to the form *intermedium* I think, but between it and *minus*. The smaller is from a *Cnicus*, probably *C. lanceolatus* [spear thistle]; but the fruits of species in the same gernus of Compositae are not easily distinguished even when freshly collected."

We would simply add that, in spite of the hundreds of years which have elapsed since the old Fort was inhabited, the Burdock, and Spear Thistle still flourish abundantly around the site of the Fort at the present day.*

* Since these notes were written extensive collections of animal remains have been obtained in the further excavations of the Fort. Mr Mann has also shown that the plant seeds are probably modern, having been introduced into the soil by burrowing animals.

REPORT ON THE RELICS DISCOVERED DURING EXCAVATIONS IN 1913 AT CAVE AT DUNAGOIL, BUTE, AND IN 1914 AT THE FORT AT DUNAGOIL, BUTE (*with suggestions as to the Probable History and Chronology of the Sites*).

By Ludovic M'L. Mann, F.S.A. (Scot.).

(Read 23rd February, 1915).

NOTE.

All the humanly worked relics from cave and fort are now preserved, classified, in the Museum, Rothesay, with explanatory printed cards and diagrams. The more fragile relics and those apt to crack and corrode such as the iron blade in wooden handle, have been prepared in preservative media.

Each object had its *locus* and date of finding painted upon its under-side in neat small letters, over which varnish has been put. The smaller objects have been placed on cotton wool in glass-topped cardboard boxes.

I. Report on the Relics discovered during an Examination of Cave at Port Dornoch, on the Shore beneath Dunagoil.

I. THE CAVE.—The period of its occupation—Not Azilian—Bone relics—stone relics; pounders, spinning-whorl—bronze relic—pottery—crucible—relic of iron in wooden handle—water-rolled stones splintered by heating—the hearth.

While this cave has the appearance of having been excavated by the action of the sea assisted by diagonally set "faulting" when the land level stood some 20 to 30 feet lower than it now does, there is no evidence that the cave was occupied by man at any time near to that chronological point when the cave

became habitable shortly after the rising of the land. Indeed, everything points to the cave having been occupied only during comparatively recent, that is proto-historic, times. At the time when the land was about 25 feet lower than now, Britain, at least north of Durham, was inhabited by people to whom the name "Azilian" or preferably "Oransay" has been applied. If the lowest depths of the cave were examined, an "Oransay" occupation might be detected.

These "Oransay" people or some people very nearly on the same chronological horizon, attacked whale carcases stranded at points now well inland in the Carse of Stirling. Among other tools and weapons which they employed to dig out the blubber were fragments of deer-horn used as picks, a handle probably of wood being inserted into the deer-horn through a neatly made perforation.

By a new method of computation, based both on archaeological and geological grounds, which has the approval of leading authorities, the "Oransay" period in Scotland may be as old as 30,000 years.

"Oransay" man also occupied caves in the Bay of Oban and huts along the shore lines of Tiree, and the twin islands of Colonsay and Oransay in the Hebrides. A great deal of light has been thrown on the "Oransay" period by an expedition which carried out explorations in Oransay in 1913.* There was no relic found of "Oransay" type in the Dunagoil cave, but the lowest layers have not yet been examined. There is no clear evidence that the cave was occupied during the Neolithic period, that is the latest Stone Age terminating about 2000 years B.C., or during the succeeding Bronze Age which ranged in Scotland from about 2000 B.C. to 400 B.C. It is probable that it was occupied perhaps off and on during the two or three centuries preceding the Christian era and during the subsequent three or four centuries.

* P. Soc. Antiq. Scot., Vol. xlviii., 1914.

BONE AND HORN OBJECTS.—In the cave was found the tine of a deer-antler neatly sawn through at the thicker end.* (A. 1; Plate I., 1).

Relics of bone, regarding which there is doubt as to their having been used by man as implements, consist of six pin-like objects, the long rays from the anterior fins of a large fish; these objects have a fine sharp point, and it is possible they may have been used as awls, pins, and fasteners for clothes. (A. 2).

Of bone objects almost beyond doubt implements, there are two bones, each the lateral process of the lumbar vertebra of an ox. They seem to have been used as knife-like tools, the butt or vertebral end being cut to form a convenient rest for the outside edge of the palm. They resemble paper knives. The blade of one shows striations as if caused by use, unlike the natural groovings occasionally seen in bones. Similar but better made objects were got in the Heathery Burn Cave, near Durham, and belong to the late Bronze Age.† (A. 3; Plate I., 6 and 7).

STONE OBJECTS.—Of stone objects there are two water-rolled stones of a size convenient to be held in the hand, which

* Each relic as it is referred to in the text is given a letter and number, and under these references will be found a fuller description in the Table at end. Its plate and its number on the plate are also quoted.

† Rev. Canon Greenwell in *Archæologia*, vol. 54, p. 107, describes them "As from 'the leg bone of a deer or some animal of about the same size, split down the middle 'and then rubbed over the whole surface to a sharp edge on each side, part of the 'articulated end of the bone being left for handle." They were presented a few years ago to the British Museum. Dr James Ritchie last year described an example from a Fife Cave to the Society of Antiquaries of Scotland identical with those from the Cave at Dunagoil.

An imperfect one is engraved in the *Proceedings of the Society of Antiquaries, London*, 2nd ser., ii., 130.—Mr Greenwell states "Some of these objects are in shape 'not unlike an ordinary ivory paper knife which has one end made thicker than 'the other to hold it by. They are all highly glazed on the surface by use, 'apparently upon some soft material, and in addition have abundant straight 'scratches across them. Eight perfect ones and portions of at least three others 'were found, varying in length from 10¼ in. to 12 in., showing an even thickness of '1⅛ in. One, 6¼ in. long and ⅞ in. wide, is shorter, thicker, and stronger, and seems 'scarcely to have been made for the same purpose as the others; they probably served 'more than one operation, perhaps they were knives for skinning or some other process 'in the preparation of hides, or they may have acted as a kind of spoon for eating some 'such food as porridge, though for the first they seem to be too weak, and for the other 'not very well adapted.

'The most satisfactory explanation of their use is that they were instruments for 'driving back the wool in the manufacture of woven fabric, and though they appear to 'be rather thin and sharp fer this purpose, that seems to be their most probable use, to 'which their glazed surface gives additional probability."

have each been abraded in two facets at one end by use as pounders or crushers, most probably for the trituration of cereals, nuts, or roots. Some specimens of this type of tool have very coarsely abraded ends and were used perhaps for rougher work such as the crushing down of copper ore (as found on ancient sites in Anglesea), and for the breaking of stone into small pieces to be mixed with the clay for pottery (as at Glenluce). They have not been found in graves. They are of frequent occurrence on domestic pre-historic sites later than the "Oransay" period. They were found in Scotland on a site of late Neolithic position, the semi-subterranean Stone Age village of Mye, examined by Mr A. Beckett and myself in 1902.* They were common during the transitional stage between the Stone and Bronze Ages,† during the Bronze Age and down through the Early Iron Age centuries when they were used in comparative abundance. They were in use by the natives in Scotland during and subsequent to the Roman occupation of Scotland, but it is somewhat strange that they seem never to occur among the relics recovered from Roman sites or native domestic sites closely connected with the Roman forts, such as the civil annexes along the Roman Walls. The water-rolled pebbles which were chosen to be used as pounders, are usually of quartz or quartzite, which are hard materials. They seem to have gone out of use by the ninth century A D. as the exploration (details of which have not yet been published) in Wigtownshire of an extensive industrial site definitely assignable to this period revealed none. The occurrence of these objects in the cave does not therefore yield much positive chronological evidence because of their wide range in time. The terminal, though not the initial, point in that range is however fairly well established. (A. 4).

