The Excavation of a Midden in the Culbin Sands, Morayshire

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with a contribution by G. Bailey on the animal remains

The Culbin Sands today occupy an area of coast about six by three kilometres immediately west of Findhorn Bay. Most of the sands have been stabilised by forestation and in this area lie numerous archaeological sites including the midden reported here. Various archaeological investigations in the Culbin Sands have been carried out in the past, but generally without establishing durable reference points, so that most of the locations of archaeological finds are now lost. Useful surveys of archaeological sites in the Culbin Sands are those of Black (1891) and Callander (1911). More recently, details of Neolithic and Bronze Age finds made in the Culbin Sands have been made available in Walker's work on the prehistory of Nairn, Moray and Banffshire (1966).

The history of the Culbin Sands and its effect on medieval occupation in the area is well-known and need not be discussed here, but it might be noted that little evidence of the rate of growth of the Culbin Sands is available; the earliest record of inundation by the sand is *c* AD 1100, but the stratigraphy of the site to be described here, and observations elsewhere in the area, suggest that the build-up of the sands on a large scale began in earlier times and has not been a continuous process. The difficulty here is basing a generalised statement on localised evidence. Records show that fierce gales early in 1695 over-ran four farms in the general area in question. In an act of Parliament of the same year, a conservation law was passed forbidding the pulling of bent, juniper and broom bushes from the sand-hills, citing the Culbin catastrophe as what would happen if the law was ineffectual (Callander 1911, 170). The distribution of archaeological finds from the Culbin Sands does not indicate that the sands have been gradually built out into the sea, such as is occurring today in east Fife (Tentsmuir). Both Bronze Age and medieval material have been found near the present coastline, and there is no distributional pattern of finds to indicate the former presence of a well-defined coastline much different from that of today.

The area today consists of a series of low sand-hills running generally south-west to north-east, separated by sheets of more or less level sand along which most of the present tracks run. The lower sand surfaces occasionally contain deposits of thermally-shattered beach pebbles, representing natural beach debris, exposed through wind erosion of the original sand covering. These do not appear to represent areas of former human occupation. The constant removal of sand by wind, now somewhat curtailed by forestation, has yielded remains from all periods which have attracted collectors for many years. Callander in 1908 bemoaned the disturbance, by these collectors, of the top layers of almost every site he visited. Today, sites suffer from the same destruction and the midden reported here seems to have been particularly unfortunate.

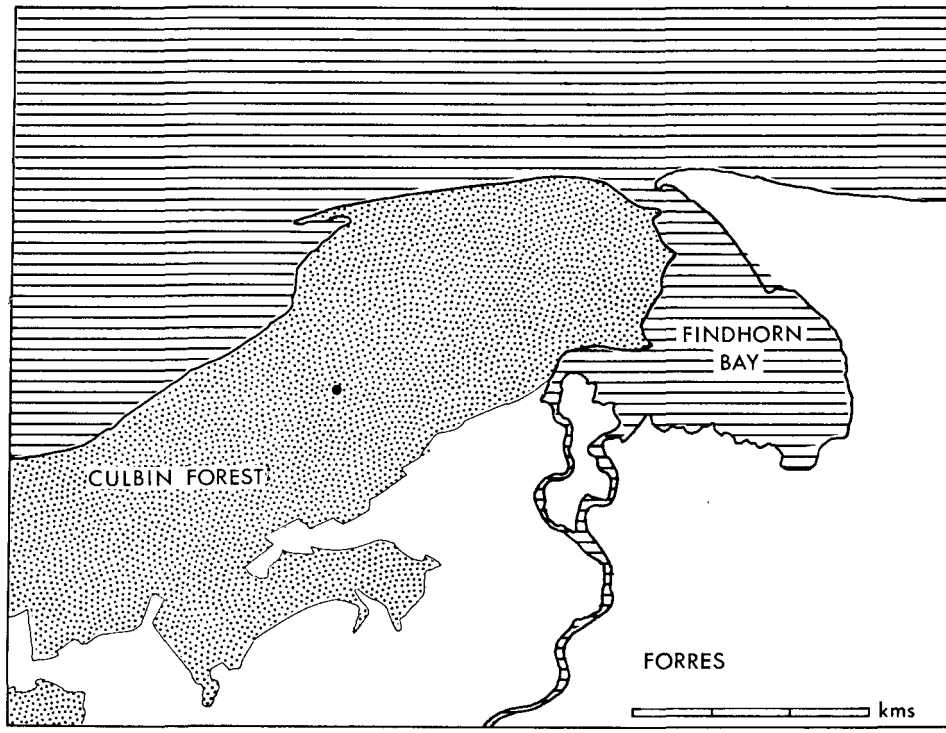

FIG 1 Map of Culbin Forest with site marked

The Culbin midden (Grid Reference NH 99136233), excavated by the authors in May and June 1970, lies in the southern area of the Culbin Sands, and is approached through the farm of Wellhill. The site (fig 1) is now 1200 metres from the coast, and is not likely to have been much nearer in the time of its occupation. No water-deposited sand was observed in the course of excavation so presumably the midden was always above water. Its approximate height is 9 m OD. In the immediate vicinity of the midden are numerous patches of water-worn pebbles, many naturally split, lying between the wind-blown dunes. These pebbles are predominantly of white vein quartz and mildly micaceous quartzites of varying metamorphised conditions, similar to those found within the midden. No flint nodules were observed in the area. The midden itself has an extensive wind-deposit of sand over it, which supports numerous pine trees (see plan, fig 2).

