

IV.—*The Brochs or "Pictish Towers" of Cinn-Trolla, Carn-Liath, and Craig-Carril, in Sutherland, with Notes on other Northern Brochs.*
(Plates XI.—XVI.)

By the Rev. J. MAXWELL JOASS, Golspie, Corr. Mem. S.A. Scot.

With Report upon the Crania found in and about them.

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[*Read before the Society, 9th January 1871.*]

CINN-TROLLA, KINTRADWELL.

Kintradwell, one of the oldest manor-houses in Sutherland, occupies a commanding position on a natural terrace near the east coast road, about three miles north of the ancient burgh of Brora. It is known among Celtic natives of the district as Cinn-Trölla¹—Trolla's height or headland—and was probably so named from St Trölla or Tröllhaena, known in the Calendar as St Triduana and St Tredwell, whose story is given at length in the "Aberdeen Breviary," Pars Æstiva, fol. cxxii.²

Throughout the neighbourhood occur many hut-circles, with their associated sepulchral tumuli, indicating an early and populous settlement. In the south bank of the burn close to Kintradwell, there is a good specimen of the Eirde-house, and near this a group of ruined and rude buildings, whose small chambers and narrow passages, along with the stone and bone implements found there, suggest a considerable antiquity.

About half a mile to the eastward, on a lower terrace close by the sea, occurs the dun or fastness now under notice (Plate XI.)

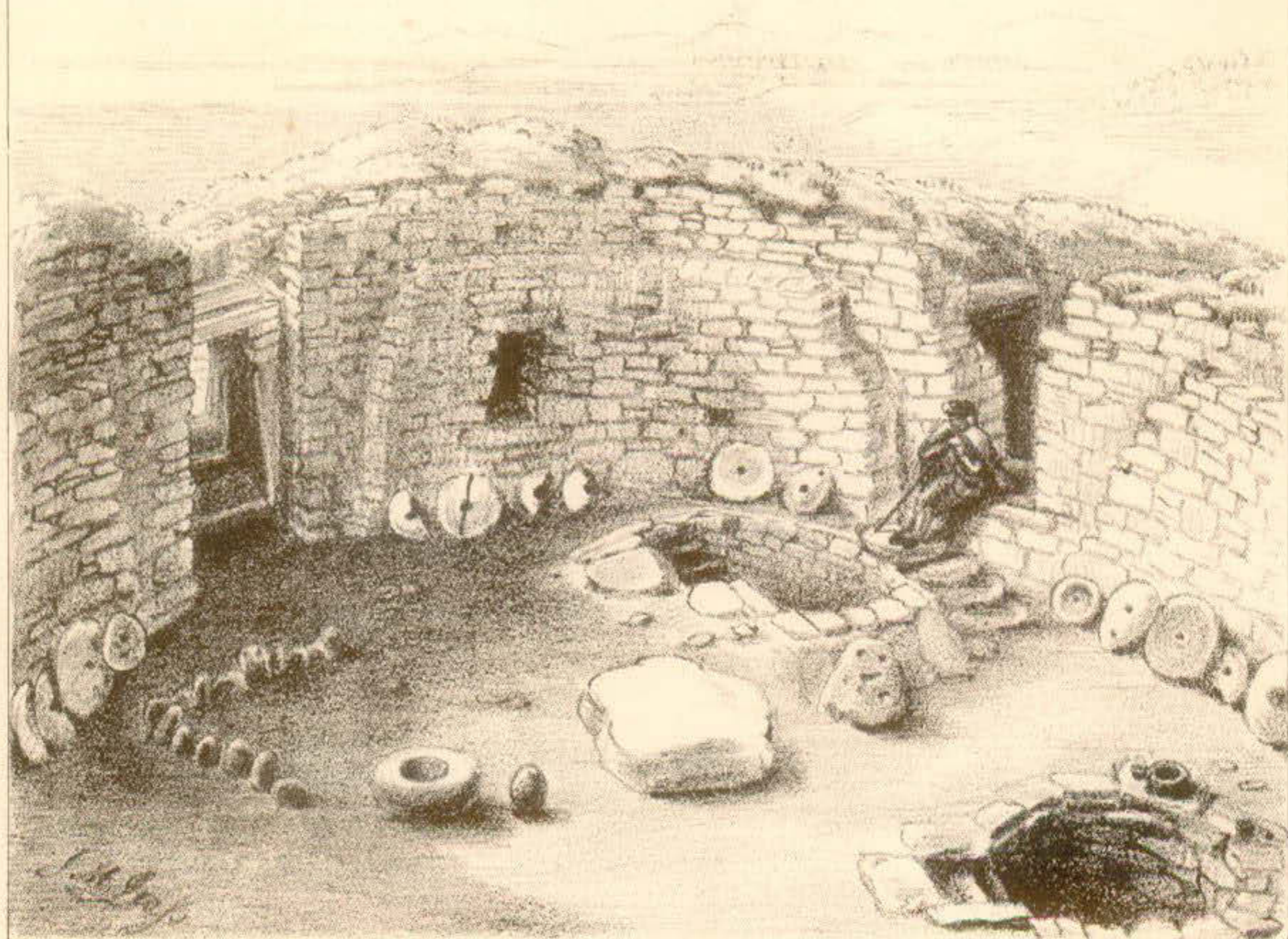
Not long ago this presented merely the appearance of a green mound, from which projected the edges of a few slabs. On the accidental removal of one of these on the west side, a small cell was discovered, whose dry-built walls converged upwards till covered by the flag referred to. This chamber was cleared out to the depth of a few feet, and another similar

¹ Occasionally Cill-Trölla and Clen-Trölla.

² See also "Sculptured Stones of Scotland," vol. ii., Notices of Plates, p. 39; "Two Ancient Charters of Caithness," Misc. of Bannatyne Club; and Martin's "Western Islands," p. 366.



CINN TROLLA BROCH, GENERAL VIEW.



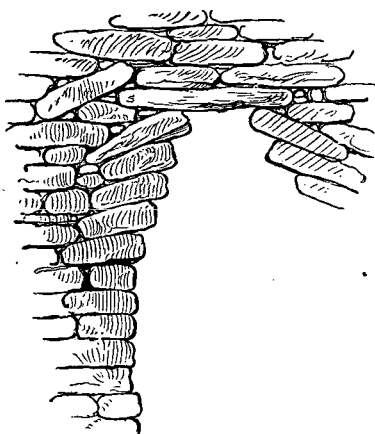
CINN TROLLA BROCH, SUTHERLANDSHIRE, -INTERIOR.

W & A K Johnston, Litho.

cell was found on the north-west, and partially explored. Both were almost filled with earth and food refuse, the bones of most frequent occurrence being those of the deer, ox, sheep, and pig; and among shells the limpet and periwinkle.¹

Further search showed that the mound required, and would probably repay, thorough examination, and this was accomplished by a grant from the "Sibster fund," at the instance of Dr John Stuart, with the following results:—

Structure of the Tower.—The entrance to the dun or bröch, which this mound was found to cover, opens from the west. It is heavily linteled, and rather wider below than above; the dimensions being 7 feet high, $3\frac{1}{2}$ wide below, and 3 above (Plate XI.) At 6 feet from the entrance the passage is slightly contracted by a doorway, whose jambs face inwards, with a corresponding flag on edge, projecting 4 inches



Section of Chamber in Cinn-Trölla Broch.

from the floor. Eight feet farther in there is another similar doorway, also to be closed from within (Plates XI., XII. and XIII.) Between this and the outer set of jambs an opening in the wall on the right, 2 feet from the flagged floor, 4 feet high by 2 wide and $4\frac{1}{2}$ long, leads to a circular apartment 7 feet in diameter and 11 high (Plates XII. and XIII., section on EF). This chamber was empty. Its roof, which was entire, is a fine specimen of the early horizontal arch, and it may be noticed that in this and other examined specimens of the un-

disturbed Cyclopean roof, the ascending tiers, which overlap inwards, seem not to have been laid level, but with a slope backwards and downwards from the concave face; *i.e.*, the wall-fast end of the slab is lower than that which projects into the chamber (see the annexed woodcut).

Four feet within the second doorway the interior court is reached at a threshold slab (Plates XI. and XII.), the whole length of the passage or thickness of the wall at this point being 18 feet. The lintels covering this passage are about 8 inches apart. The inner court is a circle, 31 feet in

¹ Proc. Soc. of Ant. of Scot., vol. v. part 2, p. 242.

diameter at the floor level (Plates XII. and XIII.) The surrounding wall varies in present height from 10 to 15 feet ; but the amount of debris within and around the tower would suggest a former height very much greater, not less perhaps than 60 feet, if the proportions of the still almost entire broch of Mousa in Shetland be taken as a test. The inner wall is faced to an average height of 8 feet by a scarcement 1 foot thick, which, although occasionally bonded with the main wall at door corners, is not so throughout (Plates XI. and XIII.) In Clickamin broch in Shetland, the partial fall of a similar scarcement exposed a doorway, which seemed the original entrance to one of the wall chambers.

