

THE SOLAR ALIGNMENT

AT

BRAINPORT BAY
MINARD, ARGYLL

P. FANE GLADWIN, F.S.A.SCOT.

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*With best wishes
P. Fane Gladwin
1985*

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**TO
THE PEOPLE
OF BRAINPORT
WHO LEFT US THEIR LEGACY**

ACKNOWLEDGEMENTS

I would like, in the first place, to acknowledge the willing co-operation of the Forestry Commission during the first three years of the Brainport excavation, when they were the owners of the site; and also that of the present owner, Lt. Col. R. Gayre of Gayre and Nigg, who has kindly continued his permission for excavation.

I wish to thank all those who have helped me at any time on the site, and in particular my thanks are due to Dr. E. W. MacKie of the Hunterian Museum, Glasgow, for his advice and encouragement, for his time consuming surveys of the area, for the excavations of 1982 which he arranged and directed, and for permitting me to make use of some of his drawings and photographs.

I am indebted to Mr. S. Rankine for his Geological Surveys, and to Mr. J. R. Carmichael for arranging a petrological investigation of certain stones from the site.

The Horizon profile from the alignment was carried out by Dr. A. S. Thom in 1979, and my thanks are also due to Mr. Michael Davis who, besides helping me on the site, has assisted with the production of this Report.

Finally, I wish to acknowledge the help received from the Natural History and Antiquarian Society of Mid Argyll in the publication of this Report.

FRONTISPIECE

Mid-Summer morning at Brainport. The "path" over the water from the back platform.

I INTRODUCTION

Brainport Bay is a sandy inlet some 400m in width situated $\frac{3}{4}$ mile S of the village of Minard on the W shore of upper Loch Fyne. Here a thin layer of top-soil covers a typical "raised beach" of sand and gravel which rises towards a low ridge 300m from the present shore line. The bay is open to the N & E but has a wooded cliff on its W side. The only prominent topographical feature within the Bay is a rocky outcrop towards the southern corner. This forms a small hillock 10m in height, and, as an important part of the excavated site, will be described in detail later in this Report. (Fig 1).

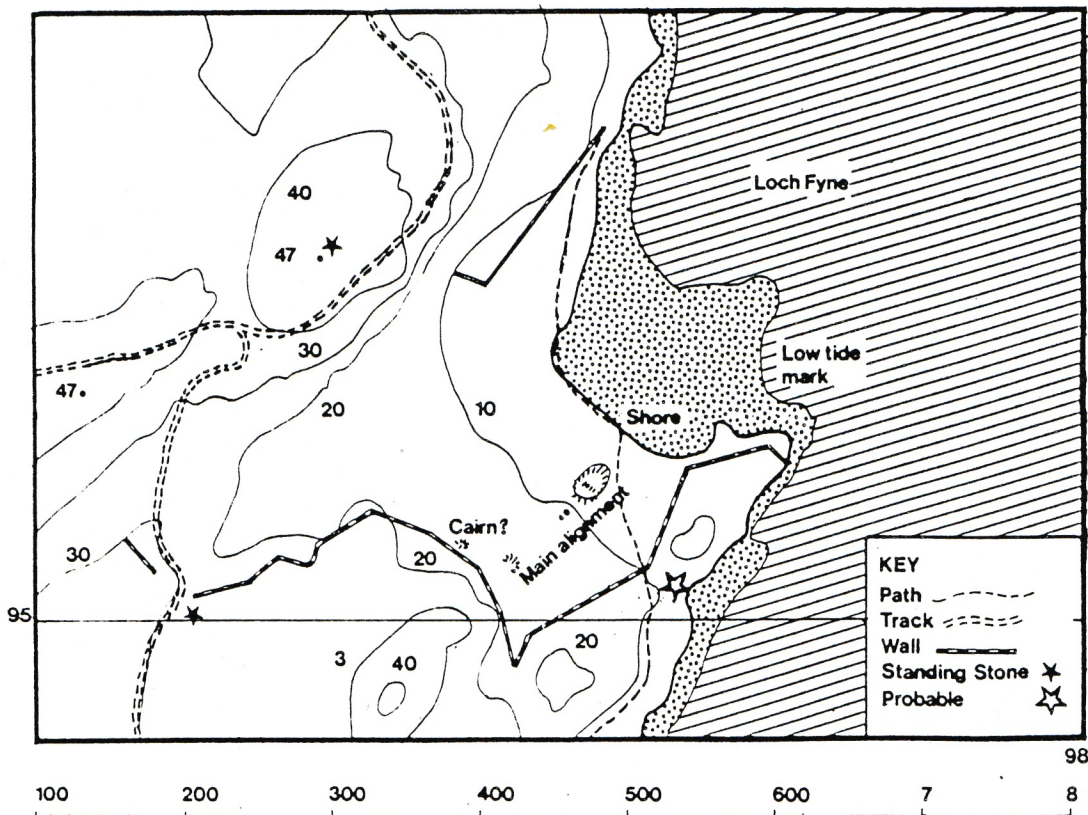
The Bay formerly contained a small settlement which was occupied up to the early years of 19th century when it was stricken by one of the cholera epidemics of the time and ceased to exist, all but two of the houses being destroyed by fire and demolished. In 1967 the area was ploughed and planted by the Forestry Commission.

Apart from fishing and husbandry, the former people of Brainport were probably engaged over a long period in the quarrying, dressing and exporting of rotary quern-stones which were cut out a short distance away, between the Bay and the village of Minard, and at other locations nearby.

It should also be noted that an important Ferry ran across Loch Fyne in early times from Brainport Point to Kilbride on the Strathlachlan shore where it connected with a pack-horse route over the hill to Kilbridemore in Glendaruel.

Brainport Bay lies near the southern end of the strip of shore between Inveraray and Lochgair which contains the remains of at least 6 Chambered Cairns and several smaller cairns. The largest of the Chambered Cairns, that in Crarae Gardens, is just over one mile to the N of the Brainport site and can be clearly seen from it across the bay. (Proceedings, Soc.Ant.Scot.XCIV.1 (Scot).)

FIG. 1



Minard stands about mid-way in this region of prehistoric activity. Loch Fyne was closely connected by an ancient route over the hills with the prehistoric settlement areas of Kilmartin and Kilmichael. Indeed, Minard was until fairly recently a part of the Parish of Kilmichael Glassary, and this reflects a parochial structure going back to early Christian times.

The first discovery of what appeared to be a prehistoric site in Brainport Bay was made by the Author in the spring of 1975 and was reported in "Discovery and Excavation" of that year. At first it was thought that it might have been the remains of a small shoreline "Dun" or possibly the site of an earlier homestead related in type to the circular unenclosed platforms of higher levels which occur on both side of Loch Fyne.

However, it soon became apparent that there were no traces of domestic occupation, which, had it occurred, could have been expected to yield some evidence in the form of related debris. Furthermore, it also became clear that no attempt had been made at fortification of the site and there was no indication that structures of any kind had been erected over it. These first theories, therefore, had to be discarded at that time.

The discovery of a substantial back platform in 1977 from which the other previously discovered portions of the site appeared to form a line towards the Summer Solstice Sunrise, led to a practical test of the "Alignment" theory on 21 June 1977. The Sun was then observed to rise in a spectacular manner on the predicted axis of the alignment, and this event was photographed at the time by Dr E W MacKie of the Hunterian Museum, Glasgow. All further excavation since 1977 has tended to confirm the theory that the main purpose of the site was as a place of Solar observation for both ceremonial and/or religious purposes, and also, presumably, for the construction of a reasonably accurate calendar.