In 1967, the central area of the midden was dug by Mr James Watson, who recovered quantities of potsherds and animal bones. This material was shown to Mr R B K Stevenson of the National Museum of Antiquities of Scotland; in 1967, one of us (J M C) visited the site with Mr Watson and it was decided to conduct an excavation to recover details of the stratigraphy. This was carried out in 1970, but, between the termination of Mr Watson's excavation and 1970, persons unknown cut fresh trenches radiating from the central excavated area along the lines of A, B and C on the plan (fig 2). In the circumstances, it was clear that an area excavation of the midden, to recover evidence of postholes, tentatively reported by Mr Watson, was impossible. Fortunately, the position of trench A seemed to be in an area of prior disturbance, C probably had only an inch of tailing midden visible in opposing sections, and B, for reasons unknown, was not carried through the sterile over-burden, but stopped well within it. This permitted the

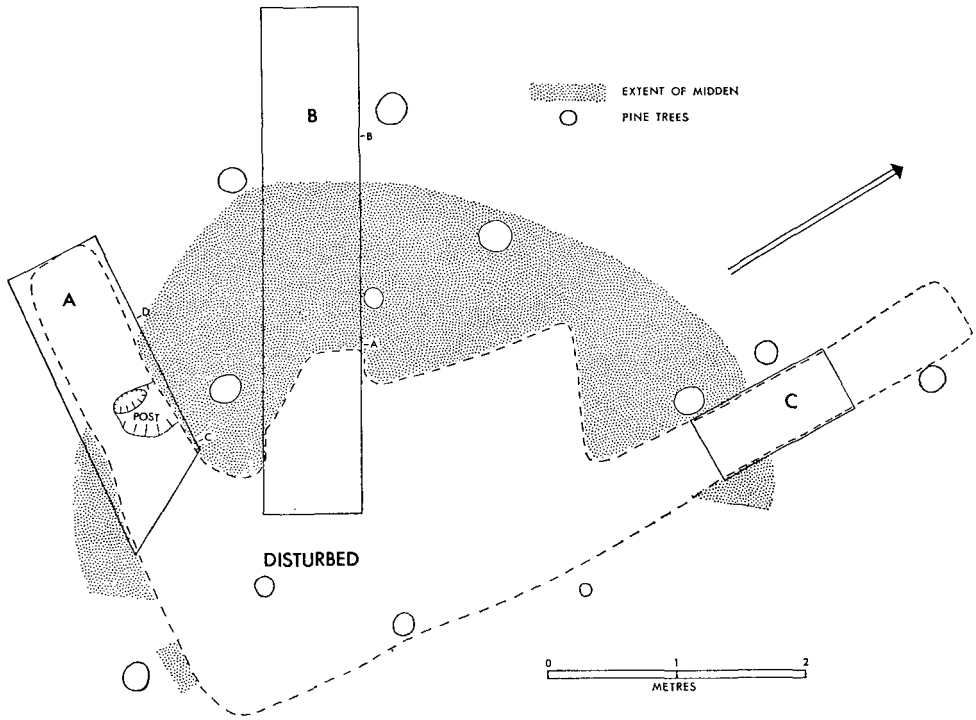

FIG 2 Plan of the Culbin midden

deepest part of the remaining undisturbed midden to be examined in trench B, and the re-cutting of the section and excavation of the remaining undisturbed portions of trench A. The growth of trees over the midden dune prevented complete excavation in 1970, just as it had probably prevented total destruction of the site in the years between 1967 and 1970.

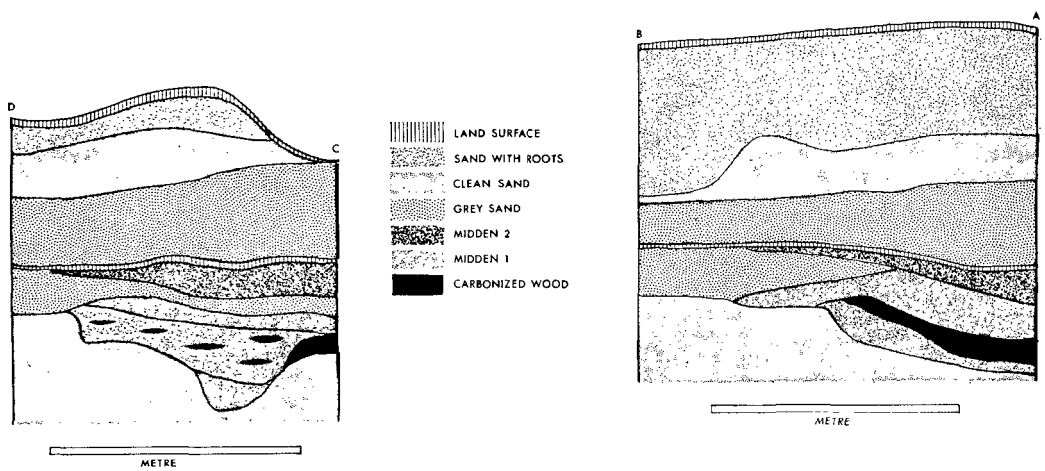

FIG 3 Sections of the Culbin midden aligned on same datum

The excavations in 1970 succeeded in clarifying the stratigraphy of the site, and the observations are recorded in two sections (fig 3), one of these (C–D) representing the series of deposits excavated by Mr Watson, the other (A–B) indicating more clearly the basic divisions of the site into several phases of deposition. The deposits were removed layer by layer, and various samples were taken for further laboratory work.