A relic of stone of popular interest is the spinning whorl; used to weight the pencil-like spindle operated sometimes with

* *Report on the Excavation of Prehistoric Pile-Structures in Pits in Wigtownshire* (*Proc. Soc. Ant. Scot.*, vol. xxxvii,, 1903, pp. 370-415); and *A Galloway Stone Age Village* (*Trans. Dumfries and Galloway Soc.*, N.S.. vol. xx., 1909, pp. 74-95); *Scot. Ex.*, 1911, *Cat.*, p. 817, items 4-6, and p. 869, items J and K.

† Pounders and many other relics from a Wigtownshire site, the only known one of this period, I have exhibited and described (*Scottish Exhib. of National Hist., Glasgow*, 1911, *Prehistoric Cat.*, pp. 820-822, items 1-42).

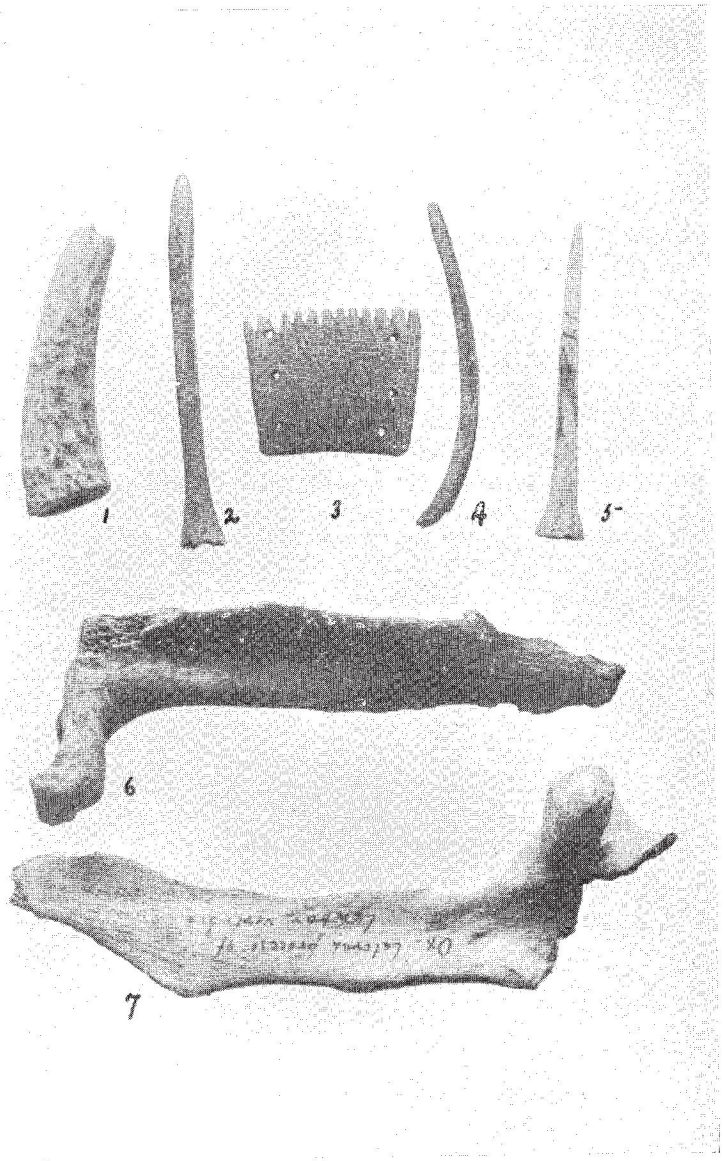


PLATE I. (½)

1. Tine of Deerhorn sawn across thicker end. 2, 4 and 5. Pin-like Bone Implements.
3. Plate of Bone, toothed, with six perforations. 6 and 7. Lumbar Vertebrae of Ox, shaped like rough paper knives.

the distaff by the women in spinning thread. The whorl was not apparently used in the British Islands during the Bronze Age or earlier times, as no relics of this character have been discovered during recent excavations on domestic sites of the Bronze Age or earlier periods in this country. Their use seems to have begun about the beginning of the Early Iron Age, say 400 or 500 years B.C., and of course continued throughout the whole of the centuries until about the middle of the nineteenth century when they survived only in very remote places in this country. It is not easy to arrange the Scottish spinning whorls in chronological sequence. The most neatly made and the most ornate, so far as my experience has gone, belong to the middle of the ninth century. The Dunagoil specimen is a crude one and does not in itself throw much light upon its age. Indeed, the occurrence of a whorl in a cave, unless it were found deep down in a relic bed, is not positive evidence of the chronological position, as it is possible that even in recent centuries a woman might enter the cave during a shower of rain and continuing her spinning work might lose the whorl. However, this is improbable; and the presence of the whorl at Dunagoil points to the cave having been occupied as a more or less permanent site some time after the third or fourth century B.C., but during times of social quietude only, for in other times the cave would be a dangerous place to occupy, as the people sheltering there might be caught as in a trap. (A. 6; Plate II., 2).

Bronze Object.—In the cave was found a small piece of rather thick curved sheet bronze, which demonstrates that the place was occupied either during the Bronze Age or later. Objects of sheet bronze were in use in Scotland during the later phases of the Bronze Age and of course during the succeeding centuries. The fragment of metal does not contain sufficient evidence within itself to enable its story to be told. (A. 7; Plate II., 4).

Pottery.—Some fragments of pottery (A. 8) and a crucible (A. 9; Plate VI., 2), were found in the cave. These are interesting and useful finds as almost all the different types of pottery in Scotland can now be arranged in a fairly accurate

chronological series, and even a small fragment of pottery found in a domestic or sepulchral deposit is at times sufficient to tell a great deal about the chronological horizon of the site; while ancient crucibles are rare and therefore the discovery of one is a welcome addition to the list of Scottish examples, of which about twenty only are known.

The fragments of pottery from the cave consist of some six pieces of plain ware with an out-turned or everted, rounded rim, without decoration, made without the use of the wheel and hardened by the action of kiln or fire. They seem to belong to the early centuries of this era or to the proceeding few centuries of the Early Iron Age but would not be out of harmony if found with relics of the Bronze Period. While a great deal has yet to be learned with regard to ancient Scottish pottery, the classification, so far as it can yet be formulated is:—first, exceedingly well-made, finely-decorated, dark ware with an almost burnished surface, and with rounded base like a bowl and often with a flat, broad brim; secondly, a ware somewhat coarser with base inclining towards flatness and less rounded than the preceding class. The first named seems to have a central chronological point about 2000 B.C. and to have been found only on three domestic sites in Scotland—Rothesay, Stoneykirk, and Glenluce, and in several sepulchral deposits. The second class is transitional and lies between the late Neolithic and Early Bronze Ages and may be put down to about 1700 B.C. Following these come the early and then the late wares of the Bronze Age which branch out into several distinct types, some of which were employed solely for sepulchral purposes, but most of the types of domestic fictilia were also used for holding food to be placed with the dead.