Belief in the "alignment" theory was further strengthened in 1976 when it was found that the line of sight from the back platform to the estimated Summer Solstice rising position may have been marked by a small Cairn on the only intervening high ground at a distance of 7 miles from the site (Doire-na-Criche GR 058024).

This small Cairn had been found 18 years previously and its position was then recorded by Miss Campbell of Kilberry when carrying out her Survey of the Historic and Prehistoric Monuments of Mid Argyll (Campbell & Sandeman).

Unfortunately in the intervening years the Cairn has been almost totally destroyed by forestry operations, and it will not be before the present forest is felled that its role in relation to Brainport can be accurately assessed.

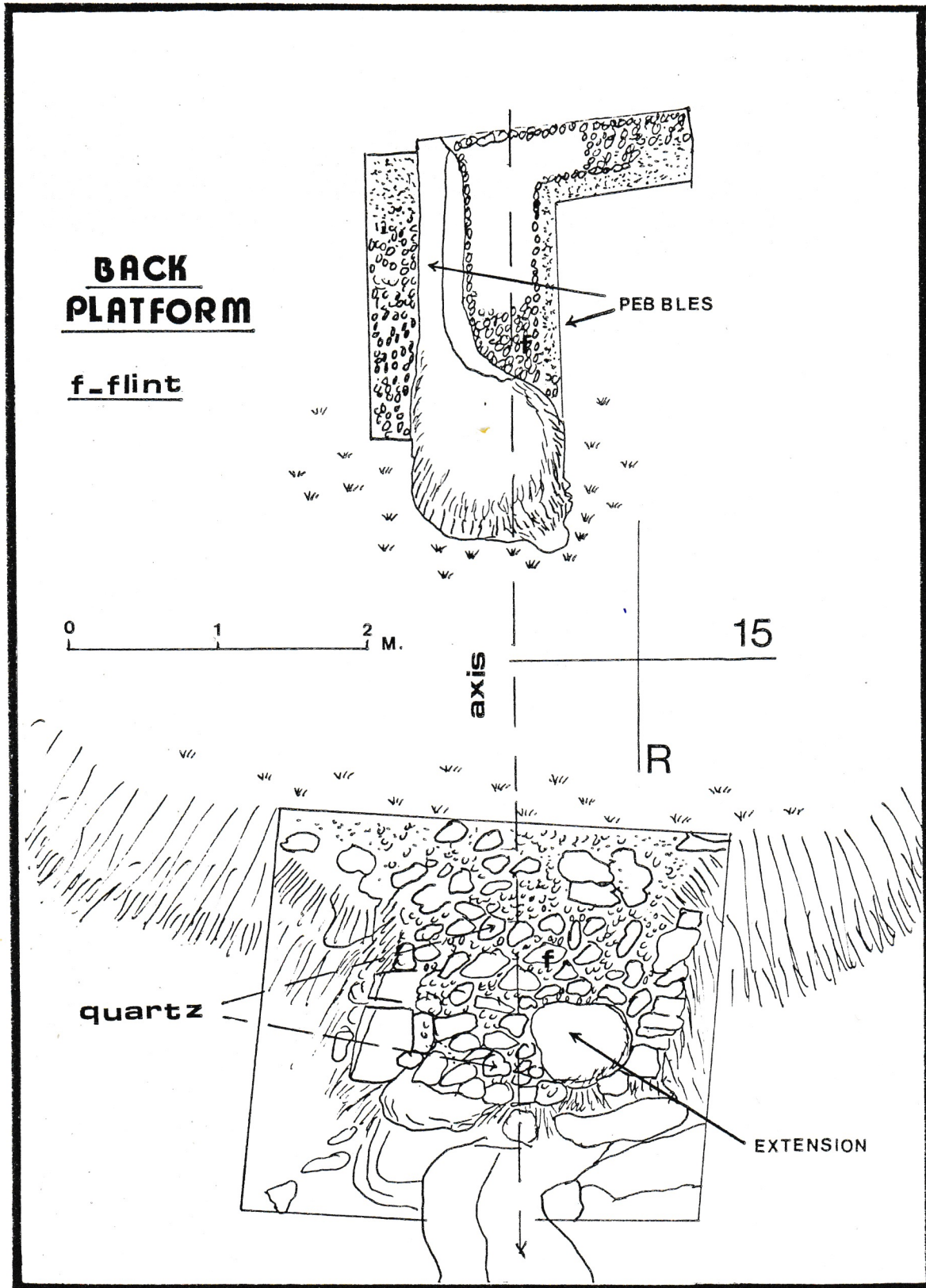
Although probably only visible from the back platform, this Cairn may once have formed an important forward extension of the Alignment.

Apart from the structures of the Solstice Alignment described in this report there is also a group of 14 cup marks on a rock slab near the centre of the bay, 2 cup marks close together just W of the alignment (Appendix II), and, on the higher hillside overlooking the site, a further group of cup and ring marks close to Barr Farm.

The area of rock slabs lying to the W of the main alignment shows many indications of quarrying, and many slabs have been removed. Some, including a massive slab 9' in length are still lying on the surface, and it seems likely that this area would repay detailed investigation in the future. (Appendix II).

There are in addition certain other outlying sites in the Brainport area which do not form a part of the primary summer Solstice Alignment, although they appear to be connected with the overall use of Brainport as a centre of Solar observation throughout the year. A brief description of these is also given in Appendix II to this Report.

FIG. III



II DESCRIPTION

1 General Outline and Component Parts (see Fig II)

The Structures considered in this Report consist of 4 main components spaced out in line over a total distance of 110m and having their central axis aligned on an azimuth of $45^{\circ} 29'$. A continuation of this axis leads at a distance of 27 miles to a "V" shaped hollow between the slopes of Ben Dubhcraig and Benn Oss. It is near this point on the distant skyline that the first flash of the sun occurs on Mid-Summer morning today.

Starting from the higher, SW, end of the alignment, the component parts will be referred to in this Report as follows:

- a Back Platform and Projection
- b The Observation Boulders and Sighting Position
- c The Terraces and Causeway
- d The Forward Outcrop Feature
- e The "Pointer" Stones

2 The Back Platform and Projection (see Fig III)

The back platform at the SW end is the highest structure in the alignment (30m), and is above the upper level of the raised beach. Originally almost semi-circular, its edge can be seen to have been artificially scarped in places on its E side and has been built up where necessary with boulders and slabs of Schist. The top is generally flat except where 2 outcrops of the bedrock protrude. The W side, however, has been severely damaged by forestry ploughing and a number of large slabs have been pushed down the slope by the plough. These slabs were probably set originally to form a similar scarped edge to that on the W side, before they were displaced. Measurements taken from the better preserved E side to the centre line indicate that the platform might originally have had a width of approximately 24m.

When first discovered, the whole of the back platform was densely covered by rhododendrons, and although these have since been partly cut, there is only a small area free of heavy roots where investigation of the soil is possible.

In this area there is a layer of brown loam between 13 and 16 cm in depth and under this a thin grey layer, perhaps indicating a former turf line. Below this is compacted yellow soil with a high pebble content which probably formed a hard flat surface for the platform. This buried ground surface extends under the earth bank which is described later in this section.

Several pieces of flint, comprising 10 small flakes, 2 "Thumbnail" scrapers and one Perforating tool of brownish flint were found lying on, or displaced a little above, the pebble surface in the area W of the central outcrop. All flakes were well separated and gave the impression of having been scattered or dropped at random, perhaps over a period. (Fig III).