The lowest occupation deposits rest upon clean white wind-blown sand. Above these lie stained sand with charcoal, shells, animal bones and potsherds, forming Midden 1. This is clearly divided into two by a thick layer of carbonised wood particularly well marked in section A–B; wood from this yielded a date of 1259 ± 75 BC (Q – 990). There is no evidence to suggest that the stratigraphical division is chronologically or culturally distinct. In section C–D, Midden 1 was more complex, and the carbonised wood deposit had been re-worked in antiquity probably in the excavation of a shallow pit. The original trench A had not penetrated completely through the occupation deposits, and the floor of this trench showed a marked hollow, which had been excavated through the lower part of Midden 1 and the carbonised wood deposit. This hollow, projected onto the section C–D (fig 3), sloped upwards towards the midden centre, and ended in a narrow slot, measuring 25 × 18 cm, set against a sterile wall of sand to the west. The post-slot, for this is presumably its function, was filled with collapsed occupation debris from Midden 1. It is likely that it was dug before the upper part of Midden 1 had been deposited, but as only the base of the hollow was observable, its overlying deposits having been cut away in earlier excavations, its precise association must remain uncertain.

It seems likely that the entire Midden 1 deposit represents a single phase of occupation of the site, marked first by a deposit of midden material in sand, then by the remains of an extensive fire, and followed by upper deposits of shells, bones, and other debris. This occupation covered an area of approximately 4 × 5 m. Subsequently it appears that the site was abandoned, and wind-blown sand accumulated upon much of the deposits before the second and final occupation took place. This is represented by a much thinner but denser midden deposit, Midden 2, separated in Section C–D from Midden 1 by sand, but partly resting upon Midden 1 in Section A–B. The interval of time between these two occupations is not likely to have been great and could have been as short as the time required to accumulate a 6 cm deposit of sand, i.e., perhaps one or two seasons. No finds of bone or potsherds were made in this upper midden, either by Mr Watson or in 1970; the differences in shell content between Midden 1 and 2, noted below, may point to some chronological and/or economic separation.

Following this occupation, the site was abandoned, and a period of local stabilisation occurred, during which a land surface developed on top of the midden and its surrounding sand. This was clearly marked by an old turf line, probably originally consisting of mosses comparable to those now capping the entire site and much of the Culbin Sands. Thereafter, further wind-blown sand accumulated upon the site, drowning this old land surface; the deposition of this sand seems to have been sporadic but it is possible that the white clean sand at the top, partly penetrated by rootlets, was deposited during the fierce gales of the late seventeenth century, referred to above.

ORGANIC REMAINS

Unfortunately, pollen was not recovered in sufficient quantities from any of the deposits to allow firm conclusions about chronology or environment. Pollen grains of pine were noted from the base of Midden 1 and from the sands overlying Midden 2; birch occurred throughout both Midden 1 and 2. Both trees now grow in the Culbin Forest.

All of the deposits were predominantly of wind-blown sands, including the sterile white sands at the base of the midden. There were higher phosphorus fractions in Midden 1, accounted for by the animal bone content, and in the old land surface on top of Midden 2. High calcium fractions and high pH values in both Midden 1 and 2 represent the shell content.

Present in the burnt horizon of Midden 1 were seeds of goosefoot (*Chenopodium album L.*), black bindweed (*Polygonum convolvulus L.*), sheep's sorrel (*Rumex acetosella L. sensu lato*), corn spurrey (*Spergula arvensis L.*), bedstraw (*Galium sp.*), persicaria (*Polgonum* cf *persicaria L.*), chickweed (*Stellaria media (L.) Vill.*), and a few fragments of cereal (too damaged for identification). All but the bedstraw were used as edible components of impoverished diets in the Bronze Age and Iron Age. Some, for instance goosefoot, have been found in pot-fulls on Iron Age sites, indicating a role of some significance in the diet (Helbaek 1952). Of all the 95 seeds recovered, there were 63 of goosefoot and 20 of corn spurrey, suggesting these were actively collected and brought to the site. All of these seeds were common in the first millennium BC, except spurrey, which is generally known only from Roman and post-Roman sites (Godwin 1956, 93), although earlier traces exist (Coles 1971, 360).

In the lower levels of the excavation a large number of shells were recovered. Four main species are represented, all of which are edible:

Cerastoderma edule	edible cockle
Mytilus edulis	edible mussel
Littorina littorea	common periwinkle
Ensis sp.	razorshell

The shells of two land-snails and a fragment of crab claw were also identified. A bag of soil was passed through a 1 mm sieve to check for evidence of small fish bones but none was found.

In order to compare the proportional representation of the different species throughout the midden, all shell remains were grouped according to species, cleaned and weighed. The results are shown in Table 1. Although the ratio of meat-weight to shell-weight may vary in different species, it is considered that results expressed in terms of shell-weight alone are sufficient to indicate general features in the composition of the shell-heap (see Coles 1971, 358 for experiments on shell to tissue weights of these animals).

The condition of the shells was variable, with *Cerastoderma* and *Littorina* represented largely by whole specimens, whereas *Mytilus* and *Ensis* occurred mostly as fragments. It is probable that this difference is due to the inherently more fragile nature of the shell case in the latter two species, rather than to any difference in the uses to which these shells were put. However crushed mussel shell was used in the manufacture of pottery found at the site and this may be a factor contributing to the fragmentary representation of this species.