Towards the end of the Bronze Age, perhaps about 500 or 600 B.C., the great bulk of the pottery in Scotland became degraded and very rough. This inferior technique continued in Scotland throughout the centuries without improvement. The older the pottery the finer it is in Scotland. It is the crude late ware which occurs at Dunagoil Cave. Indeed, the hand-made plain ware in Scotland survived in the remoter parts of

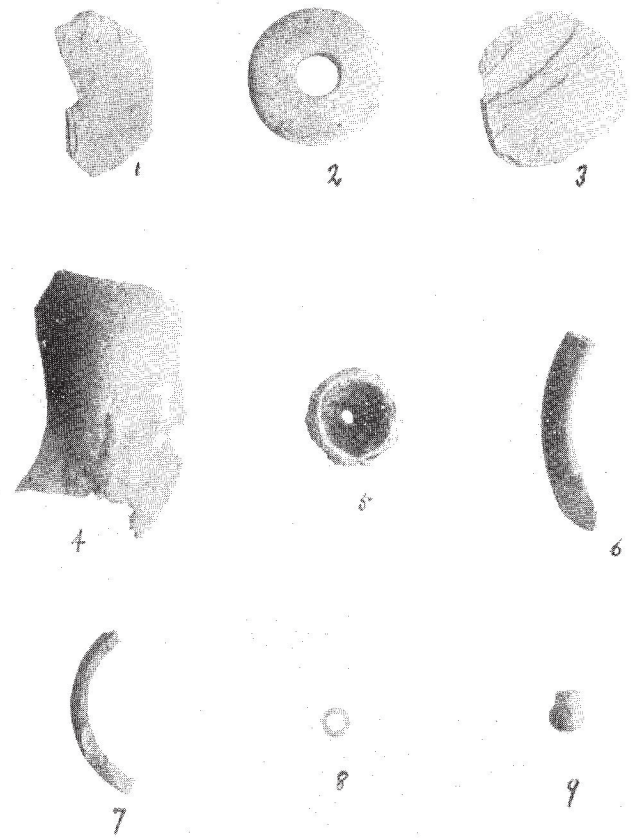


PLATE II. (⅔)

1 and 3. Discs of Slate. 2. Spinning Whorl of Stone. 4. Piece of Bronze Sheeting. 5. Hemispherical Bronze Object. 6 and 7. Fragments of Lignite, Rings or Armlets, 8 and 9. Glass Objects.

the country such as the Outer and some of the Inner Hebridean Islands and was only supplanted by the factory-made dishes which began to be introduced there about a hundred years ago. It is probable that in Bute, so near to the mainland, and to the manufacturing centres for wheel-made pottery, the hand-made ware went out of use in early mediæval times.

On the mainland of Scotland from about 400 A.D. till 1200 A.D. pottery seems to have been scarce. This, I believe, was because of the growing efficiency and abundance of iron cutting tools which would readily allow of wooden receptacles being cut out of the solid block of wood. On the other hand, in the remoter Islands large blocks of timber were less frequently obtainable, and this circumstance may have tended to postpone there the degradation of the fine prehistoric pottery and fostered a longer vogue of the finer wares. Indeed it seems to account largely for the survival in the now tree-less Hebrides of hand-made fictilia to a time easily within the memory of many persons now living. In this manner only may one explain these puzzles which surround the history of early Scottish pottery.

The crucible from the cave is a little cup-shaped unbroken specimen and has some bronze slag adhering to the interior wall. It is the only known specimen which possesses what may have been intended to be a decorative feature. At the junction of the vertical walls and the rounded basal portion is a slightly raised beading. How bronze was melted during the Bronze Age is not yet understood. The crucibles discovered in Britain seem all to belong to the Early Iron Age and early mediæval times. Because bronze slag is found adhering to many of the crucibles, it of course does not follow that they are assignable to the Bronze Age, as bronze fittings and ornaments, though not weapons, were abundant during the centuries when iron was employed.

IRON OBJECT.—A much wasted iron blade, somewhat like that of a pocket-knife, in a wooden and much decayed handle, the latter surviving because of its permeation by the oxide of iron from the blade, was obtained in the cave, and very probably

is contemporary with at least several of the other relics found at the site. (A. 10).

HEARTH.—Several water-rounded stones were noticed in the cave which have small pieces splintered from them, not of an aspect characteristic of direct human action, but indicative that the stones have been either fire-injured in or near the hearth, or have been plunged when very hot into vessels of water so as to heat the water.

Several large, circular slabs of sandstone were found together near the centre of the cave with some deposits of wood charcoal. The slabs are fire-injured and evidently formed a hearth. Before they were fire-injured at all or so extensively, the slabs have been used as stones upon which to grind metal or stone objects as testified by the smooth, worn and slightly concave surviving portions of the upper original surfaces (A. 5).

This review of the cave relics may be somewhat disappointing in respect that one cannot get the lens into a right focus with regard to the chronological position, notwithstanding an approximate ascertainment of the *terminus a quo* and *terminus ad quem* for each class of relic. But everything considered, the best hypothesis which might be submitted is that the cave was occupied during the early centuries of the Christian era with a central point, say about 500 A.D. Probably the place was used as a shelter from time to time, during the periods earlier and later, but if so these more casual occupations did not apparently result in the deposit of relics clearly "Oransay," or referable beyond doubt to times other than the early centuries of this era: but the lowest depths of the cave call for and deserve scrutiny.

II. REPORT ON THE RELICS FOUND DURING THE PRELIMINARY EXAMINATION OF DUNAGOIL FORT.

II. THE FORT.—SITE NO. 1.—A Bone Pin—A Pottery Stamp; SITE NO. 2.—Stone relics; hammer-stones, polishing-stones, whet-stones, grinding-stone, slate discs—Lignite or jet relics; Spinning-whorl, rings, armlets, some ornamented, small perforated disc; Glass objects; dress fastener and bead—Chipped Flints—Clay from Wattle-work—Crucible and bronze slag—Pottery.



PLATE III. (½)

Rectangular Smoother of Sandstone,

During my visit to the cave and fort, in the autumn of 1913, in company with Dr. Marshall and Mr J. Bruce Gardiner, with the object of conferring as to the starting of excavation work, there was picked up on the broken surface of an anciently occupied plateau north-west of the fort, a fragment of what had been perhaps a large perforated axe-hammer. It is however much injured and its identification is doubtful.

Owing to the outbreak of war the excavations which had been carried on at the fort in July and August, 1914, had to be stopped, but in the short period during which the work was in operation a rich haul of relics was obtained. If so many relics could be recovered in the short space of time and within a comparatively small number of square feet of material sifted, what a splendid array of valuable and interesting archæological material might be secured by further explorations. The larger, and sea-ward section of the fort may be called Site No. 1 and the other, Site No. 2.

Very little was done to explore No. 1 except the digging of a small trial pit to discover the depth of the soil.

Bone Objects.—In it were found a bone pin about three inches long and having a rather spatulate, polished shaft (B. 2; Plate I., 2). There was also found a curious, thin, quadrangular object of bone—a very rare relic—its face slightly curved outwards. Along one edge there are twelve short, blunt serrations. These are so short as to debar the consideration that the relic has been used as a comb. Marginally, along its other three sides, are seven small equidistant perforations probably to contain pegs by means of which was affixed a plate, perhaps of wood or bone, to serve as a handle which was apparently rivetted on to a counter-sunk space as the portion of the comb-like object near the serrated edge is thicker than the other part. It is probable that this object was used as a tool for making patterns of rows of small dots or of short lines upon pottery vessels before they were fired. Incidentally, also, it tends to show that the potter plied his industry and art within the fort. This point might be ascertained if pottery fragments so decorated are recovered later on (B. 4; Plate I., 3).