At the front (NE side) of the platform is a projecting rectangular stone structure which is built exactly on the axis of the alignment. This forms a small forward extension 2m from front to rear and 2.30m in width.

This forward extension has been built on to a conveniently projecting spur of the bedrock and is constructed of slabs and boulders of schist topped with a paving of smaller flat pieces. There has been a slight collapse in the N corner of this projecting platform, but the rectangular outline is still clear. The whole top surface is covered with an even "scatter" of broken white quartz, some 260 pieces in all, ranging from small chips to pieces of approximately 7 cm diameter. Amongst the broken quartz were found a number of flint flakes including one residual pebble core, one small scraper and one perforator. Most of the quartz is of semi-crystalline type, but there are also some pieces of "milky" quartz, which is not so common in the area.

The significance of this and other Quartz Scatters is discussed in Appendix III of this report.

In the SE corner of the projection is a large squarish stone which appears to have been levered off a schist outcrop 12m N of its present position. On its outer side this stone shows the marks of having been smoothed by hammering. This appears to have taken place after the stone had been moved to its present position to form a cornerstone of the projection.

From the top of this carefully constructed projection an observer obtains the best view of the alignment and this view can only be described as dramatic on the morning of the Solstice, when the rising sun makes a brilliant orange "path" over the water between Brainport and Pennymore Point, a distance of $4\frac{1}{2}$ miles.

The other notable feature of the Back Platform is an earthen bank between 2 and 3m in width and in places up to 1m in height, which seems to enclose the whole SW end of the Alignment.

This bank begins at the S corner of the Platform and runs straight at right-angles to the Alignment (NW) for approximately 50m before it appears to turn NE and immediately tapers away.

In 1982 two sections were cut across this bank 50m apart, and it was found to be composed of light brown loam, presumably scraped up from the surrounding top soil. Some charcoal and a number of flint flakes were found within the bank. Charcoal lying on the old ground surface under the bank gave a Radiocarbon date of BC 1160 \pm 80 (GU 1704/84). This dating is also important in relation to certain other parts of the site where the buried soil surface can also be traced (see Section 4).

3. The Observation Boulder and Sighting Position

At a distance of 60m below and to the NE of the Back Platform described above, is a prominent group of large boulders. These are composed of a fine-grained and rather light coloured Micaceous Schist. The largest of these boulders stands upright on the axis of the alignment whilst that behind it and that to the E of it are recumbent. The upright boulder is just over 2m in total height and about the same in breadth at its widest point near the bottom. The upper portion is severely weathered and on the centre of the NE face near the top is a natural hollow 10 cm in depth and approximately 8 cm in diameter. The interior of this hole appears to have been smoothed and increased in size as though by rubbing. The boulder rests on a thin bed of soft Phyllite, under which is the gravel and sand of the "Raised Beach". The rear recumbent boulder which rests on similar deposits, appears to have split off at some time from the larger stone.

The lower portion of the big Boulder has a considerable overhang at the front, and all along this NE face under the overhang is a well-laid setting of small beach stones set for the most part end-on, and varying in diameter from 10 to 15 cm. This setting contains a small open space at the centre some 35 cm in width. In front of the setting of stones and resting on the Phyllite is a close "scatter" of broken white quartz (73 pieces in an area of 1.5 sq m). This quartz "scatter" seems to indicate that the upright boulder formed an important component part of the alignment. An examination of the group at first gives the impression that the upright boulder was also formerly recumbent, but that it may have been "up-ended" and levered a short distance to the NW to bring its centre directly on to the axis of the alignment. The bedding layers at the SE end of the upright boulder turn through an angle of 90° and are clearly at variance with those of the recumbent stone just to the E of it. Later excavation, however, (July 1982) tends to cast doubt on it having been deliberately moved, and it may be that its position exactly on the axis of the solar alignment is fortuitous. If this was so, however, it would hardly have lessened, and might even have increased its importance in the eyes of those who developed the site.

Excavation behind (ie SW) of the big Boulder, disclosed an in-fill forming a small level floor 1.40m x 45 cm in size and raised 22 cm above the level of the ground in front.

This in-fill was composed of a number of small beach boulders resting on beach material, and a layer of micaceous Schist pieces some of which appear to have split off one or other of the group of boulders. However, there were also a number of pieces of the grey Chlorite Schist which is found on other parts of the site, and this, together with the fairly large foundation pieces of Granite below, seems to infer that the surface was deliberately raised, perhaps so that persons of average height standing on it could see easily over the top of the large boulder in front.

An unusual twisted double bar of Iron (App. I6B) was found resting at the NW corner of the raised in-fill. Its shape relates to no known type of Artefact, and its purpose remains unknown.

It should be noted that from here an observer can see towards the point of Mid-Summer Sunrise on the distant skyline through a "V" shaped cleft in the large rock outcrop to his immediate front. (See Fig IV).

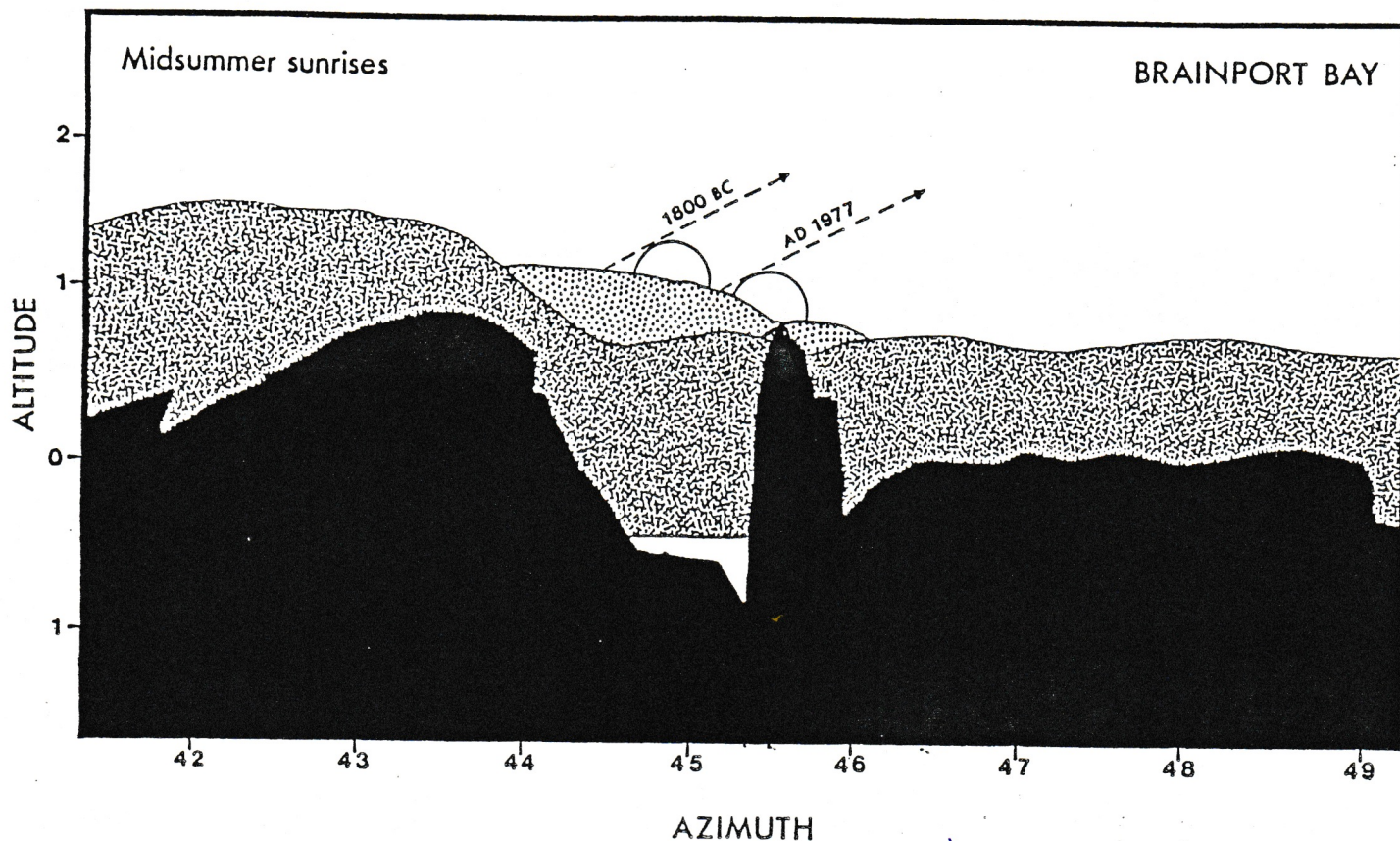
This cleft measures 130 cm across the top and has a maximum depth at the centre of 138 cm. The N side of it is formed from the bed-rock, but it seems possible that the S side, which is formed by a large boulder, could have been artificially positioned by leverage.