218 whole *Cerastoderma* valves and 471 whole specimens of *Littorina* were examined for traces of wear or utilisation but showed no clear evidence of this, and it is evident that these two species were collected for their food content. It is probable that this was also the primary motive in the collection of *Mytilus*, in view of the high proportion of shell preserved, although the use of the shell in pottery-making must be taken into account. The remains of *Ensis* were too fragmentary to indicate whether they were derived from worn specimens picked up casually on the beach, or from live specimens collected for food. Species of razorshell are burrowing creatures which normally occur low in the intertidal zone or in the sublittoral, and are only easily collected when exposed by spring tides or thrown up by storms. At any rate the low representation

TABLE 1

REPRESENTATION OF SHELL SPECIES BY WEIGHT

Batch No.		*Cerastoderma edule*	*Mytilus edulis*	*Littorina littorea*	*Ensis Sp.*
TB2	U	6*	932	397	15
TB3	U	4	640	166	6
TB6	U	–	531	252	1
TB7	U	2	572	184	4
TA14	U	3	481	236	37
TB1	L	30	7	–	–
TB4	L	87	21	19	–
TB5	L	69	6	6	2
TB8	L	133	111	12	13
TB9	L	94	22	12	4
TB11	L	84	143	13	22
TB12	L	49	8	10	2
TB13	L	27	9	6	2
TA15	L	18	85	2	2
TA16	L	40	5	7	1

* All weights were measured to the nearest gram

U = Upper Midden

L = Lower Midden

of this type throughout the shell levels suggests that it did not form any significant contribution to the food supply.

All the species could be obtained from the area adjacent to the site at the present day, either from the foreshore off Culbin, or from the nearby estuary of the River Findhorn. If distance is a reliable indicator, it is probable that the majority of the shells were collected from the former area, which, at the present day, is 1200 metres from the site, whereas the nearest point on the estuary is nearly twice the distance. The Culbin littoral with its gently sloping sand platform and shingle beds could have supported all the species recorded above.

Although the complex local changes of shingle and dune formation recorded for the area (Steers 1937) suggest that the modern situation may not be an accurate guide to the prehistoric environment, it is unlikely that the marine resources were much closer to the site in the second millennium BC. Shingle bars formed by wave action have been noted in the area of the site (Steers 1969, fig 34), representing the surviving indicators of a complex evolution of the coastline; the extension of the land seawards from a 25-foot beach (Steers 1969, 138), and dated to between *c* 5000 and *c* 3000 BC (Scott 1970, 117), predates the Culbin site according to the distribution of prehistoric material recorded above.

Although all four species are represented throughout the midden, there is clear evidence of a change in the dominant species (Table 1). In the lower midden *Cerastoderma* forms an important contribution to the food supply, whereas in the upper midden it is virtually absent, its place being taken by *Mytilus* and *Littorina*. Although individual sample sizes are small, and the area of the mound sampled by excavation is also small, the same trend is recorded from different trenches, and the difference in shell-representation is sufficiently clear-cut to justify further discussion.

The change in economic exploitation may have been caused by three factors: over-exploitation of the cockle-beds, changing economic preference, or changes in the littoral environment. Where over-exploitation occurs, this is usually indicated by a progressive diminution in the size of individual cockles. Whole valves from a series of samples were measured and the resulting

values were ranked in graphic form. This simple test failed to indicate any significant size variation between the different samples. More precise statistical tests were considered inappropriate for the limited data. The available evidence then yielded no visible indication of size-diminution over time which might be taken as evidence of over-exploitation.

A more likely explanation for the disappearance of the cockles may be changes in the littoral environment. Cockle-beds are particularly susceptible to a variety of destructive physical agencies such as frost, storms and silting (Wright 1926, 18). Even slight disturbances may be sufficient to remove the basis of a cockle economy. Such changes have been noted at Traigh Mhor on the Isle of Barra, where recent numbers of cockles were much reduced by comparison with figures for the last century. The cause of this is apparently increased wave-action leading to deposition of coarser sand particles which are inimical to the settlement of cockle spat (Mason 1970, *in litt.*).

Evidence quoted above suggests that the coastline of the Culbin area is a relatively exposed one, subject to the movement of large quantities of shingle and sand by coastal drift. Much of the sand is derived from the Findhorn river which is susceptible to severe winter flooding (Steers 1937, 507). Relatively unstable conditions of this nature, which might easily change the structure of a cockle-beach in the vicinity of the Culbin site, appear to have been a general feature of the area for long periods, and it seems most reasonable to attribute the disappearance of cockles from the shell economy to changes in the local shore environment rather than to any other factor.

Only a small collection of bone was recovered, representing a total of 93 fragments. The identification of these is indicated in Table 2.

TABLE 2

Level	*No. of identifiable fragments*	*Total no. of frags*	*Species identification*
Midden 1	3	25	Sheep/Goat
Unstratified	42	68	Sheep/Goat, Pig, Cow

The greater part of the bone material was obtained in the earlier excavation and lacked evidence of provenance. Of the 25 fragments which were stratified, all were in definite association with Midden 1.

Although the sand and shingle formations of the area are unlikely to have supported very rich grazing in the vicinity of the site under natural conditions, there are local exceptions to this picture; the area adjacent to Buckie Loch, immediately north of the site, supports a luxuriant vegetation at the present day (Steers 1969, 145).

