small sized with short horns. Remains of adults are not numerous, the greater proportion of the bones and teeth being of immature animals.

Pig.

As in the case of the ox, the bones of the pig are very fragmentary. Any complete bones which occur are from young animals. The presence

of worn last molars and a few large tusk-like canines among the teeth betray the fact that adult pigs were there. The majority of these remains are, however, from young specimens.

Sheep.

This animal is represented by fragmentary bones and teeth of which the majority indicate immaturity. Since neither complete cannon bones, skulls or horn-cores have been preserved, it is impossible to state what kind of sheep was present.

Roe Deer.

Three fragments of antlers represent this animal.

Red Deer.

This is merely indicated by an odd fragment of an antler.