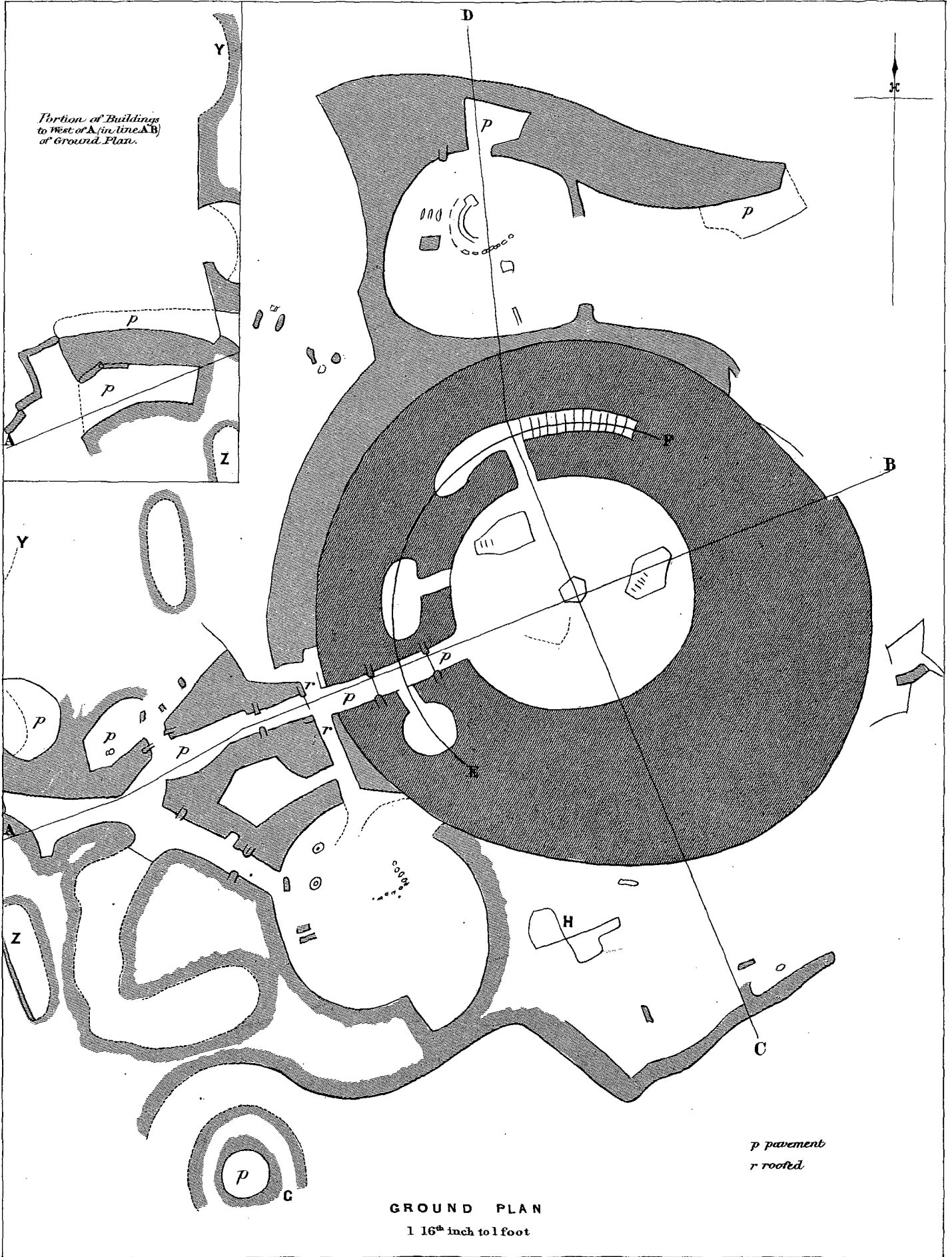
Six feet along the inner wall, to the left of the main doorway, and 3 feet from the floor, an opening $3\frac{1}{2}$ feet high and 3 wide, leads into a chamber in the wall 11 feet long and 10 high (Plate XI.) This was the cell, the top of which was formerly discovered by accident, and explored to a depth of about 4 feet. Its roof-slab being now replaced, the arch is entire (Plates XII. and XIII., sec. E F). Immediately beyond the entrance to this chamber there is an irregularly shaped cavity, partly *in* the floor, 8 feet long, 5 broad at its widest part, and 3 deep. Its walls are puddled with clay, and its bottom rudely flagged. Three steps lead down into it at its south-west end (Plates XI. and XIII., sec. C D). Close to this, at a height of 4 feet from the floor, a passage, 3 feet wide (Plates XI. and XIII.), opens at 6 feet into a chamber 2 feet lower on the left, 10 feet long and 9 high ; part only of the roof remains. Ground was broken here also on the occasion already noticed. In line with this chamber, and on the right of the six-foot passage, is a flight of thirteen steps, leading up to what is now the top of the wall, here 12 feet high and 14 wide—the staircase occupying 2 feet of breadth in the middle (Plates XII. and XIII., sec. E F). Close to the court wall on the south-east is a neatly built shaft or well in the floor, 7 feet deep, 4 wide above, and 2 below (Plates XI. and XIII., sec. A B). Five steps lead downwards to a point 3 feet from the flagged bottom. At this height water could have stood before the draining of a pool which once occupied a hollow in the sandy soil outside of the tower on the north. A stone cup was found near the top step. These steps, and the three leading down into the floor-chamber already noticed, are arranged like a ladder, the flags being separated by intervening end blocks, so that with a very steep pitch there is yet sufficient foothold. In the centre of the circle lay a large slab, fire-

marked and blackened, and near it sixteen selected beach stones, about 1 foot long and four inches thick, were set in the floor on end and in contact, forming a right angle—nine stones in one side and seven in the other.¹ In the angle lay a heap of ashes and splintered bones (Plate I.) Between this and the south wall the floor was laid with a double pavement, 10 feet long and 4 broad, the joints of the flags being packed with yellowish clay. Nearly one-third of the outer face of the tower wall on the south had apparently been pulled down, and rebuilt in a ruder style than the original. The true curve is lost, the tower wall much thickened, and the junction with the original building very imperfectly effected on the north-east.

Outworks.—The flagging of the entrance-passage was traced outwards and westwards to a distance of 65 feet from the tower. It was found to be bounded on each side by a low wall, from which doorways, about 4 feet high, and flagged passages led into small enclosures, whose walls varied in height from 3 to 5 feet. Within these were occasional detached pillars, the highest being now about 4 feet long, as if to support a low roof (Plates I. and XI., XII.) On the south side of these structures, and *in* the edge of the terrace facing the sea, was an almost circular chamber about 6 feet in diameter. Its landward side was 7 feet deep, and the south side 3. It had apparently been dome-roofed, and was flagged at bottom (Plate XII., G). In a partially circular enclosure, in contact with the tower on the south-west, and about 35 feet across, twelve long beach stones stood, forming a right angle like those in the tower. Near them were two stone mortars sunk in the floor, and two small slabs on edge, about 2 feet apart. Close to the tower on the south and south-east were very small irregular enclosures formed by flags on edge (Plate XIII., sec. H I). On the north occurred two cist-like structures in the earth. They contained ashes, charcoal, and splintered brute bones. Near them twelve long beach stones, similar in size and character to those already described, were ranged in a curve, ending northward in a small drain, partly flagged over and filled with unctuous earth.

The oval structure on the north-west of Plate XII. was a shallow cavity bounded by flags on edge. It contained fragments of a human skeleton and an iron dagger blade. The marks on the same plate to the north indicate

¹ These stones are quartzite and gneiss, selected apparently for their hardness, and are not numerous on the neighbouring beach.

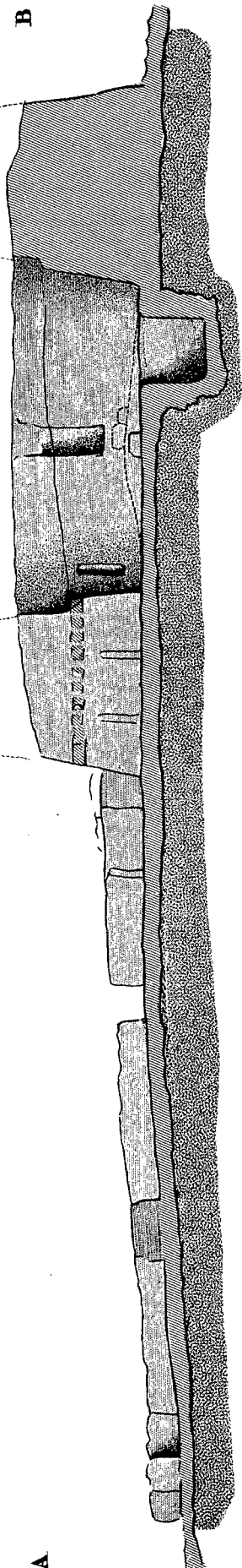


Portion of Buildings to West of A. (in line AB) of Ground Plan.

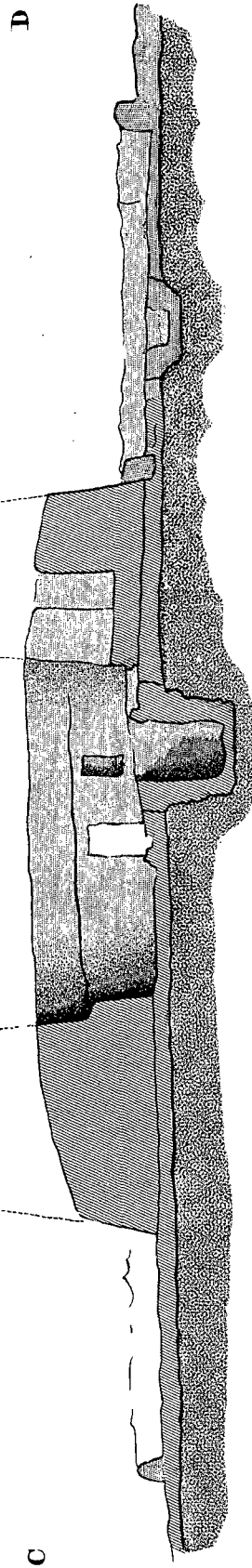
GROUND PLAN
1 16th inch to 1 foot

CINN-TROLLA BROCH

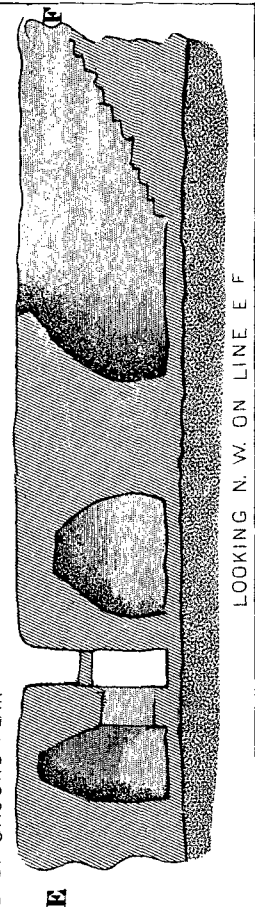
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LOOKING N. W. & N. IN LINE A B OF GROUND PLAN



LOOKING S. W. & W. IN LINE C D OF GROUND PLAN



LOOKING N. W. ON LINE E F

SECTIONS
1-16th inch to 1 foot

CINN-TROLLA BROCH

W & A. K. Johnston, Edinburgh.

flags on edge. The line-shaded parts attached to the tower from south-west round by north to north-east represent a low wall facing outward, and backed by stone detritus, which, after examination, was replaced and turfed over to preserve the wall.

It has been suggested by an experienced antiquary¹ that all the outside structures may be secondary. A careful examination of specimens from Sutherland northward to Shetland strengthens my belief in the correctness of this opinion. Their style of building is strikingly inferior. Unlike the massive and dry-built walls of the broch proper, those of the outer huts are built of small stones, bedded and packed with unctuous earth, throughout which, and not merely at the surface of the wall, occur bones and shells,—the food-refuse, apparently, of an earlier time. That time was perhaps sufficiently remote to account, by the partial ruin of the tower, for the accumulation of broken and inferior building material of which a later and less skilful people seem to have availed themselves. It is also important to note that while the only whole-roofed chamber was empty, those whose roofs were found damaged had been almost filled with food refuse, introduced doubtless from the top, after the tower wall had been reduced to its present height.

Contents of the Tower.—The upper portion of the broch was found to be filled to a depth of about 6 feet under the turf with stony debris. Below this, at various levels till the bottom was reached, traces of occupancy were found in strata of ashes and hardened earth, never extending over the entire area until near the true floor, and generally fenced in by a rude arrangement of stones.

*Human Remains, numbered with reference to Appended Report
by Dr T. Aitken.*

Two feet under the turf, on the top of the mound, near the east side, lay a human skull (No. 1) with the humeri, and several brute bones, such as those of oxen and deer. About the same level another skeleton (No. 2) was found, a few feet to the westward. It lay on the left side, partially contracted, and was packed round with small slabs and roundish stones. The left side of the skull was much decayed. Two feet lower, and close to the

¹ The Rev. G. Gordon, LL.D., of Birnie.

south wall, lay a headless skeleton. The skull (No. 3) was afterwards found 6 feet off, at the inner end of the entrance passage, laid upon a flat stone, and protected by two sloping slabs. Under the flat stone lay the skull of a horse. The human cranium was in good preservation, and probably belonged to a muscular man in the prime of life. Near the outer end of entrance, and about 2 feet below the surface, were found the fragments of another skull and portions of the skeleton. This (No. 4) seemed to have been slashed across the crown, and also through the left lower jaw, by a sharp and heavy weapon, judging from the manner in which the jaw bone and three teeth were obliquely cut clean through. Close under the roof of the stair foot chamber lay portions of another skull (No. 5) and some limb bones. The lower jaw was unusually thick, owing, perhaps, to dental irritation, as the permanent canines had forced their way through the outer wall of the bone in their progress upward. On the stair were found two more skeletons (Nos. 6 and 7). The bones were much decayed, and one of the skulls was almost destroyed. In the round chamber opening from the entrance passage were found the fragments of a child's skull (No. 8); and on the flagged floor, close to the entrance of the passage, lay some portions of a skeleton and the vault of a skull (No. 9).