A conclusive estimate of the relative contributions of marine and land resources to the diet of the shell-gatherers cannot be given on the basis of the excavated data. However in Table 3 the estimated minimum meat content of the prehistoric shells is compared with the meat weight of a single carcase of an adult sheep and an adult cow.

TABLE 3

Meat source	*Weight of meat*
Total of excavated Culbin shell	min. 2·8 kgs
Adult sheep	56·7 kgs
Adult cow	408·2 kgs

The figure for the molluscan meat weight was arrived at by halving the total shell-weight of the midden. The proportion of meat-weight to shell-weight may in fact be considerably less

than 50%, and varies according to the season of the year in the case of some bivalve species. However an overestimate is considered preferable, since the aim of the figures is to demonstrate the relatively low yield of shell-meat; it may also offset errors introduced by loss of weight of shells which have been buried in the ground for long periods (Shawcross 1967, 122).

INORGANIC REMAINS

Throughout the midden, flat beach pebbles occurred, some fractured thermally, others intact, and only one piece showed traces of utilisation. This piece, a pebble split along a natural fracture plane, had three flake scars along a lateral edge, and these scars might have been produced through pressure in the twisting action necessary to open large bivalves. Most of the pebbles were friable, micaceous quartzites, but pebbles of white vein quartz, biotite-garnet

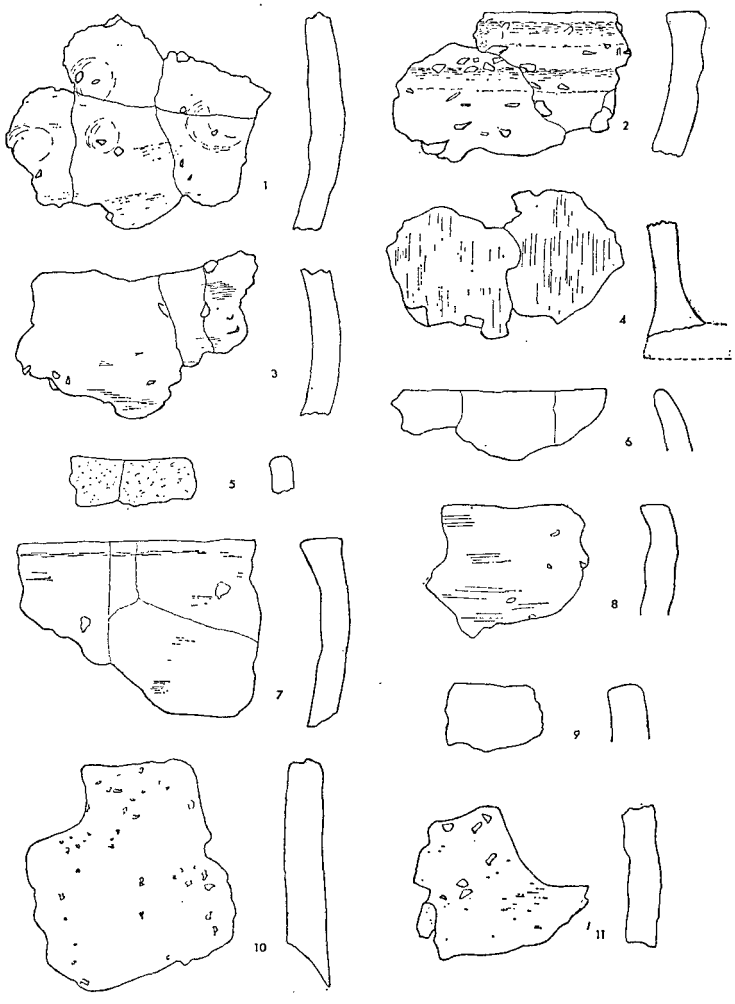

FIG 4 Pottery from the Culbin midden; scale 1:3

gneiss, and pure white quartzite also occurred. These were available from beach deposits in the immediate vicinity according to the present distribution of stone scatters in the Culbin Sands. No flint nodules were observed in stone scatters in the immediate area. All of the pebbles, however, must have been introduced into the site by human agencies, and the sole explanation for their consistent appearance throughout the midden must be that they had been used as pot boilers; a number were fire crackled but the remainder were of such a friable nature that they would have shattered at the first introduction of heat.

Eleven pottery vessels are represented by the sherds recovered in 1970 and in earlier excavations. Only three sherds were found in 1970, and these were associated with Midden 1. In the following report we assume that all of the pottery was of this occupation; no finds of pottery or bone were made from Midden 2, and the overlying deposits were entirely sterile.

The pottery from the site consists of rather crudely finished pots in two distinct fabrics. Both shell and flint grits were used, giving marked differences to the binding properties of the fabric. The shape of the vessels, use of slurries, colouring of the sherds, and poor firing, however, suggest the simultaneous use of the two wares. The large size of the flint grits, and their smooth sides, form a poorly-bonded pottery; shell grit has greatly superior cohesive properties. The facts that no flint was immediately available in the area of the site, and that only three flint-gritted pots were found, suggest that this ware may have been made away from the site. The shell-gritted ware, represented by eight pots, is likely to have been made locally; the sherds recovered in the 1970 excavations were all shell-gritted. Both wares are of similar clay, and this suggests that the grits may reflect seasonal changes in potting sites. The clay used is not immediately available in the area of the site today, and could have been recovered either from glacial deposits or river beds.