From the Boulder also, several fixed lines of sight may be taken along the sides of the 2 small standing pointer stones which will be described later in this Report.

It is also worth noting that for a few days either side of the Summer Solstice, the first rays of the rising Sun shine through the cleft in front and strike the upper portion of the large Boulder. This does not occur at any other times of the year.

The space between the large boulder and the recumbent one to the E of it was found to have been filled with modern rubble and field stones which have now been removed.

FIG. IV



4 The Terraces and Causeway (see Fig V)

Approximately 15m NE of the observation boulder and sighting position, 2 low circular terraces, one inside the other, are built on to the SW side of the main rock feature. Their revetted edges are supported by regular kerbs formed from large boulders, and from the edge of the lower, larger, terrace, a cobbled causeway leads off towards the South for a short distance. The large terrace forms $\frac{3}{4}$ of a circle having a diameter of 10.4m and it is almost bisected by the central axis of the alignment. When discovered it was covered by turf and bracken and decayed humus to a depth of up to 31 cm.

The revetment of the larger terrace consists of a circle of heavy boulders on which smaller stones have been piled at a fairly steep angle to a height which varies between 75 and 85 cm. The retaining revetment thus formed varies in thickness according to the configuration of the bed-rock beneath. At the SE side the last 3m of the original construction appears to have collapsed at some period and has been more crudely rebuilt over the top of the collapsed debris, perhaps to give it a better foundation. However, some care has obviously been taken to rejoin the main rock feature. It is in this reconstructed SE quadrant that evidence was found of simple ironworking with perhaps a form of primitive forge in use against the rock-face, which itself shows evidence of considerable heat. The shallow pit below it contained a quantity of Iron debris mixed with charcoal, but no recognizable artefacts, although a backed and tanged blade was found on the top of the revetment nearby. (See Appendix I).

FIG.V

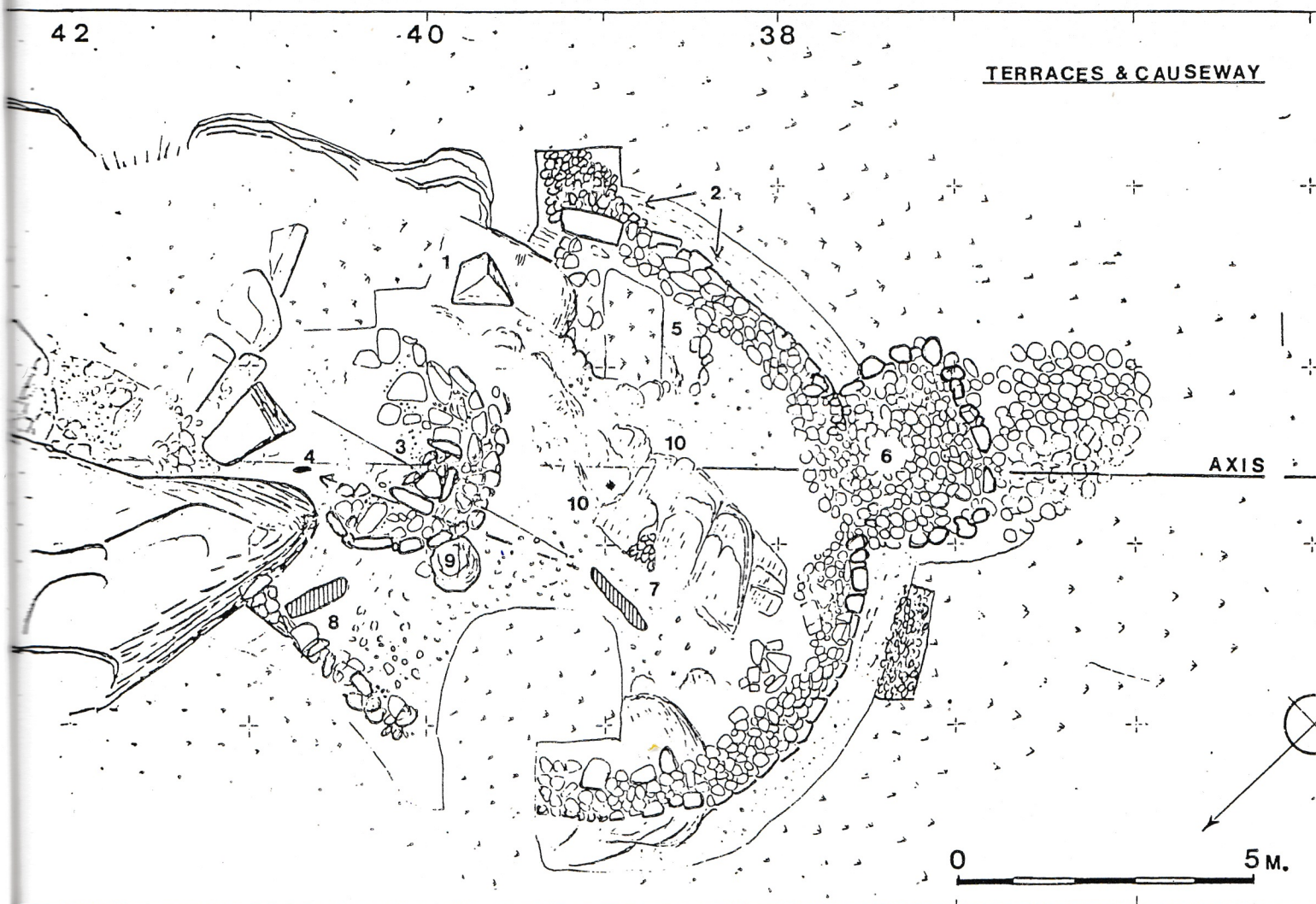


FIG V LEGEND

- 1 Pyramid Stone
- 2 Area of collapse and early reconstruction
- 3 The Small Terrace with central setting of stones facing W
- 4 Socket for Pointer Stone No 2
- 5 Area of small-scale Iron working (Forge?)
- 6 Causeway towards MWSS with blocking boulder
- 7 Original position of Stone No 2
- 8 Stone No 3
- 9 Buttress stone supporting small Terrace
- 10 Scattered pieces of carbonised Antler

In general the floor of the larger terrace is formed by the top of the roughish surface of a Phyllitic layer mostly soft and flaky, but hard near the centre. Here there is a substantial outcrop which rises to 30 cm above the average level of the terrace. In some places an attempt has been made to level the floor with an in-fill of gravel and small stones, notably near the centre. The floor slopes towards the E side (the area of the collapse) and on its W side the Phyllite bedrock gradually intrudes into the retaining revetment. Here the stonework has been tapered off to preserve the circular outline and in one place a half-hearted attempt has been made to shape the edge of the outcrop by hammering. It is notable that at each side of the terrace the retaining stonework is turned sharply inwards to form a neat right-angle join to the bedrock.