The skull (No. 10) was not found at the broch, but in a shallow grave on the neighbouring links, exposed by the blowing away of the sand. Many such interments occur there at a depth of from three to four feet. The body generally lies on the side, the limbs partly bent, and the whole set round and packed with small slabs and stones. Occasionally there is a covering of slabs, and generally a paved circular space, about four feet in diameter, a few inches under the turf over each interment. Cases of burial in short cists occur in the same sandy terrace. In one instance a neat bone bodkin was found with the bones, and in another a flint flake and the dog tyne of a large red deer. On this terrace was found the stone figured in vol. ii. "Sculp. Stones of Scotland," pl. civ.

The following crania were found outside the tower after the first series had been reported upon. They are referred to in the Appended Report as Nos. 1, 2, &c., second series.

In the small outer chamber, nearest on the left looking from the broch doorway, there was found a skeleton in fair preservation (No. 1, 2d ser.) In this chamber were also discovered an iron spear-head and a small thick leaden ring. Portions of two more skulls (Nos. 3 and 4, 2d ser.) were found in the large circular enclosure south-west of the tower, near the mortars marked

on the plan (Plate I.) In the shallow oval enclosure north-west of the tower another skeleton was found (No. 4, 2d ser.), part only of the skull being preserved. Near this, close to the surface, lay an iron dagger blade. At the foot of the tower wall, on the south-east, some skull plates and other fragments were found (No. 5, 2d ser.). These were apparently of great age, from their lightness. The portions of cranium remaining are about twice the usual thickness.

Except in the case of Nos. 2 and 3, and No. 4, 2d ser., no arrangement of stones was detected in connection with the skeletons found in and about the broch. There were, however, many traces of former disturbance of the mound to within a few feet of the floor, brute bones of various kinds being mixed up with human remains, charcoal and shale ash, querns and horns, slabs and shells. One cannot presume to guess as to which of those interments, if any, belonged to the period of the broch builders, but there need be no hesitation in believing that some of them, at least, were as much later as was required to reduce the tower to a ruined heap and cover it over with turf, when, perhaps, from its ascertained traces of structure, it came to be regarded with a sanctity which is often associated with the mysterious, and was used as a grave mound after all tradition of its original purpose had perished. That that purpose was its use as a dwelling-place, perhaps by the chief or patriarch of a small sept, and possibly as a retreat for his dependants in time of danger, may be held as indicated by the character of its contents.

Food Refuse and Implements.

Among the bones found were those of the reindeer ("Proc. Soc. Antiq. Scot.," vol. viii. part i. p. 191), also those of the red deer, roe, ox, sheep, goat, pig, fox, wild cat, and wolf (?)¹ or large dog.² Many of the deer's horns were notched as if by a chisel-shaped tool of narrow edge, and some of the bones were cut by some sharp instrument. The fish bones were those of the whale, bottlehead, porpoise, dog-fish, cod, and haddock. The shells were the oyster (rare), mussel, cockle, limpet, and periwinkle, the two last being the most numerous, and filling up nearly to the roof the wall-chamber first explored.

STONE.—A flint scraper and a chert flake. Hammers or mullers formed of ovoid beach stones, and worn at the ends. Pestles, such as

¹ As to the comparatively recent occurrence of the wolf in this country, the following extract from the MS. "Accompt Book" of Sir Robert Gordon, Tutor of Sutherland, may be interesting:—"Item, sex poundis threitein shillings four pennies gieven this yeir 1621 to thomas gordonne for the killing of ane wolf, and that conforme to the acts of the cuntry."

² The bones found in these brochs were sent by Dr J. A. Smith to Dr Albert Günther of the British Museum, and were returned named by him.

described, set on end in and outside of the tower. Mortars, one with its pounding-stone inside. Querns and rubbing-stones, about fifty, including fragments. (The foregoing, except the flint and chert, were common to both broch and outworks.) A cup (steatite). Small smoothed disc (mica schist). Black polished stone (burnisher?). Small flattish ovoid stone, with rubbed sulci on opposite sides ("Cat. Mus. Royal Irish Academy," p. 75). Fragments of shale rings, well finished. Spindle whorls. Also a block of sandstone, 14 inches square and 8 thick, cup-marked on one side, found face downward near the supposed well. A stone with similarly connected cups was found near the Balvraid broch, Glenelg ("Brit. Archaic. Sculp.," by Sir J. Y. Simpson, pl. xiv. fig. 2).

BONE.—Small blade smoothed and pointed. Two small implements of deer's antler, with socket at the broad end, and transverse perforation; like a tool handle or whistle (Jewett's "Grave Mounds," p. 177; figs. 179, 180). Bow tip, made of deer's horn. Two small spatulæ (potter's tools?)—the larger of these was found in the earthen packing of an outwork wall. Articulating plate of vertebra of the bottlehead, with central hole (such said to be used in Norway as brooches). Basin formed from the body of the vertebra of whale. The above, with the exceptions noted, were found on or near the floor of the broch.

IRON.—Spear head. Dagger blade. Part of smaller blade. Chisel-shaped tool, with socket. Found in the outworks.

POTTERY.—Many fragments burned brown red and yellow. Fragments, greenish glazed, like portions of crucible. Piece showing finger and thumb marks of maker on opposite sides.

LEAD.—One small thick ring.

[The objects above mentioned are preserved in the Society's Museum.]

CARN-LIATH, DUNROBIN.

The broch of Carn-liath, recently explored by His Grace the Duke of Sutherland, stands about a mile to the eastward of Dunrobin, on the same coast terrace as that of Kintradwell, from which it is about seven miles distant. From the outcropping of lichen-covered stones through the earth and turf

under which the broch was buried, the mound was known by the name of Carn-liath, the Grey Cairn. The general design is similar to that of Cinn-Trölla tower.

Structure of Tower.—A doorway, 7 feet high and 3 wide, facing eastward, leads by a flagged passage, 18 feet long, to the interior court, which is 30 feet in diameter. At 8 feet from the entrance, jambs facing inwards occur, inside which the passage widens slightly, and opens through a low doorway on the right to an irregularly formed chamber in the wall, 10 feet long, 5 broad, and 8 high, flatly arched with flags (Plates XIV. and XV., sec. EF). At quarter distance round the inner court wall to the left, a door 3 feet wide leads through a passage, 6 feet long and 5 high, to a flight of 21 steps on the right, which gives access to the top of the tower, now only 13 feet high at this point (Plates XIV. and XV., sec. CD). There is no stair-foot chamber. In the middle of the floor is a sunk chamber 11 feet long, 7 wide, and 8 deep, connected at the east end with a smaller structure 3 feet deep, the entrance probably to the former, which seems to have been arched over on the horizontal principle (sec. A B and C D). The walls of this chamber are formed of large upright flags, to the height of about 5 feet, above which occurs neatly built masonry. Close to the tower wall, in the north side of the court, a similar sunk chamber occurs, 8 feet long, 6 at greatest breadth, and 6 deep. On its north side stands a narrow flag on end, 8 feet high, with its edge to the interior. This seems to have been a roof support (sec. C D). The lower half of this chamber wall is formed, as in the other, by flags facing inward, and reminding one of the structure of the crypts in the horned-cairns of Caithness ("Proc. Soc. Antiq. Scot.," vol. vii. p. 480).

Outworks.—Outside the entrance, and close to it on the left, is a mass of masonry, through which a covered and flagged passage 12 feet long, 3 wide, and $4\frac{1}{2}$ high, leads into the entrance passage (sec. A B). To the right, at their junction, are the jambs of a doorway across the line of main entrance, and inside these, on the north side, a well-built niche capable of holding such a slab as might be used for a door. On the lintel of this outer cross passage, at its south end, are three cup marks.¹ A low spur of what seems secondary

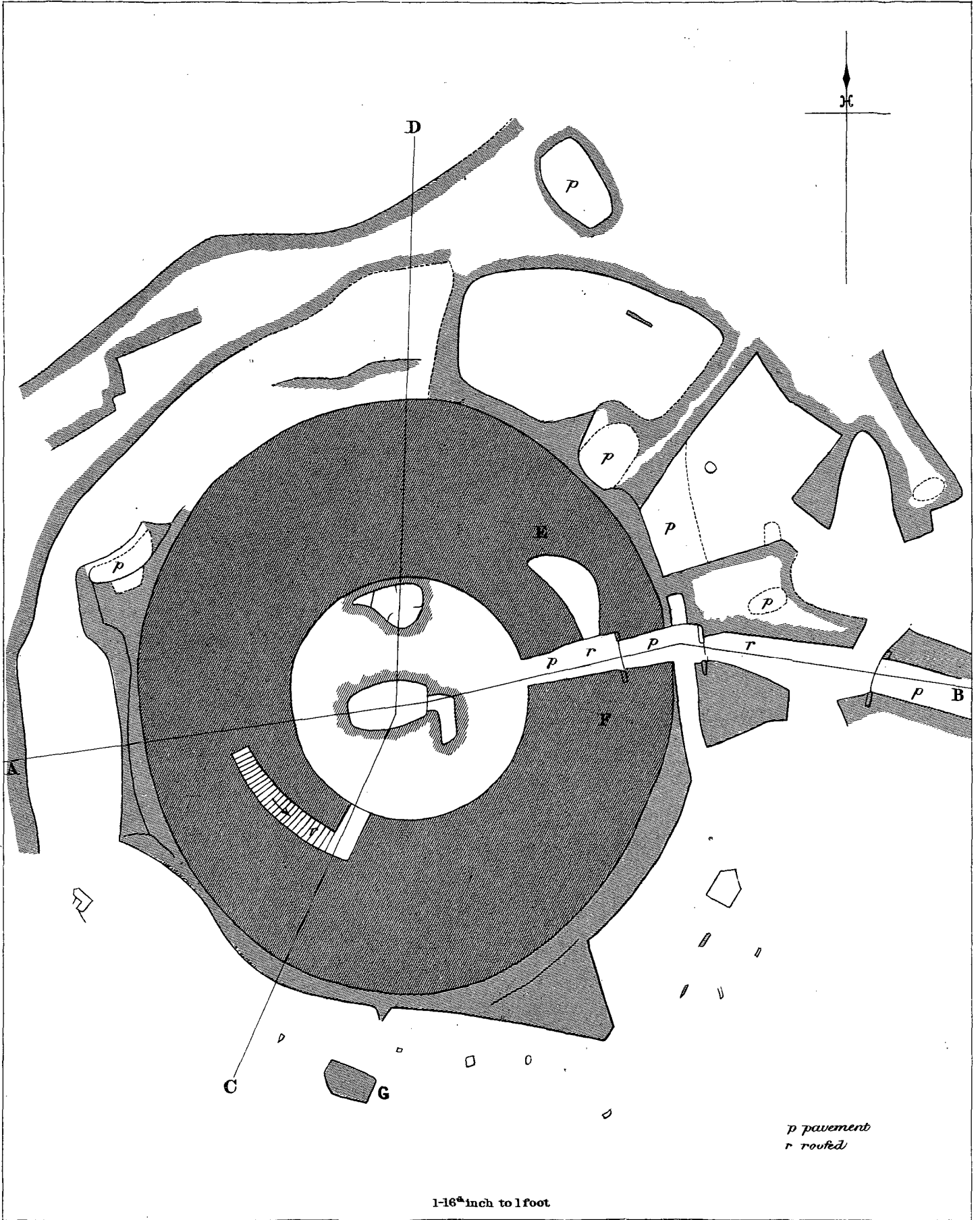
¹ These are of the ordinary type, and occur on the upper surface of the stone, which was therefore probably intended for a different purpose.

masonry projects from the tower on the south side, and continues to flank the wall round by south-west to north-west, faced occasionally with flags, and forming a bench, found to consist only of stony rubbish and now turfed over. West and north-west of this, at distances varying from 5 to 18 feet, a low wall faces towards the tower. Traces of almost parallel lines of stonework occur a few feet to the north-west, that marked E, Plate XIV., facing outwards.