Probably six of the eleven pots from this midden resemble Callander's 'can-shaped vessel' (Callander 1911, 165–6, fig 2), which he recovered from another midden in the Culbin Sands. The pot had a slightly thickened, flat rim, 13·34 cm in diameter, with straight sides 1·64 cm thick, 14·6 cm high, and ended in a base with a slightly protruding foot (pl 9). The three flint-gritted vessels from the present midden were all of this shape. The base sherd (fig 4, 4) suggests a larger pot with a slightly protruding foot, straight sides, and an approximate external base diameter of 23 cm. Another vessel (fig 4, 2) was 20 cm in rim diameter. The eight shell-gritted vessels from the midden show more variation in shape. Along with two, possibly three, flat-rimmed vessels, there are sherds representing smaller, thinner vessels with rounded rims and more pronounced curvature of the sides, suggesting bowls with slightly incurved rims, but the absence of base sherds does not permit a full reconstruction for this type.

Flint-gritted ware

The size of flint grit is astonishingly large. The potters incorporated in their clay intentionally broken flint grits that average about $4 \times 5 \times 8$ mm, but range from smaller to as large as $15 \times 14 \times 7$ mm. A piece of friable quartzite of large dimensions, $22 \times 10 \times 9$ mm, fell from one sherd fragment. Re-used pottery grit is also included, equally large, suggesting the potters did not understand the bonding properties of the grit, which, if crushed smaller, would have markedly improved the bonding of the fabric. The vessel surfaces, particularly the exterior, were heavily slurried before firing to smooth the surface. Thumb-sized depressions at random over the exterior of some pots (fig 4, 1) suggest the potter attempted to push some of the protruding flints back into the wall of the pot. Fine lines, usually horizontal, but sometimes vertical, and frequently in more than one direction on the same pot, show the course taken by the potter's hands as they moved over the pot while finishing it (fig 4, 4, 7, 8). Except for those fine scratches in the wet

slurry, and the occasional grooving by the thumb near the rim (fig 4, 2), the vessels are devoid of ornament. The thickness of the walls, in all cases over 1 cm, suggest that the fabric thickness was an attempt to overcome the mechanical weakness produced by the flint.

The poor, uneven firing of some vessels produces a patchy buff and grey exterior and a grey interior; these were probably fired in an open hearth. Sherds from another pot (fig 4, 1, 3, 11) with a sooty charred interior over a buff slurry, certainly indicate that this vessel was placed directly in the open hearth; this particular pot was probably coil-made (fig 4, 3). The overall dark grey colour of a base sherd (not drawn), suggests firing in a reducing atmosphere, possibly by inverting the vessel.

Shell-gritted ware

Shell-gritted pottery varies in the amount of grit used and the size of crushed mussel shell. Most contained considerable grit of all sizes with an average of $2 \times 2 \times 0{\cdot}5$ mm, but varying from $1{\cdot}5 \times 1{\cdot}5 \times 0{\cdot}2$ mm to $7{\cdot}1 \times 4{\cdot}5 \times 1{\cdot}5$ mm. Because of the nature of the grit, the ware appears more finished and more adaptable to variation of wall thickness and shape in the estimated eight examples of pots from this site.

Three sizes of vessel appear to be represented: a large storage jar with flat rim and straight sides (fig 4, 9, 10), a medium size jar (fig 4, 7, 8), and a smaller, bowl-shaped pot (fig 4, 5, 6). The larger vessels have a thickness of about 15 mm and one of the large pots (fig 4, 10) was coil-built. A small rim sherd (fig 4, 9), found in the 1970 excavation, had no apparent slurry, but a large vessel (fig 4, 10) had been slurried on both sides. Again, as in the flint ware, patches of grey on the buff exterior of one vessel (fig 4, 10) suggest open hearth firing with the pot upside down. The contrast between the buff and grey colour of the fabric seems to have physical properties as well, weakening at the junction of the two. Frequently the buff slurry, particularly on flint-gritted wares, separates from the rougher internal fabric, and its weakening in the above instance suggests this may be a feature of the firing rather than the ineffective bonding of the ungritted slurry to the gritted interior.

A smaller flat-rimmed vessel (fig 4, 8) was approximately 25 cm in diameter, with a slurry applied over the shell grit. Although it has a variable thickness and an irregular finish to the interior just beneath the rim, it is one of the better made pots from this midden. Two smaller vessels (fig 4, 5, 6), probably bowl-shaped, have thinner (7·3–10 mm) walls than have the vessels with flattened rims.

From the 1970 excavations at least two other thin-walled vessels are represented. One vessel, with a wall 9·4 mm thick, has a heavily-slurried buff surface not well joined to the rest of the sherd. The other vessel is a buff coloured pot with a wall thickness of 6 mm, and probably had straight sides. Sherds from one vessel of undetermined shape were almost devoid of shell grit, but had a slurried surface and possible finger-grooved decoration that was inconsistent around the circumference (fig 4, 8).

The pottery from the Culbin midden belongs to the group of wares generally called 'Flat-Rim pottery'. The first expression of the theory that Flat-Rimmed pottery existed as a discreet entity was made by Benton in 1931, in her assessment of the material from the Sculptor's Cave at Covesea, only 17 km to the east of the Culbin Sands. In her report, the association of exotic bronzes and pottery with flattened rims was taken to illustrate the immigration of a group of people into north-eastern Scotland and not otherwise represented in Britain. This idea was accepted by many prehistorians, but the precise nature of the pottery in question was never distinguished from the great quantity of rather coarse wares that were gradually added to the Flat-Rimmed family. This included material from Ireland and northern England as well as

Scotland. Various statements on aspects of these wares have appeared from time to time (Proudfoot 1956; Griffiths 1959; Coles 1962, 1964), and regional groups were identified (Coles 1960).