In 1983 it was possible to cut a section across the revetted edge of the large Terrace at the N side. Here the edging stones could be seen to lie on the buried soil surface and totally beneath the upper layer of brown Loam. This would appear to indicate that the construction of the Terrace is at least contemporary with the deposition of 3 pieces of flint on this buried surface and of a number of flakes on the Back Platform as described in Section 2. (See Fig VI).

A number of pieces of burned and carbonised deer antler (20/30) were also found scattered over the surface of the buried soil layer, mostly near the centre of the terrace. These pieces were not associated with ash or charcoal and presumably therefore the burning of the Antler had taken place elsewhere and the carbonised pieces had then been scattered on the terrace.

They were mostly of a cindery consistency and in some cases were very brittle. On several pieces the outer striations on the horn could still be seen, and this gave the clue to the nature of the substance.

It seems probable from the size of the pieces that most of the material is from red deer antler, although some small pieces of roe deer antler could also be present.

Although pieces of antler and indeed whole antlers have been found on many types of site in Scotland I have so far been unable to trace any other example of carbonised pieces being scattered in this way.

The pieces ranged in size from approximately 2 cm to approximately 5 cm in length.

In 1983 an investigation of the collapsed tumble of stones from the earlier revetment at the E side showed that it extended down to the bedrock 34 cm under the present marshy soil level and that some of the lowest stones were resting on beach material. It can, therefore, be inferred that this collapse occurred at a very early date when at least some of the high tides were washing round the E side of the rock feature. Only if this were the case could the lowest stones have come to rest on the base rock.

At the S side of the larger terrace, a curious feature (Fig V 6) is a short cobbled causeway approximately 2m in width which leads down at a gentle angle of slope on a bearing of 210° (M) from the "lip" of soft Phyllite which runs off the main outcrop at this point. However, after a distance of 2m the cobbled way is blocked by a semi-circular setting of larger boulders. When discovered the whole of this cobbled causeway together with its ring of blocking boulders was covered by a layer of cairn-like material. This feature appears to have been constructed at the same time as the lower Terrace since the upper facing stones of the revetment are interrupted for the whole width of the causeway, and there are no indications that any facing stones ever rested on the Phyllite at this point. Had they done so, it would have

been necessary to excavate parts of the decayed rock in order to retain them. It is not possible to surmise how soon after its construction this small causeway was covered over, but it shows no signs of surface wear or displacement of stones, as would have been the case if it had been frequently used. It seems, therefore, that it was never intended as a means of access to the lower terrace.

The Causeway itself is aligned directly on the point where the Sun can be seen to set at Mid-Winter, and since it is unlikely to have been used for entry on to the lower Terrace, its use may have been related to the annual "departure" of the Sun at that time.

This raises the possibility that the whole purpose of the large Terrace, which is clearly not essential as part of the Mid-Summer Alignment, may have been to provide a platform for the ceremonial observance of the Mid-Winter Sunset.

Within the larger stone terrace described above there was found to be a smaller flat-topped platform with its centre roughly on the main axis but orientated towards the W and raised up on average some 40 cm above the level of the larger terrace. (See Fig V).

In the construction of this small platform the exact height and orientation appear to have been very important. The diameter is 3.30m across its widest part, and the whole structure faces towards the W. The kerb consists of a double tier of boulders, the upper tier being slightly set back as though to provide stability to the edge. The E side is firmly built on to the bedrock, but on the W side, where the construction is less secure and perhaps more liable to subsidence, a large flattish boulder has been positioned against the kerb to form a strong buttress. (See Fig V (9)).

Most of the terrace floor consists of broken Phyllite and a number of small flat stones, but in the centre near the front is a clearly defined open rectangular setting composed of 3 long straight-sided pieces of Schist. The rectangle thus formed is 83 cm in width, open at the back and having a large flat slab at its centre.

This little platform, inside the larger terrace, is a most unusual type of structure and, facing W as it does, was perhaps intended for the observation of the Equinoctral Sunsets. The skyline, although close, (1½ miles) is a deeply indented rock edge, and before being planted with trees, it would probably have been suitable for observation. If the rectangular setting of stones is deliberately constructed, as it appears to be, it may well have marked the exact spot where the observer was required to stand. This would have been a very necessary requirement when sighting on such a close skyline at the times of the Equinoxes, when the Sunset position is altering very noticeably each evening. It would, in fact, have made observation of the "last flash" position comparatively easy and accurate to an experienced observer.

However, it should be noted that there is also more recent evidence of the Equinoctral Sunsets having been observed, with equal accuracy, from the top of the steep hill 300m NW of the Alignment. (See Appendix II).

5 The Forward Outcrop Feature (See Fig VII)

As mentioned in the Introduction, this is the main topographical feature in Brainport Bay and it also forms an important element in the alignment.

The upper layers of the rock are composed of a hard grey Chlorite Schist, but from beneath this Schist towards the SW side successive layers of Phyllite protrude, giving the hillock a "stepped" appearance. This Phyllite is hard and slate-like in its higher levels but becomes progressively softer and more flaky in its lower strata.

On the E side of the outcrop there is a precipitous drop of between 2 and 3m, but at the NE the slope is more gradual towards the shore of the bay. The W side slopes down at an approximate angle of 45° to the level of the "raised beach".

Along the western edge, a natural rim of rock appears to have been "improved" here and there by the addition of several large slabs levered off other parts of the site. In places this rim stands nearly 80 cm above the floor level and tends partially to enclose the flat area at the top. The greater part of this area has been carefully paved with flat slabs of schist laid where necessary on a bed of beach gravel. This paved area is irregular in shape and on the NW side in particular, the bedrock protrudes through and alongside it. In one place it is stepped-up by a 25 cm stone kerb to a higher level at its SW end. At the NE end of the paved area a narrow drainage channel has been constructed around the side, and this leads rain-water over the edge of the rock and prevents it from collecting in wet weather.

No post holes were discovered nor other indications that any roof structure had ever stood over the paved area.

At the SW corner where the main outcrop reaches its greatest height, there is a V-shaped gap in the rock through which the rising Sun can be observed from behind the observation boulder as previously described in sections 1 and 3 of this Report. At the NE end of the outcrop the paving gives way to a flat area of stone at the centre of which stands the forward (No 1) pointer stone which will be described in detail later. The area in front of this stone has been levelled with a hard infill of small schist fragments and beach gravel. In the top layer of this surface are some 25 pieces of quartz, including at least 5 large pieces which form a close "scatter" in front of the Pointer stone. Some of these pieces of quartz appear to have been broken "in situ" as it is possible to fit a number of fractured pieces of certain stones together.