A short distance north of the tower is a sunk chamber 14 feet long, 8 broad, and 5 deep (F). Its floor is flagged, and its walls were built with small stones, similar in size to those used in the upper part of the interior floor-chambers. Between this and the tower is an enclosure of irregular form, its wall being now about 3 feet high. In the north-west angle of this enclosure lay a considerable quantity of ferruginous detritus, which is highly magnetic, and throughout which occur small pieces of charcoal, and blackened grains of a cereal resembling barley. Between this and the tower at the south-east are two small paved spaces, at a higher level, like secondary floors. Separated from the last-mentioned enclosure by a low wall there is another of nearly the same size to the south-east, from which a short narrow passage leads to a space only partially enclosed. On each side of this open space, marked on the plan (Plate IV.) as flagged ovals, were shallow cists outlined by small slabs, but without covers. Fragments of human bone were found in both. In a square cist on the original surface to the south (G) were found pieces of charcoal and splinters of burnt brute bone, apparently those of an ox. The marks on plan south and west of this indicate small flags on edge. The dark-coloured oblong on the south-west is a low bench of rude masonry, explored and now turfed. Three mortars were found and left *in situ* on the north-east and south-east.

The remarks made as to the style of the outer buildings at Kintradwell Tower seem also applicable here, and to include the chambers in the floor both here and there, excepting perhaps the so-called well.

Contents of the Tower.—Under about 10 feet of stony detritus, overlaid with turf, the floor was covered about 3 feet deep with unctuous earth, containing strata of ashes, above which level the wall seemed much affected by fire all round and almost to its present height, which averages 12 feet. There were but few traces of secondary occupancy in the interior of the tower.

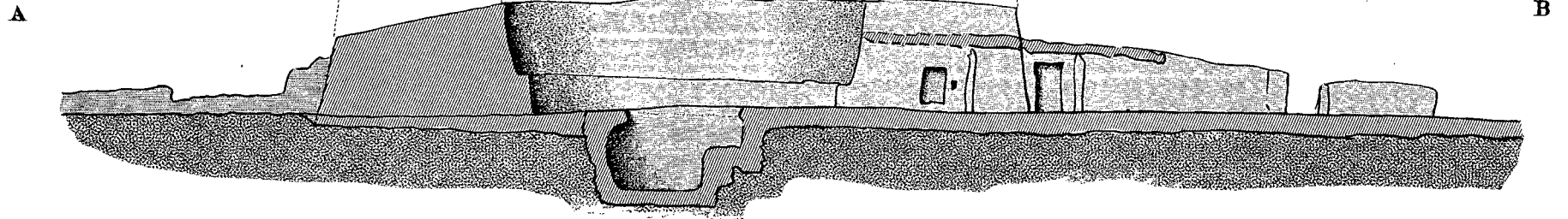


*p pavement
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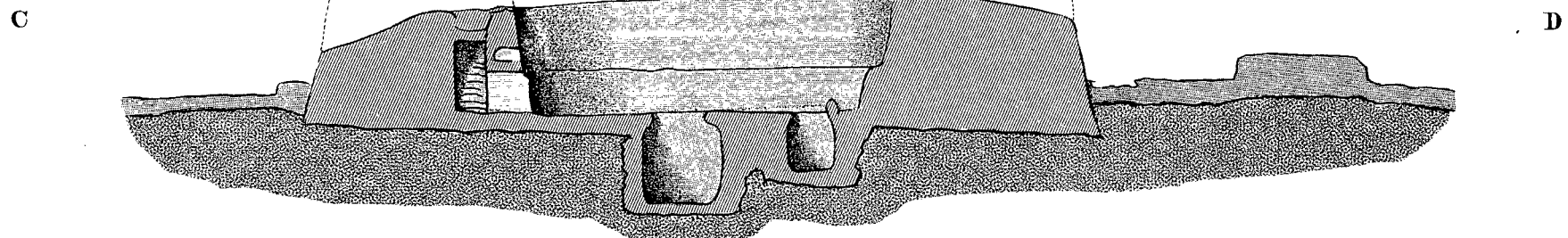
1-16th inch to 1 foot

CARN-LIATH BROCH

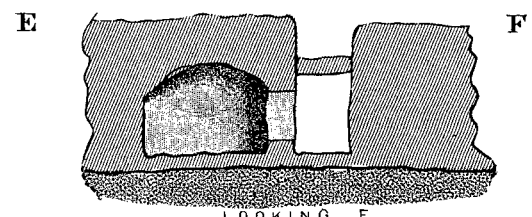
W & A K Johnston, Lithog.



LOOKING N. ON LINE A B OF GROUND PLAN



LOOKING W. ON LINE C D OF GROUND PLAN



LOOKING E.

SECTIONS
1-16th inch to 1 foot

CARN-LIATH BROCH

W.&A.E. Johnston, Edinburgh

One human skeleton was discovered on the top of the usual scarcement, here about 5 feet high, at the north-west corner of the inner doorway near H, Plate XIV. The upper part only of the skull was entire. It seemed to have been wounded during life, judging from the exfoliation both within and without around a small orifice on the left side. (Appendix.)

Comparatively few deer's horns were found in this broch. The bones of most common occurrence were those of the ox and sheep (a small horned variety). Those of the deer and pig were also present. Some fish bones occurred, too fragmentary to be identified. The shells were those of the cockle, *Mya arenaria* (rare), *Buccinum undatum*, limpet, and periwinkle. For the following (which are preserved in the Museum at Dunrobin) see Plate XVI. :—

STONE.—A few chips of yellow flint (inside of the tower and out).

- a. Hammers or mullers of the usual type (do.).
- b. Two pestles or long stones (inside).
- c. Three mortars (outside).
- d. About a dozen querns (inside and outside), some more modern in form than those of Kintradwell.
- e. Whorls in sandstone and steatite (inside and outside).
- f. Discs in sandstone and shale, from 3 inches in diameter downwards, with small central hole (inside).
- g. Nodule of hematite, rubbed smooth on one side (inside).
- h. Many shale rings from $\frac{1}{4}$ inch in diameter to 3 inches open, and in all stages of finish (inside and out).
- i. and j. Two small steatite cups, one with handle } (inside).
- k. A supposed scoop or baling-dish of same material }
- l. A rounded piece of soft Oolitic sandstone, 8 inches high and 4 broad, flat below, and perforated at top as if to be used for a weight.
- m. An ovoid piece of same material $4\frac{1}{2}$ inches long, with longitudinal groove between two small circular depressions on each side of the stone. Both these found outside the tower on the original surface, under about 5 feet of rubbish.
- n. Also found in the original floor of the broch a sandstone slab 13 inches across its widest end, and 20 long, with concentric rings rudely punctured out, and apparently unfinished, resembling in design that described as found at Torwood, Stirling-

shire, in a building which seems to be very like that at Carn-liath.—(Proc. Soc. Antiq. Scot., vol. vi. part 1, p. 259.)

BONE.—*o.* Two long-handled combs—one long-toothed, the other seems broken (inside).

p. Bone of whale, club, 14 inches long (inside).

BRONZE.—*q.* Two plates, $\frac{1}{10}$ th of an inch thick, found near the floor of the broch. One, which is oblong, measures 11 inches by $7\frac{1}{2}$; the other is semicircular, and about $7\frac{1}{2}$ inches radius. Both are marked in lines with the pin-end of a hammer on both faces (inside).

This, perhaps, was one of the forms in which bronze was imported for manufacture. Bronze palstaves and celts occur in Sutherland, and stone moulds for such implements in Ross-shire. Cæsar mentions the importation of bronze into Britain ("De Bello Gallico," lib. iv. c. 22), but long before his date the Phœnicians had probably instituted the traffic. The ancient bronze is said to have consisted of 88 or 90 per cent. of copper to 12 or 10 per cent. of tin ("Brit. Archaic Sculp.," by Sir J. Y. Simpson, p. 98, note 2). The composition of the Carn-liath plates, as analysed by John Ross, F.R.S.A.E., is—copper, 84 per cent.; tin, 16 per cent.

SILVER.—*r.* One supposed fibula, said to be of Roman type.

IRON.—Blade like that of modern dirk, much rusted. Heap of granular oxidised iron (magnetic).

POTTERY.—Fragments, fire-baked; no glazed specimens. The silver and iron were found outside, and the pottery inside and out.

In some parts of Greenland, where rats abound, the natives store their provisions on hanging shelves, along the supporting cords of which are strung at intervals small discs of stone and bone like those of stone and shale found in Carn-liath. Although it was recorded in 1630 that "there is not a ratt in Sutherland; and if they doe come thither in shipps from other pairts (which often happeneth) they die presentlie, how soone they doe smell of the aire of that cuntrey," it is just possible that, in their distant day, the Picts of Carn-liath may have had a different experience.

Another curious resemblance between their condition and that of some modern Greenlanders is suggested by the occurrence in the broch of the long-handled combs. Such implements, worn suspended from the girdle, are now used by Esquimaux women to disentangle the lower end of a sheaflet of sinews which are being plaited into rope. In the broch of Burray, in Orkney, five such combs occurred.

A mile to the west of Carn-liath, on the high wooded ground above Dunrobin, stands another ruined broch. On still higher ground at Backies, a mile farther inland, there is



J.M. JOHNSON del.

W & A R. Johnston. Lithog.

RELICS FOUND IN THE BROCH OF CARN LIATH, SUTHERLANDSHIRE.

(See p. 205)

Scale to q inclusive, $\frac{1}{2}$ r $\frac{1}{2}$ s $\frac{1}{2}$ t, u, v true size

another. The latter was partially explored many years ago, and yielded the usual potsherds and shale fragments, and a steatite cup of the common type. From the first-mentioned of these brochs, those of Backies and Carn-liath, when at their original height, might probably both be seen.

CRAIG-CARRIL, STRATH BRORA.

Another building of this class has just been explored by the Duke of Sutherland during the visit at Dunrobin of a distinguished lady associate of the Soc. Antiq. of Scotland. This tower stands in the opening of Strath Brora, on the south side, about six miles from the sea, and five from Kintradwell, from which it was probably visible when entire. It occupies a commanding position on a terrace flanked by a sweep of rocky hills in the deer-forest of Carril, near the lofty and picturesque cliff of that name.

Structure of Tower.—In general plan this broch resembles those described. Its interior diameter is 30 feet. The wall now averages 15 feet in height, and is 17 feet thick at the floor. A double doorway, as usual, protects the entrance, which faces eastward. Between the first and second set of jambs is a chamber in the wall on the right, similar in size and shape to the corresponding crypt in Carn-liath. Inside the court, and close to the wall on the left, is a space 7 feet long and 3 wide, enclosed by flags on end varying from 3 to $4\frac{1}{2}$ feet high. In the floor between this and the centre is a small cavity lined with flags like the mouth of a drain. It contained black earth and bits of deer's horn. On the south side, as at Carn-liath, but 4 feet from the floor, a door 3 feet wide leads through a short passage in the wall to a flagged landing. To the left are three descending steps leading to a narrow wall chamber 12 feet long and 11 feet high. Half of its arched roof remains. From this chamber, at 3 feet from the floor, an orifice 8 inches square and 3 feet long extends to the entrance passage, on the opposite side of which there is a corresponding short socket. These are 6 inches within the inner jambs. Such bar-holes, although not found in the brochs of Cinn-Trölla and Carn-liath, occur in those of Morvich, Backies, Cill-Pheadar, and several others in Sutherland and elsewhere; but their connection, as in this instance, with a wall-chamber is believed to be rare.¹ In line with the entrance of

¹ Perhaps the "peep-hole" at the How of Hoxay is another example.—"Prehistoric Antiquities," p. 427. I have just seen a similar connexion of bar-hole with guard-room at Kenilworth.

said chamber, a flight of eight steps in the middle of the wall to the right of the wall door, leads to the top.