The objects from No. 2 Site consist of stone, bone, clay, glass, lignite, and bronze relics.

STONE OBJECTS.—Of these there are three hammer-stones of white quartz of the same type as the two pounders just described from the cave. There is also a small water-rolled, white quartz pebble, the surface of one of the flatter sides of which is so highly polished that it glistens as if coated with transparent varnish (B 7; Plate IV., 5). This object was probably used in the rubbing of leather, bone, or wood. A similar stone was found in the neighbouring site near St. Blane's Church. There is also a fragment of a discoid water-rolled stone with a smoothed surface probably used for some grating or whetting purpose. A thick, roughly oval piece of sandstone about one foot long has its lower side quite flat and worn, the surface before wear having been punctulated all over or battered by moderately heavy, regular, uniform impacts of a stone of hard kind held in the hand, which was the ancient method of shaping a stone. The surface of the monoliths of Stonehenge for example were thus treated. This object might be put down to be the top stone of a saddle-quern were it not perfectly flat on one side.

There is a whet-stone about three inches long, and another of greywacke, rather ill-balanced and quadrate (B. 9 and 10; Plate IV., 5 and 3). A narrow, rectangular block of sandstone about a foot long has one face worn into a concave surface by its use as a whetstone (B. 11, Plate III.). Among the more interesting of the stone relics are two small, rather thin, discs of blueish grey slate. The purpose of these is still enigmatical (B. 12 and 13; Plate II., 1 and 3).

OBJECTS OF LIGNITE.—Of the other stone objects there is an assemblage of fourteen relics made of lignite. It would be interesting to ascertain the position of the lignite beds in Bute, the quality of the material and whether the deposits were

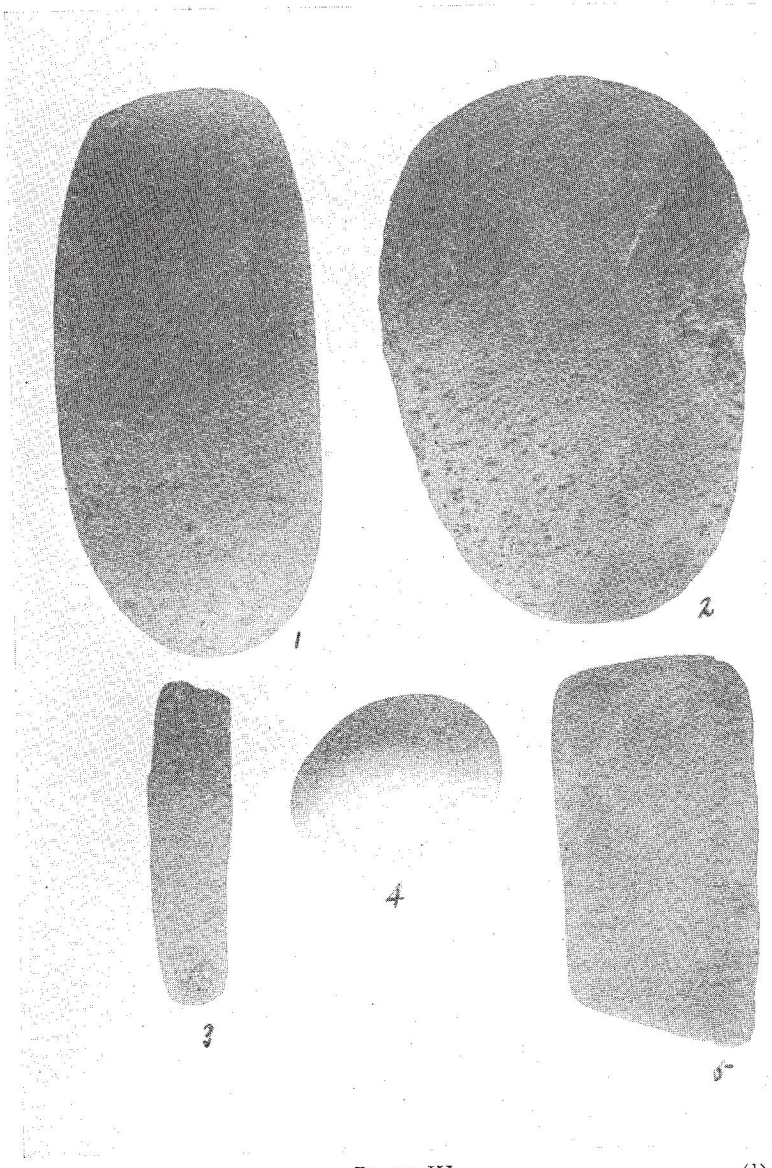


PLATE IV. (½)

1, Pounder. 2 and 4, Smoothers. 3 and 5, Whetstones.

readily accessible to and were utilised by the prehistoric and proto-historic Bute man.*

There is a fragment of a large lignite object somewhat like an armlet but heavy and irregular with broad ring and striated surface. It may have been an armlet which in course of manufacture, and with its striations not yet polished away, had got broken and was thrown aside. Many similar objects have been found, several in Ayrshire, but their use has not yet been definitely pronounced upon.

There is a rather large spinning-whorl of lignite, flat on one side and slightly convex on the other. Spinning whorls when made of this material are usually of somewhat larger diameter than those made of the heavier stones of closer grain. The spinning whorl had to be of a weight roughly within certain limits, and without attributing to the whorl maker any scientific knowlege, it is to be noted that the less the specific gravity of the stone the larger generally is the diameter of the spinning-whorl. Whorls of lead (common about the ninth century) are thus of the smallest size. Sometimes the diameter is restricted when the thickness is increased, but in the case of the Dunagoil specimen the whorl is comparatively thin (B. 15 and 16; Plate V., 1 and 4).

Of the lignite rings one is obviously a finger ring, but very small as if made for a child; it is unfortunately slightly imperfect. As to the other rings, it is difficult to tell their precise use; they seem somewhat large to be worn as finger-rings, and the perforation is too large to allow of their being assigned for use as spinning-whorls, for which purpose they are besides too light in weight. Some were undoubtedly armlets (or possibly anklets), the larger ones worn perhaps on the upper arm, the smaller ones

* Since this was written Dr. Marshall has shown me the outcrop of lignite deposits a little to the south of Ascog on the hill-face on the south side of the Millhole Burn, about 200 yards from the shore. These seem to be the beds of coal referred to by Mr James Kay (*Trans. Buteshire Nat. Hist. Soc.*, vol. 2, 1908-1909, p. 64).

As might be expected, the surface material is crumbling and friable, yet here and there one can pick out perfectly compact small slabs, which would quite well have served the requirements of the lignite workers of Dunagoil and St. Blane's as I proved by working up and polishing some of the pieces extracted during our visit to the outcrop.

on the wrist. Some must have been worn by children, others by adults, probably men as well as women. Of particular interest are two fragments of armlets (or anklets). These in cross-section are semicircular, the inner side being flat or nearly so. The outer and rounded surface in one case has three incised lines running round it in slightly spiral fashion, a most unusual and interesting feature. Another ornamented armlet of lignite is represented by a fragment; around the outside surface has been incised a line conform to the curvature and a series of short transverse lines.