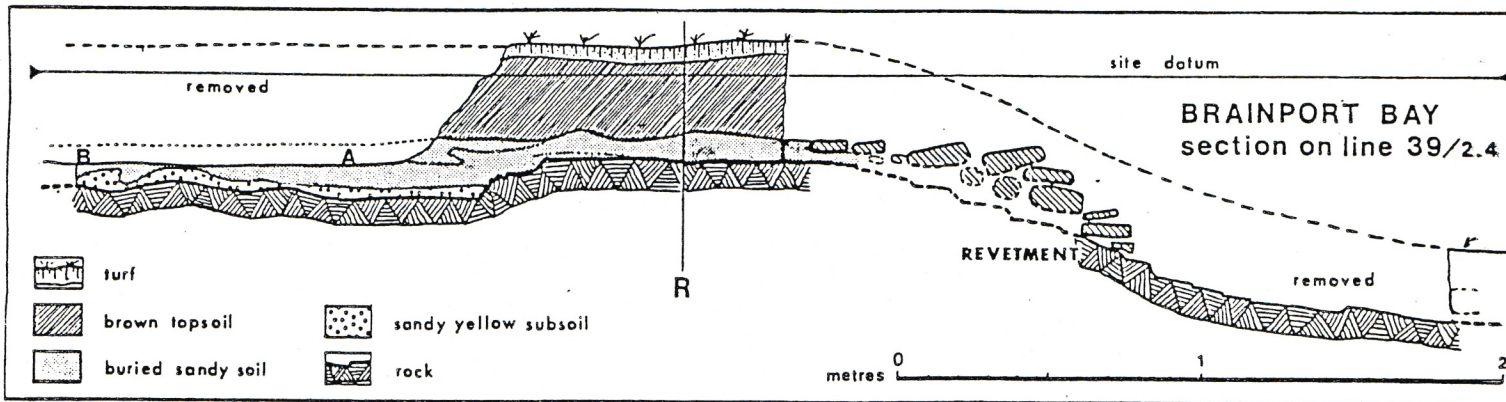
The largest piece of flint found on the site, a residual core (No 16) was resting on the surface of the infill amongst the scattered quartz.

There are several areas on the top of the main outcrop feature where burning has taken place, and these include the areas either side of the front Pointer stone.

In one place, about the centre of the long paved area, a roughly circular hearth has been inserted at a later date by the removal of several paving stones which were left lying on adjoining slabs. Charcoal recovered from this Hearth yielded a date of AD 855 + 65. No traces of animal bone or broken pottery were found, and the quantity of charcoal was small. The reason for the late insertion of this hearth is not clear.

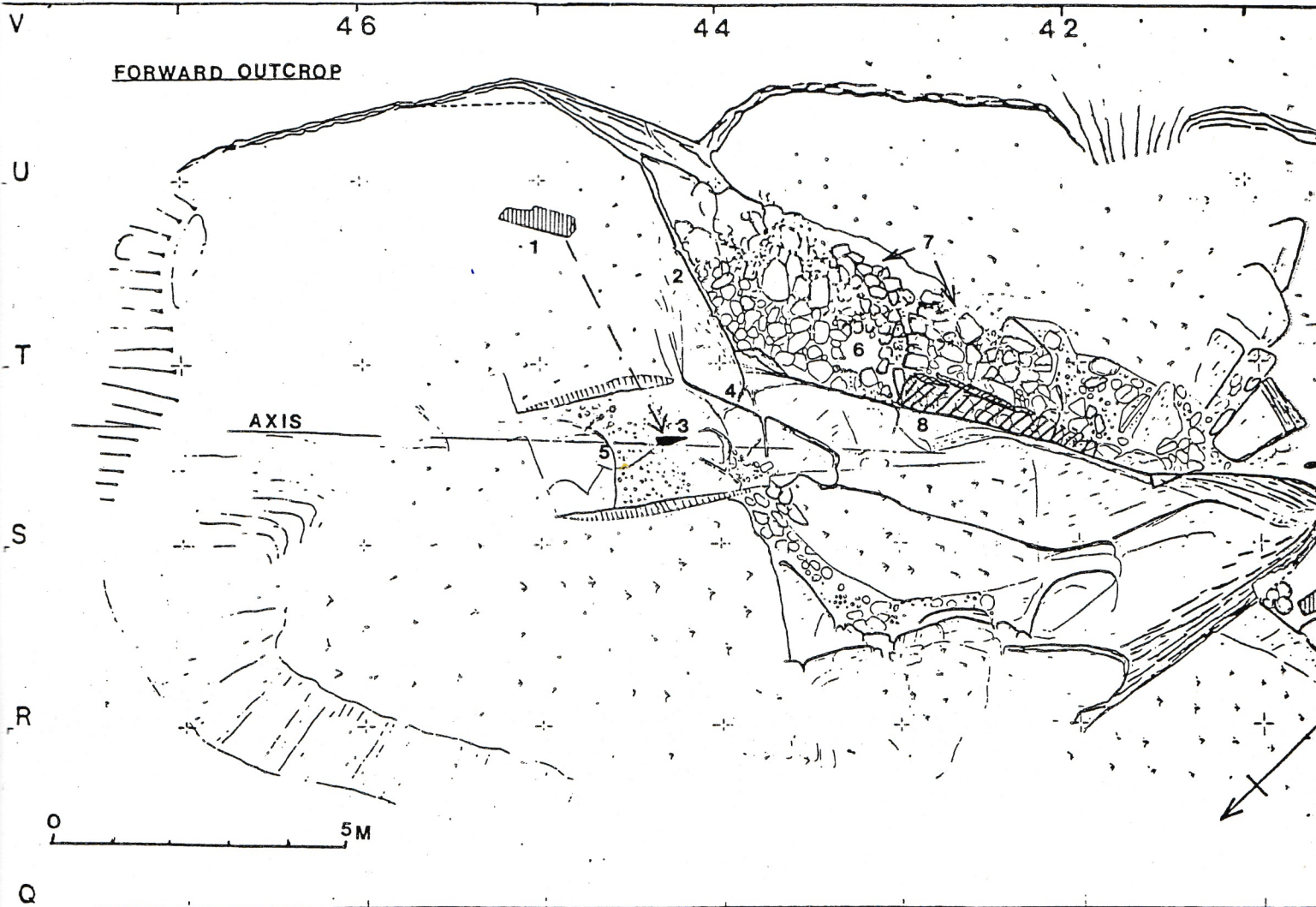
However, a far larger and more significant area of burning is located towards the SW end of the paved area where a trench 3m in length and 36 cm in depth has been constructed close to the axis of the Alignment. One side of the trench is formed by the bedrock, which is discoloured by heat for its full length. The other (E) side is formed by

FIG. VI



A - FLINT B - ANTLER

FIG.VII



- 1 Position of Stone No 1 when found
- 2 Drainage channel along edge of paved area
- 3 Socket hole for Pointer Stone No 1
- 4 Position of 33 "Counting"(?) stones
- 5 Quartz scatter in front of Pointer Stone
- 6 Late hearth inserted in paving
- 7 Paved areas
- 8 Large fire-trench (filled in)

a schist slab 10 cm in thickness set on its edge and backed by the pavement infill and a number of larger stones. This slab is also discoloured and severely cracked by the heat generated in the trench. (See Fig VII).