Outworks.—Outside the tower, at the distance of 12 feet, is a well-built surrounding wall, with entrance in line with that of the broch, and a smaller door on the south side. This rampart is 4 feet thick, still averages 5 feet high, and is faced by a broad ditch.¹ There is no appearance of such outworks as those at Cinn-Trölla and Carn-liath. A hut circle of the ordinary size, about 33 feet in diameter, with a small addition at the north-east side, like some observed in Ross, occurs on the moor about 40 yards north of the tower. About 80 yards to the south-east, a shallow, weem-like structure, 8 feet in diameter at top, and with well-built wall, occurs in the face of the terrace, and from this a deep trench runs northwards for about 30 yards. Some brute bones were found here, and two chert scrapers.

Contents of Tower.—Two human skeletons were found in the broch. One lay extended on the floor to the right of the entrance, and near it was found a copper finger-ring plated with bronze. The other lay on the landing at the foot of the stair. Both were much decayed, but the whole of one skull and the vault of the other are preserved. The former is broad and short, the latter long and rather low. (See Appended Report.) The floor was covered about 3 feet deep with unctuous earth and ashes, above which the tower was filled with stony *debris*. There were few traces of secondary occupancy.

A few specimens of deer's horn were found, and bones of deer, ox, sheep, and pig. Some shells of the *Unio* (*Alasmodonta margaritifera* pearl mussel, common in Loch Brora) were also found, and those of periwinkle and limpet.

STONE.—Two flint flakes and one of chert (inside). A few hammers or mullers. Two mortars. Fragments of querns. A steatite cup with handle.² A 7-inch disc of sandstone flag. A rude shale ring, 2½ inches open (outside).

BONE.—Deer's horn handle with pin-hole.

OX HORN.—A concave oval plate of ox horn, like bowl of large spoon, 6

¹ Similar ditches occur at Brindister burg in Shetland, and Cill-Pheadar broch in Sutherland.

² The interior of the cup was coated half way up with a whitish incrustation, which proves to be phosphate of lime.

inches long, and apparently 4 broad at the middle, when entire, with four rivet holes at one end, and two iron rivets *in situ*. (Plate XVI. s.)

COPPER.—*t*. A finger-ring, bronze plated (penannular).

IRON.—Two pieces of slag (outside, near entrance).

POTTERY.—Many fragments, some hard and thin; also a broken bead of amber or vitreous paste.

A lamp-like vessel of impure pot-stone has just been found on the beach near a broch at Stoer in the north-west of Sutherland; and in another at Eriboll on the west coast, two spiral finger-rings of bronze (*u* and *v*). In this latter broch, which is being explored by Captain Clarke, Meddat, Ross, bones of the seal, deer, ox, and pig occur, and some rude scrapers of quartzite.

NOTES ON OTHER NORTHERN BROCHS, &c.

Opposite the broch of Craig-Carril stands another on the north side of Strath Brora, on a high plateau, commanding a wide view. There are two more on the south side, farther inland, and three more on the north; the last of the chain, so far as noticed, being Caisteal-Coille, the castle in the wood, about twenty miles from the sea. All these seem to have been so placed, that from most of them two others could be seen, one on either side, looking along the valley,—an arrangement which suggests their occasional use as beacon towers to signal inland from the coast.

The question of the geographical distribution, or range of the brochs, is one of much importance, but the evidence is as yet far from complete. They are known to occur throughout the northern counties of Scotland and the adjacent islands, but seem to be especially numerous in the north-eastern division of the mainland, since sixty are known to exist in Sutherland. Their southern range is not yet defined, but one has recently been explored in Perthshire, another at Cockburn Law, on the Lammermoors, (Proc. Soc. Antiq. Scot. vol. viii. pt. 1. p. 41), while the structure at Torwood in Stirlingshire, already referred to, is probably also a broch.

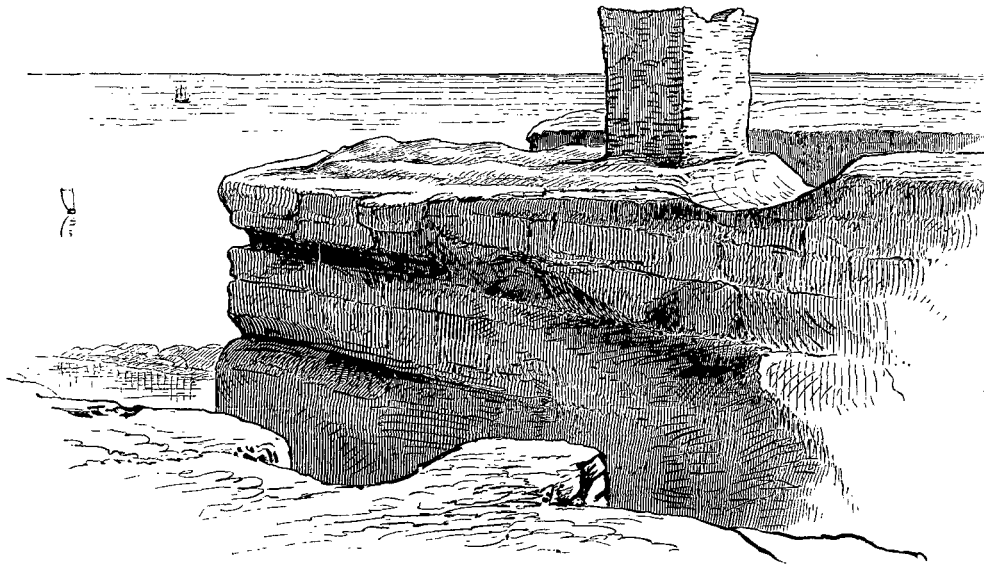
Pennant, in his "Introduction to the Arctic Zoology," supposes that Coningsburgh Castle in Yorkshire may belong to this class on the authority of a description by Edward King, Esq., in the "Archæologia," vol. vi. p. 234. At that date these towers were generally believed to be of Scandinavian origin, but Worsaae, whose authority is unquestionably of the highest

value, says that no such buildings occur in the Scandinavian North. He states, however, that they are to be found in Ireland.

Their general plan is the same, although there are differences in the number and arrangement of the lower wall chambers, and the size of the brochs occasionally varies. That at Cockburn Law is over 50 feet in interior diameter. Another at Sandness in Shetland is nearly of the same size, while Mousa, on the opposite side of a narrow strait, is only 21 feet wide, and Caisteal-Coille but 20. Their general interior diameter seems to be about 30 feet, and it is a curious coincidence, if it be not an illustration of the characteristic persistence of a leading idea in archaic times, that this also is the normal diameter of the hut circles, so numerous on our northern moors. These, indeed, may for a time have been contemporaneous with the brochs, and mark, perhaps, the ordinary wigwam homes of those to whom the tower afforded an occasional refuge. In Sutherland they are often associated in locality.

Viewed from without, the broch presented the appearance of a round tower, whose height was probably equal to twice its interior diameter. It was wider below than above, the vertical contour being slightly convex for the lower half of its height, and gradually approaching the perpendicular as it neared the top. The inner face of the wall, bounding the interior court, sloped slightly outwards towards the top, so that a thickness of perhaps 18 feet at the base is reduced to about 8 at the summit. An outside overhanging at the top of Mousa has often been regarded as an ingenious architectural device to prevent the scaling of the wall. It was first suggested by Captain Thomas, R.N., that this was probably a natural result of weathering. This idea seems confirmed by an examination of the top of the tower, where the overfall, which is greatest on the most exposed side, is found to be only 8 inches outside the perpendicular, a small proportion in a dry-built wall of over 40 feet in height, and which has seen so many Shetland winters. The deflection is also almost as great at the top of the inner face of the wall, overhanging the interior court, where it could have answered no fortifying purpose, and in both cases the slabs dip towards the centre of the curve,—the natural result, indeed, of decay, but opposed to the principle on which the Cyclopean arch was apparently constructed. In Oldwick Castle, a comparatively modern building, which stands on a high bluff at the south head of the bay of Wick, a similar result of weathering is clearly seen at

its eastern angle. A common feature of the brochs is the so-called guard-room or small chamber in the wall opening generally on the right from the entrance passage. Sometimes there is a similar chamber on the opposite side. There are generally several oval chambers on the ground level in the thickness of the wall, and entered from the inner court, which was roofless. Above these there is an open space in the middle of the wall, reaching to



Castle of Oldwick, Caithness.

the top and narrowing upwards.¹ Throughout this, at distances varying from 6 to 3 feet in different specimens, and at different altitudes in the same specimen, are tiers of cross flags fastened in the wall and forming level galleries to which easy access is had at one end by a stair which winds within the wall to the top. The other end of the galleries is closed by the

¹ Even in the small broch of Mousa this opening is about 2 feet wide at top. Where it seems absent in other instances may have been caused by the falling inwards of the wall. Its existence seems necessary to the construction of the building, and to give access to the top of the tower.

floor of the stair. At Clickamin there are two stairs, one on each side of the tower. Above the doorway are rectangular apertures in the wall looking towards the interior court. They sometimes extend in a straight line to near the top of the tower, and serve to relieve the underlying lintels, and to light the galleries, as, except the main door, there are no openings to the outside. It is, perhaps, not necessary to suppose that these galleries were planned for dormitories, or indeed to be occupied in any way, inasmuch as, although the tower could, with immense labour, have been built without them, their presence along with the stair makes its construction comparatively easy. They seem to have formed the necessary scaffolding rising with the wall till the work was finished. When, however, it became needful for the people to assemble in the nearest broch for safety, these galleries might be available; and it would, perhaps, be difficult to plan a building of the same strength, size, and simplicity of structure, which could afford a greater amount of temporary accommodation, including ground room in the court for a limited number of cattle. If built, as is likely, for defence against maritime invaders, who, if they did not carry the fort at the first assault, could probably not afford to invest and besiege it, these brochs would protect for the necessary time a very considerable number. In populous districts several in the same locality might be required,—hence, probably, the occurrence of three near each other at Glenelg in the west of Inverness-shire.

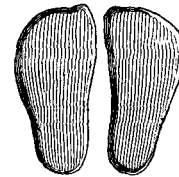
As to the scarcement or facing-wall, about 1 foot thick and 8 high, of such frequent occurrence in the brochs, it has been suggested by one of the most distinguished of living antiquaries, that it may have formed the resting-ledge for a conical wooden roof covering the central area, such as were probably used in the hut circles. Others have supposed that it formed the support of a narrow roof, sloping downwards like that of a shed or series of lean-to booths surrounding the wall. It may be noted that it seems rarely of such massive structure as the wall proper, with which it appears to be bonded only at door corners. This, with the fact that it was found covering what was almost certainly an original doorway to a wall chamber at Clickamin, suggests the possibility of the scarcement being sometimes, if not generally, a secondary structure.

Although in the present state of our knowledge in this department of archæology, the question of date can only be dealt with as one of comparison,

it may be permitted briefly to refer to a few of the facts which are supposed to bear upon that subject.