Decorated armlets of lignite are of great rarity. Some Scottish lignite armlets are decorated with a series of small pittings. The women at York, during the Roman occupation there, wore armlets of fine, dark, polished jet (perhaps from Whitby), ornamented with rather deep transverse grooves giving rise to a segmented appearance. A fragment of one of this type I recovered in Wigtownshire.

In three or four cases in the south-west of England shale armlets have been found with parallel grooves and corrugations encircling the whole outside surface; and a fragment of a lignite armlet so decorated was recently recovered at Traprain, East Lothian.

A remarkable lignite object is a small disc barely an inch in diameter and about one-eighth of an inch in thickness with a centrally placed perforation the size of a pin-hole. This object was too thin and delicate to be worn as part of a necklace and its purpose is still problematical. I have succeeded in finding other identical objects on the West Scottish mainland. They may have been used in bringing together horse-hairs in the process of twisting the hairs together. Fabrics of twisted horse-hair were prehistorically rather common, and the finest garment of the kind is in Dublin Museum (B. 17; Plate V., 2).

Before leaving the lignite relics it is perhaps unnecessary to call attention to a somewhat similar series of objects discovered at St. Blane's Church, probably belonging to a civil

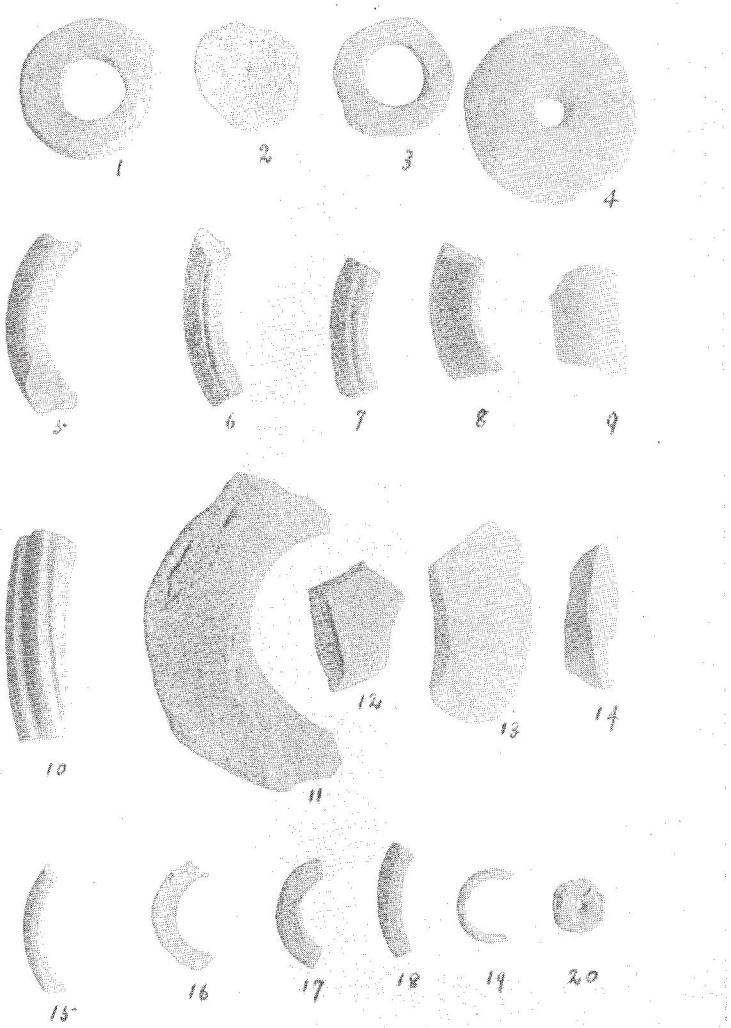


PLATE V. (½)

OBJECTS OF LIGNITE:—1, 2, 3, 4, 20, Perforated Discs. 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, Fragments of Rings and Armlets. 12, 13, 14, Chippings.

settlement anterior to the arrival of St. Blane who was a contemporary of St. Columba. At St. Blane's the evidence is that the manufacture of the armlets was carried on at the spot, which strenghtens the conjecture that the material was obtained *in situ* on the Island. This circumstance is not, however, absolutely convincing as at another set of workshops discovered at Port Patrick where the manufacture of jet armlets was carried on, there is no trace whatsoever of the material having been found anywhere in the vicinity of the workshop. At Port Patrick the workshops yielded many hundreds of lignite objects including a series of relics ranging from the slabs of the raw material, brought in to be worked up, to the finished articles. Objects broken during the process of manufacture were also found at Port Partick and at St. Blane's.

If Dunagoil were further explored it might also be shown definitely to have been a manufacturing site.

Objects of Glass.—Of these there is a small, flattish, globular bead of blue glass (B. 21), and the half of a dark blue object of dumb-bell shape (B. 20). The latter is a rare, but well-known type of glass relic and was perhaps used as a button, the thread having been, it is supposed, tied round the constricted waist and sewn on to the garment (Plate II., 8 and 9).

Flint Fragments.—Some eight fragments of chipped flint were found. These show primary but no secondary working. The largest dimension of any is an inch and a half. These were all recovered in No. 2 Site scattered about at levels from six inches to three feet down from the surface.*

Pottery and Baked Clay.—Among the clay and pottery objects a brilliant discovery was made. About 30 lumps of clay fired to a reddish tinge, except near the centre where the material is of darker aspect, show curious corrugations, and

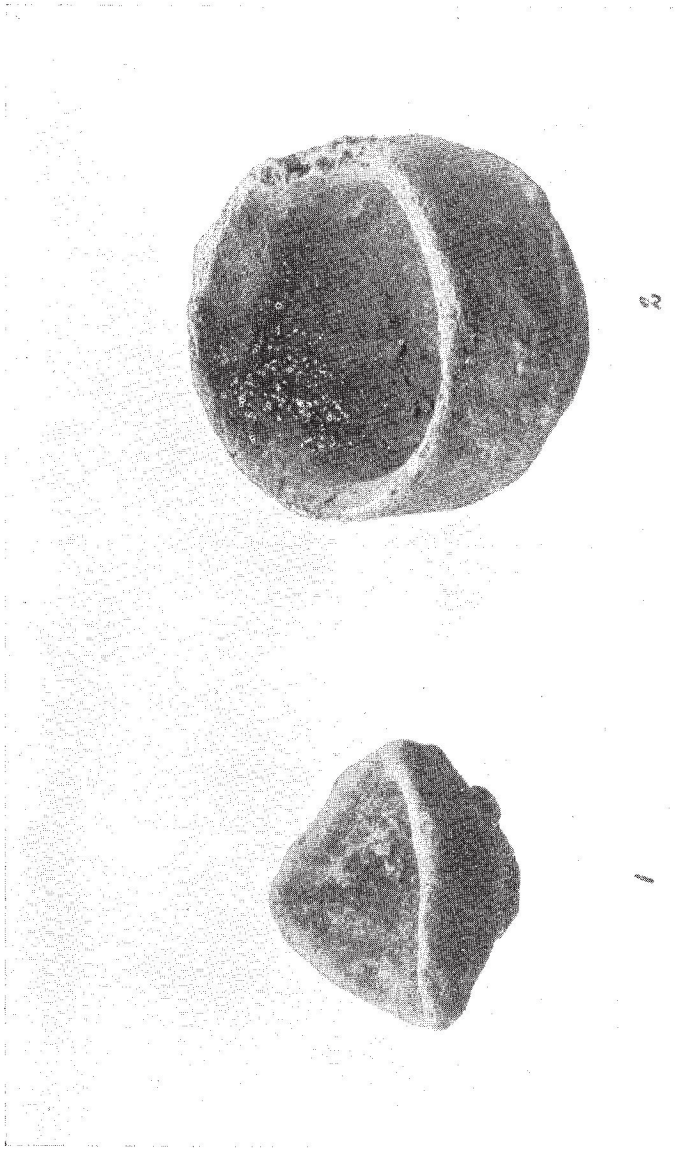
*Mr John Orr showed me in 1911 a flint flake ($1\frac{9}{16}$ in. long), without secondary working, and a fragment of a plain jet armlet (the external diameter of which had been $2\frac{1}{2}$ in.), which he had picked up at Dunagoil many years previously.