This trench was found to be filled with beach boulders and topped with flat stones up to the same level as the surrounding paving. When these stones were removed it was possible to recover a small quantity of charcoal from the bottom of the trench. This charcoal all appeared to emanate from thin brushwood, and the relatively small amount, in view of the scale of burning which had obviously taken place, would seem to indicate that the debris of previous fires had been regularly cleared out from the trench.

This charcoal sample yielded a date of AD 335 + 55*. From this it would appear that the fire trench was in use up to that date and it could be inferred that it was then no longer required and was therefore filled-in up to the level of the surrounding paving.

There were no indications that the fires in this trench were put to any domestic use, nor that cremations had taken place, and it therefore seems likely that they were of a ceremonial nature particularly as the trench is close to the central axis of the Alignment. (See Part III of this Report).

A further discovery of some interest was made near the NE end of the outcrop feature. Close to the socket hole in which Pointer stone No 1 is now standing, a noticeable whiteish vein of quartzite runs over the surface of the schist. This vein disappears at a lower level 81 cm S of the socket hole. Here a cache of 33 small quartz pebbles was found on the rock in a shallow hollow at a depth of 22 cm below present surface level. These pebbles were packed tightly together as though they had been formerly contained in a bag, of which no trace now remains. It could well be that they were intended for use as "counting stones" and were kept at a spot where they could easily be located when required.

The only other "finds" from the top of the outcrop feature were 2 pieces of flint, a large residual core close to the No 1 Pointer stone, (No 16), and a badly burned small Scraper (No 10) on the bedrock close to the Fire Trench described above. It seems possible that this could have dropped out of a heap of ashes removed from the fire trench, since several pieces of charcoal were resting on the rock in the same general area as the burned flint.

6 The Pointer Stones

All 4 stones believed to have been used as directional pointers or sighting aids were found in the forward area of the alignment, either on top of the main rock feature, or on one or other of the terraces. They consist of stones numbered 1, 2 and 3, all of which are long and narrow in shape and the "Pyramid" stone, so named because it is shaped like a sharp 3-sided pyramid.

Stone No 1. At the NE end of the forward outcrop feature described in the previous section, and directly on the central axis, a hollow was discovered at the extreme edge of the bedrock. This hollow was excavated and found to contain 4 tapered triangular shaped pieces of schist between 18 and 22 cm in length, lying on a thin layer of coarse grey silt at the bottom of the hole. The hole itself is 27 cm in depth, 40 cm from front to rear, and 21 cm in width at the top. It seemed very likely on excavation that this hole might have formed a

* GU 1703 Code BB121.

socket for an upright post or suitable stone, as it was in an acceptable position for such a pointer and had clearly been artificially contrived - the front end having been built-up and packed with pieces of schist. In addition the tapered stones found in the hole appeared to be of a suitable shape and size for jamming purposes.

The silt in the bottom also seemed to indicate that the hole had been open and had filled gradually in the course of time after whatever it contained had been removed.

From its shape it appeared that this hole was intended to house an object of flat-sided section with its narrow ends orientated along the axis of the alignment. If an upright stone had once stood in this socket, a very likely candidate was a long flat-sided slab of schist which was found lying at an angle on the top of the outcrop 4m E of the hole (see plan). This stone measures 1.28m in length, 45 cm at its broadest part, and tapers to a thickness of 9 cm at the top. To test the suitability of the socket position, a timber post was cut to the same length and inserted into it. When viewed from the conjectural sighting position behind the large Boulder (see Sec 3) and through the cleft in the rock, it was found that the tip of this post just reached the level of the distant skyline near the point of the present day solstitial Sunrise. At a later date the long flat-sided stone described above (No 1) was inserted into the hole in place of the post, and was found to fit exactly, with its flat sides parallel to the axis of the alignment. It was then easily jammed into the socket using the tapered stones which had been found in the excavation and it has been left in this position where it seems likely to have stood in former times.

The importance of this stone in the Alignment is indicated by the Quartz "scatter" in front of it and perhaps also by the deposition of the large flint core mentioned above, close to its N side.

A charcoal sample from 5 cm N of the stone but 6 cm above the level of the in-fill on which the Flint was deposited, yielded a carbon date of AD 134 \pm 55 (EV 1434).

Stone No 2 This stone was discovered lying in the N quadrant of the lower terrace (see plan) 14 cm below the turf level. Underneath it was a layer 2 cm in thickness of dark organic material and eroded Phyllite containing a few pebble-size pieces. This probably represented the remains of a thin turf and moss layer on the buried soil surface or could, perhaps, have been formed by the decomposition of a matt of bracken roots under the stone. In any case it seems likely that the stone had been laid with care on the ground as it is too slender to have withstood rough usage. It may then have been deliberately covered over. Above its upper surface was a layer 6 cm in thickness composed of dark loam containing some traces of ash, and over this, approximately 10 cm of turf and bracken roots forming the present soil surface.

The stone itself lay on one of its broad sides with its pointed end towards the W and its thicker end towards the socket in which it has now been placed (see plan). Its dimensions are as follows: length 146 cm, greatest width 24 cm, greatest thickness 12 cm. It tapers to a narrow point at one end.

The stone is composed of an unusual type of schist bearing numerous patches of reddish colouration which have not been noted elsewhere on the site, nor anywhere in the vicinity. There are no indications that it has been worked to shape, but there is a single man-made smooth depression on one side near the centre, perhaps an embryonic cupmark. It seems likely that this stone was brought to the site from elsewhere for a specific purpose.

The very slender shape seemed to rule out its use in any form of construction, and indeed, it seemed unlikely that it could have been used for any purpose other than perhaps as a gnomon or upright pointer of some kind. In order to test this theory, a search was carried out over the whole area of the terracing and in particular along the line of the axis to try and find a socket in which the stone might have formerly stood.

In due course attention was directed to a flat stone on the upper terrace exactly on the axis and opposite the centre of the V-shaped cleft in the rock.

This stone was at first thought to form part of the bedrock, but was found to be loose, and on lifting proved to be a small capstone over the top of a narrow hollow in the rock. This hollow had become filled with grey-brown silt composed of eroded Phyllite, and contained 2 thin pointed stones. When the silt was removed the hole was found to be 35 cm deep, 15 cm wide at the top, and 21 cm from front to rear. These dimensions tallied almost exactly with those of the butt-end of Stone No 2. As no other possible socket hole was found in the area, Stone No 2 was inserted into this conjectural socket, where it was found to fit perfectly. It has, therefore, been left in this position.

A small flint Scraper (No 3) was found on the buried surface 65 cm W of the socket hole.

In 1982 it was noticed that the setting Sun at Mid-Winter threw a sharp shadow from the edge of this stone on to the smooth rock surface approximately 1½m from it on the N side.

This shadow is surprisingly sharp, and it seems entirely possible that using charcoal to mark the last position of the shadow, the movement of the Sun could have been noted until a few days before the "stand-still" period occurred. It also happens that the shadow strikes the rock face at a tangent which has the effect of magnifying the daily movement, and thus making it easier to mark and note.

This No 2 stone might, therefore, have had a dual function, since it could have been used both at Mid-Summer and at Mid-Winter.

Stone No 3. At the N corner of the lower terrace a bank of soil faced with stones 60 cm in depth had been built up against the edge of the natural outcrop for some purpose that remains obscure. The pointed end of Stone No 3 was found protruding from this bank. The stone was lying horizontally with its upper surface 27 cm below the level of the bank. It lay with its pointed end in a SW direction.

The thick end of the stone was deeply embedded in the earth bank with 11 cm of reddish soil beneath it. The pointed end was approximately 5 cm above the buried soil surface.