In the brochs of Cinn-Trölla and Carn-liath, and also in the supposed specimen at Torwood, in Stirlingshire, occurred stones bearing archaic cup and ring marks. A late distinguished and clear-sighted student of antiquities, after long research, referred such sculptures to a very early period (see "Brit. Archaic Sculp." by Sir J. Y. Simpson). If those stones belonged to the broch period, the many and conclusive arguments for their antiquity are good also for that of these buildings. The Carn-liath ring-marked stone lay upon the floor, and is apparently in an unfinished state. That of Torwood resembles it in design. The Cinn-Trölla specimen also lay on the true floor. The similar one at Carn-liath was used as a lintel in an outer and perhaps secondary building. *They may all, however, have been removed from earlier sites, and this possibility seriously affects their value as evidence of the age of the brochs.*

At Clickamin, in Shetland, on one of the slabs forming a causeway through the loch by which the broch of that name is reached, there occur two incised figures of human feet (see woodcut). They are right and left, about 1 inch apart, and $9\frac{1}{2}$ inches long. The great toes are indicated separately, and the figures are depressed about $\frac{1}{10}$ th of an inch. Such sculptures "occur in Brittany on the stones belonging to chambered sepulchres and cromlechs;" also on rocks in Scandinavia and Ireland, and in the Scottish counties of Forfar and Perth ("Brit. Archaic Sculp.," by Sir J. Y. Simpson, p. 83).



Incised Figures on
Slab, Clickamin,
Shetland.

"In the Ordnance Survey of the county of Londonderry, vol. i. p. 233, the late Dr Petrie has described and figured the so-called stone of St Columba, exhibiting the sculptured impressions of two feet (right and left), of the length of 10 inches each. This monument, he says, is held in great veneration, and he believes it to have been one of the inauguration stones of the Irish kings or chiefs of the district (Id. p. 183). (See also "Sculpt. Stones of Scotland," vol. ii. app. to pref. p. 1.) It is just possible that the Clickamin stone may have formerly occupied a different position, unconnected with the tower; but its occurrence in the doorway of a thick wall which crosses the causeway, and forms the outer barrier of the broch, would

suggest a purpose associated with that building—the marking, perhaps, of the place where an oath of fidelity was taken, either by the chief as to *his* trust, or by the sentinel who guarded the gate. On the supposition that these sculpturings belong to the broch period, and knowing that they occur elsewhere in connection with very early monuments, a presumption is afforded in favour of the antiquity of the Pictish towers.

Whatever the value of these footmarks, however, in this respect, they are certainly worthy of preservation; and one cannot refrain from expressing a hope that something may have been done towards this object by protecting them with a light iron grating, otherwise, lying as they do in the only path to the broch, they must soon be destroyed.

In an interesting paper published in the Proceedings, vol. vii. p. 56, the author, Mr S. Laing, attaches importance to the rudeness of the implements found in the Orkney brochs, and the character of the food refuse, as evidence of the great antiquity of these buildings. This argument is well illustrated, and seems worthy of great weight. Another proof is offered in the partial destruction by the sea of the broch of Breckness, a section of which now occupies the edge of a coast-cliff of “hard and homogeneous sandstone” of Devonian age. One does not feel certain that the sea was here the sole or principal agent of destruction to the cliff, while geology suggests the suspicion that the more “homogeneous” the rock the deeper go those more or less vertical joints which introduce the great disruptive force of freezing water. So many and various are the circumstances which may modify this action that the local rate of waste of a rock escarpment is almost as uncertain a criterion of time as that afforded by the forces which deposit, rearrange, and remove the deltal detritus of an alpine burn. A very striking fact, however, is recorded in connection with the broch of Birsay. After it had become a ruinous cairn, covered 3 feet deep with mould and turf, “pagans of the bronze period buried in this green mound sepulchral urns containing the ashes of their dead.” Since this discovery by Mr Petrie, of Kirkwall, nothing has come to light of equal importance as bearing upon the age of the brochs. In the absence, indeed, of evidence to the contrary in the style of the bronze relics of Birsay, the interments with which they were connected may have been of Scandinavian origin. This might somewhat affect our conclusions as to their comparative age, since it is allowed that the bronze period of Scandinavia was probably contemporaneous with that of

iron in Scotland. The occurrence of bronze plates at Carn-liath, in circumstances suggesting their use by the Picts of the broch period, introduces another element of uncertainty. If it be admitted, however, that the Phœnicians founded a trading settlement in the South of Europe as early as 1100 B.C., and also that their greatest supplies of tin were probably derived from Cornwall (Dr G. Smith on Cassiterides, p. 45), bronze may have reached Pictland in the way of barter at a very early date. Yet even could we fix that date, it would not decide that of the origin of the brochs, nor are we better able to tell when these buildings ceased to be regularly occupied. We find, indeed, from Egil's Saga, ch. 32, that about A.D. 900, "Bjorn Hairld of Aurland in Sogn, who had fled from the fiords with Thora Hladhönd, sister of Thorer Herse, was wrecked near Moseyjarborg" (Mousa), and took shelter there till his ship was repaired, and he could continue his voyage to Iceland. Again, in 1154, Erlend Junge, a chief from Hjaltland, fled with Earl Harald's mother, Margaret, widow of Madadh of Atholl, and shut himself up in Mousa, where he stood a siege ("Orkneyinga Saga," p. 342). Neither of these notices, however, necessarily implies that the broch was at these dates owned or occupied by any one, but rather the reverse.

It may, perhaps, be charitably believed that, setting aside the question of commissariat, the hospitality of those primitive times was equal to such emergencies, but even this is not quite borne out by the testimony of Low's MS. journey, 1474, quoted by Hibbert. The author states, whether of his own experience or not does not appear, that in his day the Koningsburgers, inhabiting a walled hamlet a few miles north of Mousa, were wont to use the following formula:—"Myrkt ljora, ljost i lijugi, timi at gestrinn se genginn." "Dark is the chimney, light is the heath.—Time for guest to go."

Let me, in justice to the present inhabitants, record that when, after lingering among the ruins of Brindister-Burg, I found myself about midnight within the wall of their township, dragging a pony and groping for the *grinn*d or gate on the side next my homeward road, their kindness and courtesy to the belated stranger were worthy of all gratitude.

The discovery of reindeer's horns among the earlier deposits in Cill Trölla Broch, while of special interest to the naturalist, may seem of some importance to the antiquary in connection with our present question. The learned author of the paper on "Remains of the Reindeer in Scotland" (Proc. vol. viii. p. 206), does not, however, attach much importance to the discovery in this connection, although he acknowledges the interest and value of the statement by Torfæus that Jarls Ronald and Harold of Orkney

hunted the hart and the reindeer in Caithness about 1159. This, however, decides neither the date of origin of the brochs, nor the duration of their regular occupancy; for since the reindeer ranges in time from the Pleistocene period, and the notice by Torfæus is only the latest known *record* of its appearance among the fauna of Scotland, we cannot tell how much earlier or later than the middle of the 12th century it was hunted in the hills of Sutherland.

That the brochs were dry-built, or constructed without the use of mortar, may be supposed to imply a considerable antiquity. The church of "Candida Casa" or Whithorn in Galloway, built by St Ninian in the 4th century, was perhaps the first building in Scotland in the construction of which mortar was used. In the chapel of St Medan, however, in the same county, which was probably of a later date, the rock-walls were supplemented by dry stone building. In Henry's "Hist. of Britain," vol. ii. p. 391, lime building is said to have been introduced as late as 674 A.D., in the Monastery of Weremouth, and the Cathedral of Hexham.

Dr D. Wilson suggests that the troublous times immediately preceding the conquest of the Orkneys by Harold Harfager (about 880 A.D.) might have originated such strongholds as the brochs. He admits, however, that this northern invasion in the ninth century "marks the close of a period which is still involved in almost total darkness. How long before this the natives had learned to watch the horizon for the dreaded fleets of the Northmen, or in what form the earliest migration of the Cruithne to the north took place, we have yet to learn" ("Prehist. An.," p. 429). Since this was written in the first edition of his valuable work, very little light has been thrown upon that dark period, so far at least as affects the history of the brochs; certainly not enough to guide us back even to the period of the Roman occupation, far less to enable us to follow the train of thought suggested by the possible state of civilisation of the Picts when they displaced the Allophylian aborigines in the north, and raised, perhaps, monuments of their architectural skill as superior to the recent huts of the West Highlanders as were the ancient edifices of Central and South-western America to the wigwams of the modern Indian.

Let me conclude with a very brief summary of the evidence afforded by the Sutherland specimens as to the position and construction of the brochs and the duration of their occupancy.

These towers were skilfully and strongly built with undressed stones, and without mortar.

They seem to have been so placed, that along each of the main valleys, as far as 20 miles inland or more, signals could be transmitted through a chain of brochs from one at or near the opening of the strath on the coast. Through change of circumstances in the condition of the country they became disused, and gradually fell into ruin, during which time, however, there were left traces of their occasional occupancy by wandering hunters, perhaps, or predatory bands. Their decay was hastened by their being pillaged for building purposes, a fate which Mousa, probably from its situation on a small island surrounded by a stormy sea, seems to have escaped; and this, along with perhaps its partial restoration by Jarl Erlend, in 1154, may account for its present state of preservation.

It seems probable, for reasons already assigned, that, at this stage of partial ruin, the fallen materials of the towers were used to construct the rude huts occasionally found associated with them, the so-called outworks at Cill-Trölla, Carn-liath, and elsewhere. These seem to have been occupied by an abject population, whose chief food was shell-fish; and it may perhaps hereafter be found that such outbuildings are more or less restricted to brochs not far from the sea. This supposed secondary occupancy seems to have extended to a period when the central tower, once probably over 60 feet high, had been reduced to from 10 to 15, exposing the roofs of the ground-floor chambers in the wall. Several of the Cill-Trölla skeletons probably belong to this date, and apparently the first traces of iron implements. A long interval must then be supposed to have occurred, sufficient for the accumulation of earth and turf over both the broch and its small outbuildings, so as to give to the whole the appearance of a green hillock. Thereafter this was employed as a grave-mound by a people who surrounded the partially extended body with small slabs, as at Cill-Trölla and on the neighbouring links, or used short cists, as at Birsay, where, in at least one instance, they buried bronze ornaments with the *ashes* of the dead. Then follows a time marked by traces of disturbance of the contents of the mound to a considerable depth, and probably far removed in time as in custom from the age of cairn or mound-burials. Later still, but after what length of interval who can tell, we emerge upon a scene, dimly lighted indeed, but lively withal, and almost noisy with the antiquarian specula-

tions of the close of the 18th century, whose echoes, perhaps some will say, are not yet silent. In our day, however, we can in support of our theories plead some honest digging, and may appeal to the testimony of photography.

Sympathising with the wish of a late distinguished antiquary, we long for "the light which might be thrown upon our ancient history, if by any strange chance the Journal of Pytheas, who about 350 B.C. travelled all over Britain on foot, should ever turn up in the yet unexplored parts of Pompeii or elsewhere." Meantime we employ at home pickaxe and spade, and record with pencil and camera, hoping much, while we think of the many and zealous labourers in the field, but still remembering that our motto must be

"WORK AND WAIT."

REPORT UPON THE HUMAN CRANIA FOUND IN THE BROCHS.

By T. AITKEN, M.D.

Cinn-Trolla.—The five more perfect crania, and the fragments of crania described below, were found in the broch or Picts castle lately opened at Kintradwell, Sutherland; and as it is believed the period has scarcely arrived for drawing any satisfactory conclusion regarding such remains, an attempt has only been made to note their peculiarities, and to furnish measurements so precise that an exact idea may be formed regarding them.