were at first sight taken to be fragments of ornamented pottery. They are, however, pieces of the clay, fire-injured, which has been plastered over wattle work. A very powerful searchlight, so to speak, is thus thrown upon the aspects of the interior of the fort while it was a going concern. These fired clay pieces have been portions of the walling or roofing of the huts which were therefore, at least partially, constructed of wattle-work plastered with clay. On the destruction of the dwellings by fire the roasted plaster fell down in pieces. Whether or not the huts within the Fort were fired intentionally or by an enemy, cannot of course be pronounced upon. The impressions upon the pieces are rather deep and show the imprint of rounded stems usually about the thickness of an ordinary lead pencil, but some indicate that the tree stems were more than one inch in diameter. The corrugations closely adjoin one another and are roughly parallel; in one case the corrugations occur on both sides of the piece. It says a great deal for the excavators that they were quick and shrewd enough to pick up these, apparently at first sight, unimportant objects. Only in one other Scottish fort have such things been detected, namely at Traprain, a discovery which was made almost simultaneously with these at Dunagoil (B. 22; Plate VII.).

There is a crucible, of triangular shape, with some bronze slag adhering to the inner wall (B. 18; Plate VI.).

The pottery from the fort consists of three fragments, two showing the nature of the rims, which have, like the cave pots, an everted, rounded edge. Like the ware from the cave, the fort pottery is plain, coarse, and badly made—the worst I have seen, but is very like the pottery found at the crannog in Bishop's Loch, near Glasgow, which was occupied about the beginning of this era.

Bronze Object.—An interesting object is a small, hollow, hemispherical relic of bronze with a small perforation at its base. If it is the terminal portion of a ferrule, or the ferrule itself, it is a small specimen (B 23; Plate II., 5).



(⅔)

Plate VI.

1, Three-sided Crucible, with bronze slag adhering, from Fort. 2, Cup-shaped Crucible, from Cave.

Lanarkshire. The earliest lignite ornaments were necklaces consisting of many scores of washer-like discs, finely graded in size, made of a lignite of the best quality, with exceedingly great skill and precision. These have been found in megalithic, chambered sepulchral cairns and date back to about 2,000 years before Christ. This type of necklace continued in use well into the Bronze Age.

During the 1500 years that Age endured, fine necklaces usually of barrel shaped beads were made. One of the most perfect and grandest examples was found some years ago in a semi-demolished cairn at Mount Stuart, with a food vessel and an inhumed female skeleton. The Dunagoil and St. Blane's lignite specimens are, however, later in period.

At St. Blane's was found a sandstone rubber having its rubbing surface worn into a concave shape which fits the outer and convex surface of the lignite armlets. Such a tool may have been used in the shaping of the armlets, though not in the process of polishing them. The supposed unfinished lignite object from Dunagoil has a distinctly striated surface as if it had been so operated upon. Unlike the worker of the South English shale, the Scottish lignite artificer did not use the lathe.

Judging from the number of lignite fragments and chippings which Mr Beckett and I discovered in recently disturbed surface soil in the immediate vicinity of that curious structure called the Deil's Cauldron, near St. Blane's chapel, about one mile distant from Dunagoil fort, there seems to have been a workshop at the "Cauldron" for the manufacture of lignite objects. Probably it was associated with the other workshop shown by excavations to have been carried on at the adjoining settlement of St Blane's.

As to Crucibles.—The crucible from the fort is three-sided, and that from the cave cup-shaped. Ancient crucibles are rare, the triangular forms being in the majority, at least in England. Such were more favoured than any others, perhaps because the cornered rim was found to serve like a spout, so facilitating the pouring out of molten material.

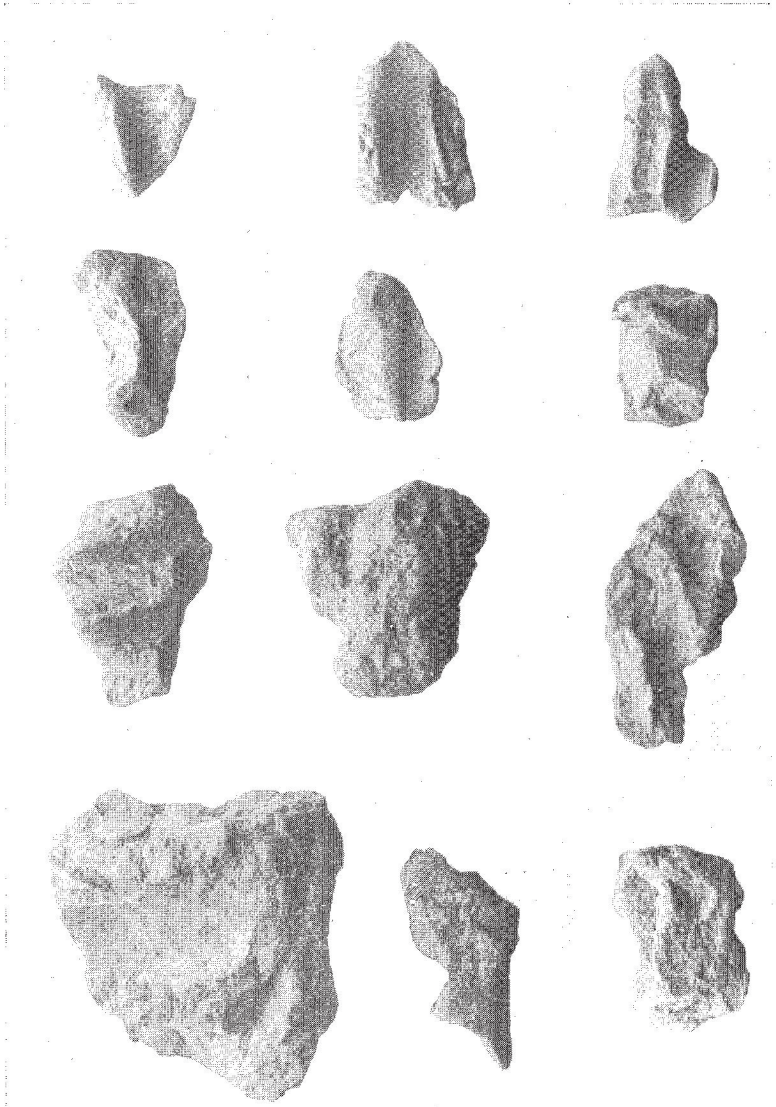


PLATE VII. (½)

Specimens of lumps of fire-hardened Clay showing the Impressions of Wattle-work, from Fort.

In the British Isles, nearly all the ancient crucibles have been found in sites occupied about the beginning of this era and not earlier, but some of a time as late as the ninth century have been discovered.