All of these were firmly considered to be of the first millennium BC, and in the original report of the excavation of the Recumbent Stone Circle of Old Keig, Aberdeenshire, Childe demonstrated the primary position of Flat-Rimmed sherds in this monument (1934); he later contradicted this (1939), without actually demonstrating that the original stratigraphical observation was incorrect. We now consider that the primary position of this pottery at Old Keig is entirely reasonable; it is only the presumed first millennium date for the ware that seems incorrect.

The basis for this statement is the recognition of western Neolithic pottery at Loanhead of Daviot, another Recumbent Stone Circle, associated with Flat-Rimmed pottery (Henshall 1963, 29), similar associations on an old land surface under the Neolithic barrow of Pitnacree, Perthshire (Coles and Simpson 1965), and, most recently, at the multiple stone circle of Croft Moraig, Perthshire (Piggott and Simpson 1971). These undoubted associations of two different types of pottery, a burnished western Neolithic ware and a coarse sandier Flat-Rim ware, demonstrate the existence in Scotland of a single native pottery tradition in the third millennium BC, using both fabrics, possibly for different purposes. The coarse pottery element also appears at the Neolithic site of Easterton of Roseisle, Morayshire (Walker 1968), and at the stone circles of Monzie (Young and Mitchell 1939) and Scone Wood (Stewart 1966), both in Perthshire.

On the other hand, there can also be no doubt of the existence of Flat-Rimmed pottery in the first millennium BC in Scotland, at a number of sites, including Dalnaglar (Stewart 1962), Dalrulzion (Thorneycroft 1933), both Perthshire, and Covesea, Morayshire (Benton 1931; Coles 1960), although the dating of these and other sites is not so well attested as one might assume. The association of this pottery with bronzes at Covesea is, however, incontestable. It is surely significant that the pottery from these three sites, two of which are only eight kilometres apart, represents the products of three different potters, using different materials and preferring different shapes and firing procedures (Coles 1962). The existence of pottery generally of the Flat-Rimmed type is therefore documented on sites of the third millennium BC and the first millennium BC, and the radiocarbon date of *circa* 1200 BC for the Scone Wood stone circle, allied to that from the Culbin midden described here, suggest that if other second millennium sites were excavated, more such coarse pottery would be recovered.

It is obvious that the mere existence of Flat-Rimmed pottery on any site cannot be employed for dating. The grouping of such pottery into related families also seems to be highly suspect at this time, and the association of exotic bronzes, of the seventh century BC, with coarse pottery at Covesea, need not necessarily represent immigrants in north-east Scotland, but is perhaps only a further example of the existence of exchange patterns between prehistoric communities. The Covesea phase in the Scottish Late Bronze Age was originally devised as a phase of imported metalwork, and probably should remain only this (Coles 1960).

The Culbin pottery recovered from the midden shows some internal variation in the pot-shapes, sizes and fabrics, but the lack of distinct characteristics such as decoration, developed firing techniques and traditional forms, indicates little more than the products of a purely local potter who did not subscribe to any recognisably established patterns. The fabric of the Culbin ware is noticably different from that of the Covesea cave, which is generally better-fired, has smaller stone grits and well-marked internally bevelled rims. In addition, the presence of finger-grooves on one or two of the Culbin rim sherds does not appear to be a significant feature; similar grooves occur on pottery in Scotland from Dalnaglar and other sites in east-central Scotland none firmly dated (Coles 1962). The few sherds recovered by Callander from a midden,

in the same area of the Culbin Sands, and noted above (pl 9), are of the same general character as those from the site reported here.

CONCLUSION

The occupation of this site in the Culbin Sands presents several problems. Primary among these is the question of seasonal activities, and the sources of both animal and vegetable foods. A midden such as this one, with relatively sparse quantities of shells and bones, is likely to represent temporary occupation by a small group of people of an area not well-suited for intensive cultivation or animal husbandry.

Cereal remains were not recovered in any quantity, but their identifiable absence from the samples subjected to flotation must not be taken automatically to exclude the possibility that the activities in the area included cultivation of cereal crops. Plough lines of wind-eroded former land surfaces indicate that grain agriculture was practised in the more recent past in the Culbin area, and note has already been made of the productive nature of certain parts of the sands to the north of the midden site.

Similarily, the presence of remains of cow, pig and sheep or goat, although not abundant, indicate that such domesticated animals were available to the occupant of the Culbin Sands; it is considered that such animals may represent the remains of rustling activities in the inland, more fertile, area of the Laich of Moray. The presence of cattle does not seem to be consistent with the environmental conditions of the sands, although sheep and pig might have found sufficient resources locally available, other than fresh water which may have been acquired from tributary streams of the Findhorn slightly to the south and east of the site.