Cranium No. 1, found with "the humeri and a lot of brute bones and shells about 2 feet under the turf, and 10 feet above the floor," is of a roundish oval form, with well-marked parietal eminences, the right being more developed than the left. Looked at sideways, the supra-orbital ridges and glabella are distinctly marked. The forehead rises almost perpendicularly upwards until on a level with the frontal eminences, whence the contour is flattened, almost level, with the exception of a distinct ridge, where it meets the coronal suture, as far back as the parietal eminences. It then takes a descending curve for a short distance, slopes down towards the apex of the lambdoidal suture, and turns boldly round to the superior curved line of the occipital bone. Between this and the inferior curved line

there is a concavity, and from this point it passes with a gentle slope to the foramen magnum. Looked at from behind, the contour is globular, the left side more developed than the right, and the outline is not at all broken in upon by the prominence of the mastoids. Seen in front, the malar bones are not unusually massive, but the nasal bones project at a considerable angle. The foramen magnum is not of the usual distinct oval form, but exhibits a quadrilateral tendency. In the supra-maxillary bone the canine fossa is of considerable depth, and the palate is normal, but the process of the right side possesses the greatest development, and the alveolar process is so well marked that the individual had probably a somewhat prognathous aspect. All the teeth have been developed, but the first incisor and second molar of the right side, and the two incisors, canine and second bicuspid, of the left, are wanting. They are in good preservation, and present no peculiarity except the marked distinctness of one of the cusps of the third molar of the left side. The inferior maxillary bone is fragmentary, having been broken through the body on the left side, between the second bicuspid and first molar, and neither of the condyles and only the coronoid process of the right side is present, so that no idea can be obtained of the sigmoid notch. Judging from the angle of the jaw, it must have belonged to a person not far advanced in life. On the right side all the teeth are *in situ*, but the second molar and the two bicusps and incisors remaining on the left side are well preserved and exhibit no abnormality. The mental process is prominent. The only feature of the occipital bone requiring remark is the distinctness of the superior curved line. The sutures are in their normal condition, but on each side of the posterior part of the sagittal suture there is a marked flattening, on which the skull can almost be supported.

No. 2. This cranium, attached to the skeleton around which stones had been placed, was discovered on the same level as No. 1. It is, however, less complete. The whole of the left temporal bone and part of the parietal and occipital bones of the same side are absent, apparently from violence, possibly post-mortem, for lines of fracture are seen passing into the parietal bone at these different points, and between the two posterior of these, an irregular fragment has been so loosened as to be capable of removal by slight force. The cranium is of the same type as No. 1, but more ovoid, of larger capacity, and equally distinct parietal eminences. The contour is the

same seen sideways, but the glabella is not so full, though the supraciliary ridges and frontal eminences are markedly so, and the forehead rises almost perpendicularly, whilst the region of the occipital bone corresponding to the fossa for the reception of the left posterior cerebral lobe is more pronounced than in No. 1. Posteriorly the aspect corresponds closely to that of the cranium described, but the foramen magnum is normal in form and position. Seen in front there is a lightness in the bones of the face, and the superior maxillary bones are of considerable height, and the canine fossa unusually deep. The palate is normal. All the teeth have been developed, but the two first molars and second bicuspids of left side and three molars and first bicuspid of right side alone remain and are in good preservation. The lower jaw is imperfect and fractured below the sigmoid notch on the right side, and on a level with the inferior dental foramen on the left. It is somewhat massive, but with the exception of the mylohyoid ridge the attachments for the muscles are not strongly developed, and the chin has not been prominent. The teeth are irregular, and the second incisor of the right side has been forced out of its place and occupies a position completely behind the rest. The first molar of the right side alone is wanting, and tartar surrounds the necks of these as well as the teeth in the upper jaw. The sutures are normal, but along the line originally occupied by the frontal one, from the eminences to where it meets the coronal, there is a very distinct elevation, and a similar flattening to that already described in No. 1 is observed on each side of the posterior part of the sagittal suture.

No. 3. This skull, discovered placed on a slab, and covered by two others, is evidently more modern than those already described, to judge from its weight and excellent preservation. From the development of its different parts, it is evidently that of a male, and from the prominence of the frontal sinuses, if the views now held be correct, the individual must have possessed great muscular strength. When looked at from above, the cranium is of a roundish oval form, the occipital extremity being somewhat more prolonged than in Nos. 1 and 2, and the right side is most developed, though the parietal eminences are not so prominent as in these crania, whilst the right zygoma, the only one remaining, is distinctly seen. Viewed laterally, the head is seen to be altogether thrown backwards, the frontal sinuses and glabella are very distinct, and from this, until on a

level with the frontal eminences, the forehead rises almost erect, whence, until it meets the coronal suture, the outline mounts in a gradually receding curve. At this point there is a slight elevation; it then continues in a comparatively straight line as far back as the parietal eminences, when it curves round and descends almost perpendicularly to the apex of the lambdoidal suture. As far as the superior curved line of the occipital bone, the contour bulges out, and then shelves gradually down to the foramen magnum. Looked at in front, the size of the nasal and massiveness of the malar bones indicate strongly marked features. Viewed from behind, the outline is somewhat globular, and the mastoids, though well developed, scarcely acquire the prominence they occasionally have in well-marked crania like this. The supra-maxillary bones are high, their palate processes normal in breadth and form, but in the left there are two large orifices, probably congenital, for the teeth, though worn, are in a healthy state, and no evidence is found in the cranium of bone disease. There are also to be observed in this part traces of the premaxillary suture. The three molar teeth of the left side, and the two first molars, two bicusps, and canine tooth of the right side remain, and are worn in a slanting direction from without inwards. The lower jaw corresponds in massiveness to the other parts, is well developed, and at the angle the attachment of the muscles is strongly marked. The condyles are large, but the sigmoid notch is to all appearance somewhat shallow, from the coronoid process not being so high as usual. The three molars of the right side, the first bicus, canine, and second incisor are present, and on the left the three molars, first bicus, and first incisor. They are considerably worn and slope from without inwards, but this is more particularly remarked in the two first molars. In the occipital bone there is a well-marked distinct globosity above the superior curved line, and below this the attachments of the muscles are very distinct. None of the sutures have been obliterated, and in the lambdoidal, immediately above the posterior inferior angle of the parietal bone of the right side, an os triquetrum is seen.

No. 4. Of this cranium there only remains the left half of the frontal bone, the half of the left parietal bone, part of the left temporal bone, a fragment of the left supra-maxillary bone, with a portion of the lower part of the external pterygoid process, and the left half of the lower jaw, which has been broken obliquely outwards from between the incisor teeth to a

point in the body of the bone immediately below the mental foramen. From the massiveness of the fragments, and the well-marked attachment for the muscles, the skull in all probability belonged to a male. In the upper jaw the three molars and two bicuspids remain, and are in excellent preservation. They have a fine ivory-like appearance, and are surrounded by tartar at the necks. The lower jaw is massive, and the ramus is more than ordinarily broad. The condyle is large, and though, on account of the coronoid process having been broken away, it is impossible to speak positively, the sigmoid notch appears small, and the angle of the ramus is slanted, not rounded off. The two first molars remain, and the fang of the second bicuspid. In the crown of the second molar there exists a somewhat deep pit, but the teeth present no other abnormality. The frontal bone has evidently been divided by some sharp instrument, and a fracture extends into it on a level with the frontal eminence, but whether the injury is ante or post mortem, it is impossible to decide. There appears also evidence on the inner border of the alveolar process of the lower jaw of the bones having been cut, for the portion between the canine and front of the second bicuspid is quite smooth. The coronal suture is in its normal state.

No. 5. Of this cranium there remain the lower angle of the left side of the occipital bone, two fragments of the left parietal bone, the mastoid, and the greater part of the petrous and squamous portions of the temporal bone. There are, besides, considerable fragments of the frontal bone and parietal bone of the left side, the suture between which is partly ossified. The greater part of the body of the lower jaw remains, but it has been fractured obliquely towards the angles at both sides behind the third molars. It is distinguished by great massiveness and solidity, and it seems questionable whether it really forms part of the cranium marked No. 5. The ridges for the attachment of the muscles want sharpness, and are rounded off; but the depressions for the insertions of the digastric tendons are more than ordinarily deep, and they are separated by a distinct ridge. The genial tubercles have apparently been injured. The mental process is prominent, and the mental foramen of the left side is very large. To judge from the freshness of the teeth, the individual was not far advanced in life, and the second dentition had not been entirely accomplished, for the permanent canine teeth are still seen in the long cavities in which they are developed, and it is not improbable that the massiveness of the jaw may to some extent be

influenced by their non-projection. The temporary canine teeth and second incisor of the right side are wanting, and it ought to be remarked that these are of small size. The bicusps are much worn, but neither these nor the molars show any deviation from the usual type.

Nos. 6 and 9. Of much greater age than those already described, little remain of these crania save the vaults, and, of No. 9, the right temporal bone, right superior maxillary, inferior maxillary bone, left side of basilar process of the occipital bone, to which a small portion of the sphenoid is attached, and the right malar bone. Both crania are platycephalic, but the greater capacity of the different regions of note renders it probable No. 6 belonged to a male, whilst the more exaggerated platycephalism of No. 9, and nearer approach to the oval form, would refer this to a female. Viewed posteriorly, No. 6 is largely developed and round in contour. In No. 9 the contour approaches more nearly to an oval form, and in both the occipital protuberance is well marked. In the two crania the forehead is low and perpendicular, and the outline is extremely flat between this point and the vertex. It then rounds down towards the superior angle of the occipital bone, and at the crown there is an absence of the distinct flattening noted in Nos. 1 and 2. In No. 9 the frontal suture has never closed, and the other sutures, with the exception of the occipital, are obliterated, and in No. 6 the sagittal and coronal sutures are nearly so. In No. 9 the superior maxillary bone is of normal proportions and appearance, but only the first molar and bicuspid remain, these being slightly worn from without inwards. The lower jaw of the same cranium is much injured, and only the canine tooth of the right side and the two first molars are left, the third not having apparently been developed. These teeth are much worn, especially the first molar.

No. 7. Of this cranium only part of the temporal bone remains. It presents no peculiarity.

No. 8. Fragments of the cranium of a child, consisting of the right half of the frontal bone, with a portion of the orbital plate, two fragments of parietal bones, and probably a piece of the occipital bone.

No. 10. Not from the Tower, but found by the blowing away of the sand covering a shallow grave on the neighbouring links. The skeleton lay on the left side, packed with round stones, and no cover. The tibia, femur, part of the pelvis, frontal and inferior maxillary bones remain. The external table of the frontal bone is much weathered, and, from the rapidity with

which it rises towards the coronal region, the person must have had a high form of head. The right frontal eminence is more distinctly marked than the left, and the supraciliary ridges are prominent. From the weight and consistency of the bone, it probably belonged to an old person, but the frontal suture has never been perfectly ossified, and is only distinctly visible in the external table. If the lower jaw belongs to the same cranium, there is farther evidence of advanced age from the oblique angle formed by the ramus with the body, which is extremely contracted on both sides below the site of the molars, but especially on the left, where very considerable absorption of bone has taken place at the alveolar margins. The mental prominence is much everted, and in life must have given the individual an extremely gibbous aspect. The teeth are much worn, and only three remain,—the second bicuspid and first molar of the left side, and first molar of the right. The two bones of the lower extremity, the tibia and femur of the left side, indicate an individual above the middle height; but, from the fragmentary state of the pelvis, the sex of the individual cannot be decided with any certainty.