They have been found in Bronze Age sites in Spain, but none of that early period has been discovered in the British area.

Some of the British specimens have been found associated with Roman and slightly pre-Roman remains and with "late-Celtic" deposits. To many of these little vessels are found attached fragments of bronze slag. They have been used in the operations apparently of melting, alloying, re-melting, and refining bronze in the manufacture of the smaller objects such as pins, as a pin-head was found fused into the skin of one specimen. They were also used for melting vitreous pastes such as the famous red enamel of which a piece was found adhering to one example. The top usually bears traces of more intense heating than the sides and base, showing perhaps that the crucibles were occasionally placed in a slight hollow of the ground which somewhat protected the sides and base from the red-hot charcoal which was placed above the vessel and its metal contents. The heat was doubtless intensified by allowing the wind to blow upon the charcoal, or more probably by a blast which was forced by artificial means. Proof of the use of a blast in metallurgy in pre-Roman Britain has been obtained. In one case, that of the crucible found at Buston Crannog, Ayrshire, particles of gold were found adhering to the receptacle, proving that crucibles were employed by ancient workers in the precious metal.

The crucibles are usually small and very rarely larger than an ordinary tea-cup, and have nearly always rounded bases and thick and nearly straight sides. Some were perforated for suspension.

Some of the globular or circular type have been found with their rims pinched slightly at one point to form a spout, and others have handles, but all of them could be easily tipped

over when the molten contents were to be poured out. They are all of earthenware except one specimen of bronze. The fabric is often made in two layers, as if to reduce the risk of the vessel cracking under the severe heat. It is not every kind of clay that would be of use in making crucibles and it might be interesting to have a report upon the material composing the Bute crucibles and where it was most probably obtained.

In Scotland, of some twenty specimens, whole or broken, which have been discovered, five were found, all cup-shaped, three with handles, at Dunadd, a hill-fort at Crinan, Argyll, ten years ago; one in a kitchen-midden at Seacliffe; and some were discovered by Mr Alex. O. Curle during excavations at the Mote of Mark, Dalbeattie, two years ago. In various crannogs, as those at Buston, Airrieoulland and Dowalton, specimens have been obtained. The Mote of Mark was really a fort. The defensive walling and also the vitrifaction of some of its parts were works most probably carried out early in this era, as Roman ware was found on the site. But the crucibles seem to belong to a later occupation of the place about the ninth century. The brochs of the north country have yielded a good number of crucibles, and I obtained one on the site of a workshop at Port Patrick where jet ornaments were manufactured.

As to Wattle Work.—It has been shown that the huts within the defended area at Dunagoil were constructed of material other than stone, probably of wattle walls plastered with clay and with thatched roofs. It is somewhat strange to find that this daub and wattle method was used in Dunagoil where stone was plentiful, but perhaps it was easier after all to construct the huts of wattle-work than in the more substantial styles, and dwellings so constructed were doubtless quite comfortable. Further exploration may, however, disclose foundations of stone dwellings.

The huts of the "Azilian" or "Oransay" people were perhaps largely of wood, turf, and wattle, for the explorations of 1913 disclosed no stone structures but post-holes, as if indicating the huts were wood-built in part.

A village in Wigtownshire of late Neolithic period, say about 2,000 B.C., has been discovered. The houses were built entirely without stone, wattle work being used. This system seems to have survived through the Bronze Age right into the Early Iron Age, for fragments of wattle walling were found at Erskine Ferry on the Clyde associated with a crannog-like house, the period of which was probably immediately anterior to the coming of the Romans into the Clyde Valley.* The recovered pieces had fallen into the foundations of the structure and having been almost hermetically sealed by mud and water the fragments looked perfectly fresh when found. They will continue to be preserved as they are now hermetically sealed up—this time in glass vessels filled with glycerine—and coated with paraffin wax.

At Glastonbury, Somersetshire, as mentioned already, was a village of some 80 huts, in use from about 200 B.C. to 50 A.D. Wood-work, wattle-work, and thatch were solely used in the construction of the houses.

Adamnan states that St. Columba had his dwellings in Iona made of timber and wattle, and the same feature is known of the houses at the early ecclesiastical settlement at Lindisfarne. Dr. John Stuart† has exhaustively covered the field of literary references to ancient wattle-work in Britain, which since his day have been amply confirmed by excavations. It seems to have been general to have houses built of this character when they were within a defended area or when they were non-defensive structures. The recent excavations already mentioned, at East Linton, on the property of the Right Hon. A. J. Balfour, showed that the huts within the hill-fort of Traprain had been constructed of wattle-work.

The few classical writers who have described the houses of the ancient Britons agree that the houses were made of wattle-work, but undoubtedly there were exceptions, as in some of the islands of the Hebrides, where stones were plentiful

* *Scottish Exhib. of National Hist., Glasgow*, 1911, *Prehistoric Cat.*, p. 864, item 5.

† In the preface to *The Book of Deer*, pp. clviii.-cxlix., edited for the Spalding Club in 1869.

and wood perhaps scarce, even in proto-historic times, the early dwellings, of beehive shape, were built of dry-stone.

As to Vitrifaction. — An outstanding feature of the walling of the fort at Dunagoil is its vitrifaction. I believe that vitrifaction was a Scottish invention and scarcely spread at all outside the Scottish area. It was in vogue in the districts now the shires of Argyll, Bute, Dumbarton, Kirkcudbright, Berwick, Haddington, Forfar, Aberdeen, Nairn, Inverness, Ross, and Sutherland.

There are about 50 vitrified forts so far detected in Scotland. The number is doubtlessly greater but can only be disclosed after exploration. They are never found in England or Wales nor in Scandinavia notwithstanding the large number of forts in these countries. In Londonderry and Cavan in Ireland, there seem to be traces of vitrifaction at a few places. The vitrified sites in South Germany, the Rhine district, Hungary, and France seem to have an origin independent of those in North Britain, and some at least of the foreign sites are of comparatively late period, as one is built of brick, and an example in France disclosed a Roman tile encased in the vitrified material. The same idea was undoubtedly arrived at, also independently, in America where burnt earth or vitrified sites have been noticed in Wisconsin and the Mississipi valley.

So far as research has gone in Scotland the vitrifying of walling in early defence-works of stone was intentionally done; usually from the inside of the structure after the walling had been built, at least up to a certain height; and was a method of strengthening the stone-work by fusing at least some parts of it together especially where the available stones were small or at weak sections in the walling, and where the structure was placed either in particularly vulnerable position or on the rock itself or in shallow foundations. No flux has yet been detected as having been used in Scotland during the firing, and the wood fuel was apparently piled up against the wall inside at the section to be cemented. The firing caused certain rocks, often specially chosen and carried to the site, to come into the condition of a ropey

lava which acted like the lime of builders of the later period. Salt water and clay worked into a viscous mixture, poured over the walling to be vitrified and allowed to penetrate into the interstices and harden there, might assist the running together of the stones on the application of the great heat required during the vitrifying process; and careful examination of partly run walling and further analysis of the run material may throw light on this matter. At the vitrified sites in, say central Aberdeenshire, so far from the sea-shore, the application of salt in any form could scarcely however have been carried out. One dare not yet dogmatise about vitrifaction; but probably it was invented in the south-west of Scotland and spread thence to the north and east, but this is a problem still awaiting solution. As to the period when the method was first employed, this is a less difficult question to answer.