The presence of shell food, although of very limited quantity, might normally be taken to indicate the proximity of the site to the coast, but the evidence of distribution of Bronze Age remains near the present coast must surely indicate that at the time of occupation, the midden was at least one kilometre from the sea. We should therefore speak in terms of a transitory economy, based upon domesticated animals somehow obtained or maintained, and supplemented at times with shellfood acquired from some distance away. The perishable nature of meat from large animals might well have been a problem, and no doubt it was an advantage to be able to fall back upon a consistent source of shellfood when conditions warranted it. The problem of local instability in the littoral environment, accounting for the alteration in the type of shellfood collected, would have been perhaps of minor annoyance.

Attention should also be drawn to the relatively abundant remains of goosefoot and corn spurrey, which, with sorrel, persicaria and chickweed, would have provided sustenance probably in the form of a gruel. The presence of these seeds may help to indicate the seasonal and marginal nature of the occupation, and this is supported by the evidence of potting techniques including the use of flint grits which were not immediately available.

The size of the midden itself hardly suggests the presence of more than a very small group of people, perhaps six to eight; the post-slot, if contemporary with the first occupation, might have been part of a temporary shelter erected beside and over the main area where food was consumed. It is likely that the intensive fire, dividing the deposits of Midden 1, would have resulted in the destruction of such a shelter, had not the nature of the fill of the post-slot suggested that the post had been removed before this time.

The pottery, of local Flat-Rimmed type, appears to be unlike the well-dated ware at the Covesea cave, and its closest analogy lies in the vessel recovered in 1908 from another midden in the Culbin area. Both occupations are likely to be contemporary on this basis, and according to the radiocarbon evidence this was between 1400 and 1100 BC.

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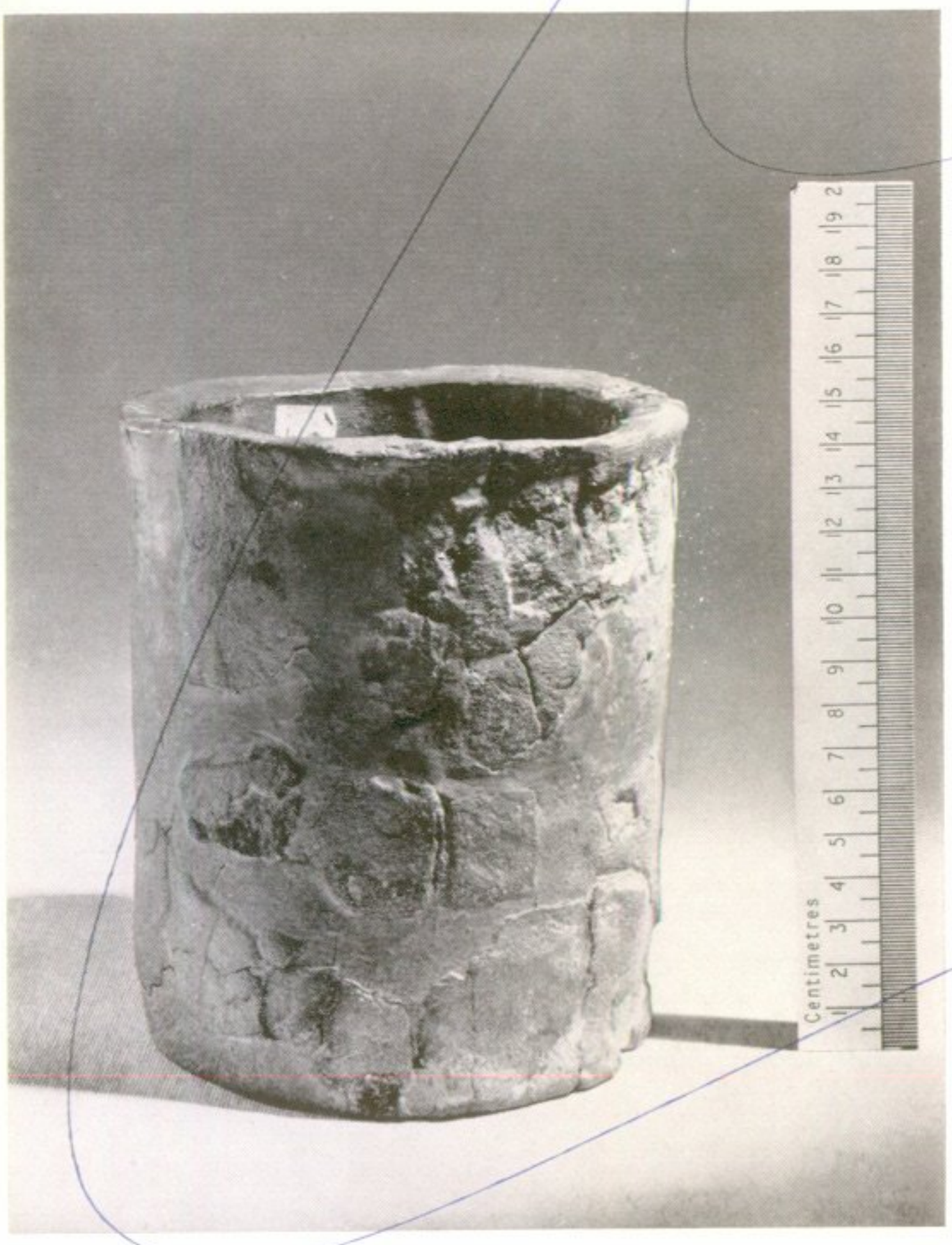

Flat-rimmed vessel from a Culbin midden, recovered in 1908 by J Graham Callander. Photograph by courtesy of the Anthropological Museum, University of Aberdeen