The following Crania were found outside Cinn-Trolla.—No. 1. This cranium, looked at from above, presents the rounded oval form of those already described, and, like them, has the right parietal eminence more developed than the left. Looked at sideways, the supraciliary ridges are very distinctly marked; the forehead rises perpendicularly as high as the frontal eminences, then turns in a well-rounded curve, and arches flatly backwards, with the exception of a slight elevation at the sagittal suture, until it reaches a point corresponding with the posterior margin of the parietal eminences. From this it slopes down to the apex of the lambdoidal suture, and then to the superior curved line of the occipital bone. The contour has a globose form, whence it descends in a very flat curve to the foramen magnum. Looked at in front, the bones do not appear more than ordinarily massive, and the nasal bones project at an acute angle, so that the nose was probably a well-marked feature. Behind, the contour is globular, the left side being most developed, and the outline is not much affected by the mastoids, though the posterior borders of these pass forward at a more than usual acute angle. The foramen magnum is normal in form and position. The maxillary bone is above the usual height, the canine fossa very marked, and also the alveolar process, in the right half of

which the canine, two bicuspids, and three molar teeth remain, and on the left the lateral incisor, canine, and two bicuspids, and two molars, but none of these present abnormalities or are much worn, except the two first molars on each side. The lower jaw is massive, is of more than usual depth at the symphysis, and the depth of the bone corresponding with the position of the posterior molars is greater on the left side than the right, on account of the lower border of the body arching more distinctly towards the angle. In the inner surface the mylo-hyoidean ridge is highly developed, and on the right side, corresponding in the position of the two bicuspids, there is an exostoid-like enlargement, which is less marked on the opposite side, but so much so as to form a distinct arch extending from the inner margin of the external bicuspid of the left side to the canine tooth of the right. On account of this, the alveolar margin is extremely broad from the first bicuspid to the third molar, and especially at the last-mentioned point, both of these teeth sloping decidedly inwards. The sigmoid notch is normal, the coronoid process of the usual height, but the condyle is very horizontally placed. The occipital bone presents no peculiarity, with the exception of extremely well-marked depressions for the muscles immediately above the posterior margin of the foramen magnum. The sutures are all in greater part ossified, with the exception of the squamous of both sides.

No. 2. This cranium was, in all probability, of the same type as that just described, but fragments only of the frontal parietal and occipital bones remain, though these are united. It has been unequally developed, with the left half thrown backwards, but its most distinguishing feature is a well-marked enlargement, corresponding with the fossa in the occipital bone, for the reception of the posterior lobes of the cerebrum. Looked at in front, as in No. 1, the right parietal eminence is most marked, and, as in No. 1, when viewed from behind, it has a somewhat flattened globular form, and is most developed in the left side. The sutures are all ossified, and the grooves for the reception of the middle meningeal artery and its branches are unusually deep on the left parietal bone.

No. 3. The occipital, parietal, and right temporal bone of a more recent cranium. The sutures have all been ossified, and the only peculiarity requiring remark is an exostosis in the border of the squamous portion of the temporal bone immediately above the external opening of the ear.

No. 4. Part of the vault of a cranium composed of almost the entire

frontal bone, a small portion of the left parietal bone, and a large one of the right. The cranium appears to have been of the same form as No. 1, and there was in all probability the same contrast, as in it, between the breadth at the forehead and the parietal eminences. The outer table of the frontal bone has been fractured internal to the right frontal eminence, the line of fracture extending from this slightly outwards, nearly as far back as the coronal suture. It is more than probable, however, this was post mortem. The glabella and supraciliary ridges are well marked. The forehead rises almost perpendicularly as high as the frontal eminences, and then curves more decidedly up towards the vertex than No. 1.

No. 5. It is possible that the fragments, so numbered, formed part of one cranium, but so many of these are wanting that no definite opinion can be expressed on this point. All the bones, however, possess the same degree of friability, and have an unusual degree of thickness throughout, attaining to fully $\frac{3}{8}$ ths of an inch at the right parietal eminence. If, therefore, they do not belong to the same cranium, they are evidently of one age, and have been exposed to the same influences. Of the anterior part of the cranium, the greater part of the frontal bone and parietal bone of the right side remain, and a small portion of the left parietal; and so far as an opinion can be formed, it was of the same type as cranium No. 1, and presented the same characteristics, though the forehead scarcely arises so perpendicularly. Of the fragments belonging to the posterior region of the cranium, if they do belong to the same, as many have been joined together as to show that, viewed from behind, it had the same flattened globose character; and the posterior border of the mastoid of the right side, the only one remaining, passes forward at the same acute angle, noted in No. 1, second series.

Dimensions of cranium No. 1, second series.

Circumference,	20 inches.
Length,	$7\frac{1}{8}$ "
Breadth at forehead,	$3\frac{5}{8}$ "
„ at parietal eminences,	$5\frac{1}{2}$ "
Height from centre of meatus auditorius externus to highest point of vertex,	$4\frac{1}{4}$ "
Length of face,	$5\frac{3}{8}$ "
Breadth of face,	$4\frac{1}{8}$ "

The following conclusions may be drawn from these observations:—

1st, That the age of the individuals to which these remains belong varied from extreme youth to advanced age.

2d, That the remains belong to very different periods, 6 and 9, first series, and 5 of second series being evidently of great age; Nos. 1 and 2, first series, and No. 1 second series, with the portions 2, 3, and 4, are more recent; whilst No. 3, first series, looks altogether a more modern skull, and if of very distant date is in remarkable preservation.

3d, That the crania, with the exception of No. 3, first series, are all of one type, their most distinguishing peculiarities being—

a. Their roundish oval form.

b. Their breadth at the parietal eminences in comparison with the same measurement at the forehead.

c. That viewed in front in all cases, the right parietal eminence is most markedly developed, whilst looked at from behind the left posterior region is most distinct.

4th, That whilst there are irregularities in the development of the teeth, they appear of the usual type.

5th, No evidence exists in the crania of any lowness of type, and the gibbosity in No. 10 is accounted for by the age of the individual to which the lower jaw belonged.

Carn-Liath Broch.—Of this skull only a part of the vault remains. The temporal bones are absent, and, in the left side, a part of the lower margin of the frontal bone, articulating with the wings of the sphenoid, and the greater part of the lower portion of the parietal bone, has been destroyed, as well as the occipital bone below the superior occipital ridge. The cranium is therefore very imperfect, but sufficient remains to indicate it as of the same type as the crania formerly forwarded. There is the same contrast between the breadth in the frontal regions and at the parietal eminences, the same flattening at the crown, the greater development of the right parietal region when looked at from above, and, so far as an opinion can be formed from the incompleteness of this region, of the left occipital behind. Looked at from above, the cranium presents a rounded oval form, and viewed sideways, the glabella, superciliary ridges and frontal eminence are well marked. The frontal outline at first rises perpen-

dicularly, but soon bends in a well-rounded curve, and then arches flatly backwards until on a line with the parietal eminences. It then takes a rounded curve, and descends almost perpendicularly towards the apex of the lambdoidal suture, when the curve takes a bolder form, and ends at the superior ridge of the occipital bone. None of the sutures are ossified, and an os triquetum is found in each lambdoidal suture, that in the left being the largest, and nearly the size of a shilling. The cranium has been considerably exposed, and the left half more than the right, the bone coming away in scales, whilst here and there there are patches where the outer table has been removed down to the diploë. In the left parietal bone, at the centre of its anterior margin, there exists a round hole of $\frac{5}{8}$ inch in diameter, apparently made by some sharp pointed instrument in a line drawn from the point already mentioned to the external angular process of the right orbit, and the inner table of the skull, round the orifice, has scaled away for a considerable extent.

Broch of Craig-Carril.—Of the more imperfect cranium found at the foot of the stair, nearly the whole vault has been preserved, and also a fragment of the superior part of the greater wing of the sphenoid of the right side. Nearly the whole of the greater wing of the same bone in the left side, and a great portion of the temporal bone, the zygoma, the apices of the petrous and mastoid portions having, however, been destroyed. Looked at from above, there is not the same striking contrast between the breadth at the forehead and the parietal eminences as in some of the crania formerly described; but as in these the right parietal eminence is rather more prominent when looked at from the front and the left when viewed from behind; though the former is so rounded and full as to give the right half of the cranium a greater development, and to make it therefore unsymmetrical. The cranium is of a rounded oval form, viewed from the same position, the posterior part of the oval being somewhat flattened from the lateral sweep of the occipital bone. Viewed sideways, the glabella is full rather than prominent, and the contour inclines almost imperceptibly backwards, until it attains the level of the frontal eminence, when it sweeps in an even though somewhat flat curve until it reaches a point corresponding to the posterior limits of the parietal eminences, whence it slopes down towards the apex of the occipital bone. From this it bulges outwards, descending at the same time perpendicularly until it reaches the superior curved line of the occipital, when it turns

almost horizontally inwards, until it reaches a point apparently corresponding to the occipital protuberance. The posterior part of the contour is, however, imperfect, on account of the lower portion of the occipital bone being wanting. None of the sutures are ossified, and on each side of the sagittal suture, at about a third of its length from its junction with the lambdoidal suture, are ten nutritive foramina, that on the right being largest. Immediately above the superior border of the fragment of the great wing of the sphenoid, the right side, the skull has been perforated, the perforation being about $\frac{1}{2}$ an inch by $\frac{3}{8}$ inch in size, and above this point the outer table of the bone has scaled away to some extent. Towards the posterior part of the squamous articulation, the edge of the parietal bone has also been injured, apparently, as in the former case, in digging out the cranium.

Of the more perfect cranium, all the parts are present, with the exception of the right zygomatic arch and the apices of the styloid processes; and there has been weathering to a considerable extent of the condyles of the occipital bone, of the molar eminence of the right malar bone, and of the right zygomatic arch at the junction of its malar and temporal portion. In this cranium there is the well-marked contrast between the breadth at the forehead and the parietal eminences as in the other crania already described, but, unlike those when looked at either from in front or behind, the left parietal eminence is more pronouncedly developed. Looked at from above, the cranium has a rounded oval form; but the outline is wanting in symmetry, from the additional fulness of the left parietal eminence. Viewed sideways, the nasal bones are prominent, as also the superciliary ridges and the glabella. From the upper border of the latter the forehead curves somewhat boldly upwards towards the coronal suture, where there is a pretty distinct ridge. It then descends in a flat slope, rather than in a curve, to a point as far as a line drawn from centre to centre of the parietal eminences, and curving boldly round, then descends almost perpendicularly to the apex of the lambdoidal suture. That part of the occipital bone between the apex and the superior ridge bulges out, and the occipital protuberance is more than usually well marked, and appears pointed. Here the outline between the superior and inferior occipital ridge is reversed, the curve becoming concave, and then again becoming convex, it sweeps flatly down to the occipital foramen. Looked at from behind, the cranium has an imperfect globular form, and the mastoid processes stand boldly out and are deeply grooved

for the tendons of the digastric muscles. The foramen magnum is normal; but the condyles are more than usually inclined towards the centre.

In the malar bones, the malar eminences are well marked. In the supermaxillary bones, the infra-orbital foramen on each side is large, the canine fossa deep, and the alveolar margin is raised into well-marked ridges, indicating the position of the sockets of the teeth. All the teeth are present, but the first incisor of right side and the last molar of left side is still contained in its bony cavity in the jaw.

The lower jaw is imperfect, the coronoid processes and condyles being wanting. It is massive, with well-marked surfaces for the attachment of the muscles, and the angles are very prominent and turned outwards. The mental process is distinct, and the genial tubercles are conspicuous and pointed. All the teeth are present, except the 2d incisor and 2d and 3d molar of left side. The incisors are crowded, and the grinding surfaces of the teeth are much worn. The nasal bones are imperfect, and have apparently suffered from injury, implicating to a greater extent the left bone, which has been fractured and displaced.

The sutures are not ossified, except at the lower portions of the coronal sutures on each side, and a small portion of the sagittal posterior to the vertex, and on each side of this there is a well-marked vascular orifice. In the lambdoidal suture there are several Wormian bones of large size, and on each side two unusually large orifices for vessels are seen where the mastoid process articulates with the occipital bone.

In addition to the injury already indicated of the nasal bones, there exists evidence of violence on the frontal bone at the left side. In two places the external table of the skull has been depressed, but no fracture has existed at these spots. The depression existing about an inch above the supra-orbital ridge is linear, and about half an inch long, and slopes outwards and upwards. The other injury is about an inch and a half above that just described, and is a hollow irregularly crescentic depression.

Besides the two crania, there are nine teeth, all more or less injured, except one—two of these are incisors, four bicuspides, three molars.