When in Scotland the use of bronze for weapons and tools began to give way before that of iron about three hundred years before Christ, there seem to have been active intrusions of combative peoples, and the creation, or enlargement and strengthening, of fortified places especially near the coast-line took place. Places inaccessible, precipitous, and of natural strength were enclosed with walling for defence. This was the time when Dunagoil perhaps was first fortified, and about this period, in the effort to secure themselves more thoroughly against attack, some ingenious person somewhere in Scotland fell upon the idea of cementing the stones together by fusing them. Perhaps he was a witness of the effect produced by the accidental scorching of certain kinds of igneous rocks, and thus obtained the idea.

This period was also ethnologically an interesting one. It long ante-dated the rush in early historic times to Scottish shores of Scandinavian colonists and raiders. At that time, so far as North Britain was concerned, the purely Pictish sway was being interfered with by the Brythonic Celts and perhaps even then by the Irish Goidelic Celts who slowly and gradually were pushing northwards from South Britain and north-eastwards from Ireland. If this outline of the racial phenomenon be correctly drawn, then vitrifaction was a Pictish invention but one probably independently made in Central Europe and in America.

Excavation work tends to demonstrate that the vitrified forts and sites are to be placed into a period distinct from that of the non-vitrified forts. The former were in use roughly from about 300 B.C. to the beginning of this era. This has been well determined by the exploration of two forts, Duntroon and Dunadd, in Argyllshire. They are near each other topographically. The former is vitrified and the latter non-vitrified. The people in the latter possessed chiefly rotatory querns for the grinding of grain, while the inhabitants of the former possessed chiefly an apparatus called the saddle-quern used for the same purpose but of more primitive type. From a careful consideration of the facts it seems to be demonstrated that the vitrified forts immediately preceded the period of the non-vitrified forts.

During the vitrified fort period the flint iudustry was rapidly dying, but the employment of flint survived for striking fire, and for simple scraping purposes. The few flint chippings, which are so far of no importance, found in Dunagoil bear this out, as well as the discoveries in other vitrified situations.

The beginning of the Scottish non-vitrified forts seems to coincide with the opening years of this era. Of course, most of the vitrified places would continue in use during the later times but if repaired or extended, then the later mason-work would not be vitrified, and this seems to be confirmed in the case of Dunagoil. Its occupation therefore was probably continued for several centuries into the Christian era.

In thus attempting to sketch the history of Dunagoil and of the different races which contested for supremacy in Bute, the question naturally arises as to why the system of vitrifying stone walling was given up. It was not, we may be sure, because of the cessation of the pressure of alien races attempting to subdue the older inhabitants. That pressure, slow and less acute in the Neolithic and Bronze Ages, became aggravated as the centuries rolled on. It was, perhaps, because the art of mason-builder improved, and the invention of other types of defensive structure no doubt helped to oust the vogue of the vitrified fort.

The name of the fort "Dun-na-goil" is most probably Goidelic, and seems to mean the Hill of the Strangers. Perhaps it has been corrupted from a phrase involving the genetive plural *nan*. As it seems clear that the fort was built prior to the coming of the Goidelic language, the name or names given to the fort in pre-Goidelic language or languages have been superseded and lost. One of these preceding languages was Pictish or Brytho-Pictish.

It would therefore appear that the designation was applied by the Goidelic Scots about 800 A.D., when the Norsemen began violently to harass that people and the West Coast of Scotland. The Norsemen seemed indeed to have gained the upper hand in the island of Bute for a period of about several centuries until their collapse at the Battle of Largs. It may therefore have been the Norsemen who were the "goil" or strangers and that the natives of Bute called the Fort after them, on the Scandinavians becoming masters of the situation in the ninth and tenth centuries and taking possession of the strongholds.

At No. 2 Site the depth of the soil, which was fine, rich and dark, but contained very few osseous fragments, was about three feet. Near the centre of the small area dug into were found about two feet under the surface two long stone slabs set on edge a few inches apart. Over them was laid a long, flat stone. This flue-like structure extended for five feet and contained a deposit of from one inch to six inches of wood-ash, charcoal, and soot. It will of course be the subject of further examination.

In excavating the old inhabited area in or around Dunagoil it might be possible to detect the different layers of occupation which should thus range in time from about 300 B.C. to about 900 A.D. or a period of about twelve centuries. This detective work would call for the greatest care and skill.

Owing to the carefulness of the examination at Traprain already referred to, the fort there was made to disclose interesting results in respect of its occupation at different periods, many different hearths and surfaces having been discovered at different depths one above the other.

It is eminently desirable that these highly successful explorations in Bute should be continued, so as to strengthen the light which is now shed on the fascinating problems of the human occupation of the Island—how 2,000 years ago the Island potter and metallurgist plied their arts, how the house-builder manipulated his clay-plastered wattle, how the mason fortified his dry-stone walling, how the craftsman in jet and lignite cut, polished and decorated his art products, while the women prepared the clothing and food—even down to the minutiae of sewing on glass buttons and the heating of the water for household purposes.

[Since these notes were prepared, further diggings have been carried on at the fort. Traces of built structures within its area, and many relics have been disclosed, which will fall later on to be described. The relics found in the later exploration are of the greatest value; but their evidence tends to show that the range of occupation was from about 300 B.C. to about 75 A.D. Hence there is called for another explanation of the derivation (discussed on page 83) of the word Dunagoil.]

LIST OF THE MORE IMPORTANT OBJECTS, SOME WITH THEIR DIMENSIONS. *When the Relic is illustrated, the Plate and its number on the Plate are quoted.*

A.—CAVE.

1. Tine of deer-horn, sawn across thicker end; $2\frac{7}{8}''$. I.—1.
2. Eight small pin-like bones; $1\frac{1}{4}''$ long.
3. Two bones, each the lateral process of the lumbar vertebra of an ox; $6\frac{1}{4}'' \times 1''$. I.—6 and 7.
4. Two stone pounders.
5. Hearthstones; from 13″ to 16″ long and from 8″ to 10″ broad.
6. Spinning whorl of stone; $1\frac{1}{4}''$, aperture $\frac{3}{8}''$. II.—2.
7. Bronze Sheeting; $2'' \times 1\frac{1}{4}''$. II.—4.
8. Pottery fragments.
9. Crucible, cup-shaped; $2\frac{3}{4}'' \times 2\frac{1}{2}''$. VI.—2.
10. Iron blade; $6\frac{3}{4}''$ long.

B.—FORT.

1. Chippings of Flint.
2. A bone pin; $3\frac{1}{2}''$. I.—2.
3. Three bone pins; each 3″. I.—4 and 5.
4. Bone plate, toothed; $1\frac{1}{2}'' \times 1\frac{3}{8}''$. I.—3.
5. Smoother of Stone; $5\frac{1}{4}''$ long. IV.—2.
6. Hammerstones of various sizes. One is shown on Plate IV.—1.
7. Pebble used as polisher of white quartz; $2\frac{1}{8}'' \times 1\frac{3}{4}''$. IV.—5.
8. Oval piece of sandstone.
9. Whetstone; $3\frac{5}{8}''$ long. IV.—5.
10. Whetstone; $3\frac{1}{8}''$ long. IV.—3.
11. Rectangular smoother of sandstone; $11'' \times 3''$. III.
12. Slate disc; $1\frac{1}{2}''$ diameter. II.—3.
13. Slate disc, broken. II.—1.