This stone seems to have played no part in the revetment of the terrace and the general impression given from its position was that it might have been deliberately buried. It is composed of a brownish schist 118 cm long, 26 cm wide, and 15 cm thick. One side is completely flat along the original plane of cleavage, the thick end finishes in a flat bottom, and at the other end it tapers to a fine point. There is at present no clear indication as to its purpose nor is there any identifiable socket in which it might have stood. It is possible that it was brought to the site for use in the construction of the lower Terrace but was rejected owing to its length and later used to give stability to the short bank of soil in which it was found.

However it is also possible that it may once have stood close to where it is lying at the NW edge of the larger terrace. From here it might have been used in conjunction with the "Pyramid" stone to give a fixed line of sight towards the Mid-Winter Sunrise position on the opposite side of Loch Fyne. Unfortunately, it now appears unlikely that its purpose will ever be known.

The "Pyramid" Stone. This is, perhaps, the most interesting stone recorded on the main site. Not only is it much larger and heavier than either of the "pointer" stones but it has been levered up into an extraordinary position at the extreme SW edge of the main outcrop where it rests, delicately balanced on a small bed of packing stones which have been inserted beneath it.

The boulder is composed of grey schist similar to that in the upper portions of the outcrop and it was, therefore, probably obtained on the site.

In the early stages of the excavation it was thought to form a part of the bedrock, and it was only in 1979 that it was found to be detached and to be set in its special position. The stone measures 140 cm from tip to base and almost exactly the same across the bottom. It forms a 3 sided pyramid with a sharp point and having its broadest face on the N side. It bears no visible markings.

The position of the Pyramid stone shows that it clearly cannot form a part of the Solstice Sunrise alignment. There are, however, several possible clues as to its purpose:

- 1 It is positioned on the extreme SE edge of the outcrop.
- 2 It is set up to a precise height on a sloping rock surface, which would make height adjustment of the tip possible by levering and wedging as required.
- 3 It is sited at the only possible spot where an observer on the NW side could look upwards from lower ground and align its tip with the high SE skyline on the opposite side of Loch Fyne.
- 4 It is positioned in such a way that it presents the sharpest aspect of its point if viewed from the NW.

The implications are that the stone may well have been placed in its present position to give a sight-line to the Winter Solstice Sunrise, and that it could have been used in conjunction with Stone No 3, for which no other use has so far been suggested*.

It certainly seems unlikely that on a site such as Brainport no attempt would have been made to observe the Winter as well as the Summer Solstice, and it is only in such a context that the presence of the Pyramid stone can so far be explained. (But see Appendix II).

- * This theory was tested at the Winter Solstice Sunrise of 1980 using a wooden post in the calculated optimum position for Stone No 3. It was then found to indicate the "first-flash" position very clearly when a sight line was taken from the low ground NW of the lower Terrace, over the tip of the Pyramid stone.

III DISCUSSION

1 General Remarks

Unlike many archaeological sites which can be readily seen to conform to a pattern often familiar from other excavations, and which can, therefore, be easily classified, the Brainport Bay structures have provided a number of puzzling and unusual features since their discovery in 1975. These can so far only be plausibly explained in relation to the probable use of Brainport as a centre for Solar observation.

This does not necessarily imply that there was a need here for extreme astronomical and mathematical precision, but that experienced observers with good powers of reasoning and adequate counting ability could have noted the yearly movement of the Sun, recorded the Solstices, and probably also the Equinoxes. These phenomena could easily be seen from Brainport and would be noted accurately enough for both calendrical and religious purposes.

Such activities at Brainport appear to have been carried out over a very long period. Several of the small flint artefacts recovered from the site might, from their type, be early Neolithic in origin, others had been deposited on a buried soil surface of confirmed late Neolithic date. Yet other finds have clearly indicated some use of the site into the Iron Age. On the whole it seems probable that the "do-it-yourself" Solar calendar would not have been abandoned until the general spread of the Christian calendar had taken place.

Whilst religious and ceremonial practices no doubt underwent considerable changes in the course of time, the efficient self-correcting calendar at Brainport, based as it was on regular and well-practiced observations, probably continued in use until such time as there was something better to take its place. Only in this way can the very long use of the site be accounted for.

2 Evolution of the Main Site

Any visitor to Brainport today must be struck by the extremely favourable position of the bay in relation to the Eastern and North-Eastern skylines. From Mid-Winter to Mid-Summer the early inhabitants cannot have failed to watch and note the yearly advance and return of the Sunrise position along the horizon. For this reason it is easy to understand how a centre for Solar observation came to be established here. Furthermore several features of the ground were so positioned that in the course of time and experience, they would have lent themselves to further technical improvement in order to render the observations more accurate.

In this way the main site could have developed until it became one of both calendrical usefulness and also of religious significance.

It should be stressed that Brainport could never have been a "re-appearance" type of site such as Kintraw. Observation here must always have been based on a straight-forward noting of the Sun's "first flash" position each day in relation to a specific fixed line of sight to the distant horizon.

In practice this would have meant noting the position of the "first flash" well before the "stand-still" period, when the daily movement could still be detected.

It would then be necessary to count the nights until the Sun returned to the same position. The Solar calendar could in this way have been calculated with a high degree of accuracy from the middle night.

It does seem logical to suppose that the earliest Mid-Summer sightings may have been taken from the back platform, using the small cairn on Doire-na-Cirche (See Sec I) as a direction indicator. This system could later have been superceded by the erection of fixed "Pointer" stones on the lower part of the Alignment and the observations would then have taken place from the area of the large Boulder, as described in Sec II above.

3 Summary

We may now sum up the main evidence on which the claim can be based that the Brainport structures were intended to be used for Solar observation and possible accompanying religious observances.

Much of this evidence is of a negative nature, but it is important nonetheless, since, over a period of years, no alternative interpretations of Brainport are known to have been put forward.

The evidence falls under a number of headings which may be enumerated as follows:

(A) Lack of Domestic Debris on the Site

This has been most noteworthy from the first days of the excavation, and was the main reason for discarding early theories of habitation. Not one sherd of pottery, however small, has been seen on the site nor have any shells, animal bones, or midden material come to light. Two rubbing stones, one discarded hammerstone, a possible agricultural "dibber" and two "hones", together with a "backed and tanged" knife blade of a later period represent the total contribution to domesticity (see Appendix I), and could have been dropped at random over a long period of time. Although the flint collection contains a small number of "thumb-nail" scrapers, these were well scattered over the site and could have been accidentally dropped, discarded, or even deliberately deposited in the course of time.

(B) The "Scatters" of Quartz (see Appendix III)

Here we have positive evidence of a religious or ceremonial purpose for the site. The scattering or careful placing of pieces of white Quartz has been recorded by numerous authors on a wide variety of Neolithic and Bronze Age sites notably cairns, cremations, at the bases of Megaliths, and inside several forms of Stone Circles. In most cases it can be deduced that the Quartz was intended to give a "hallowing" effect to sites, which were concerned with death, burial or religious ceremony of some kind. In the case of Brainport it must be considered significant that all 3 identified "Scatters", namely, on the projection of the back platform, in front of the big boulder, and in front of (ie NE of) the No 1 Pointer stone should be situated along the central axis of the Solar Alignment. The connection of these "Scatters" with the main purpose of the structures seems, in this way, to have been clearly indicated by those who placed the Quartz.

(C) The Burning of Ceremonial Fires

Only one hearth has been discovered on the site which might be thought to have had domestic connotations, and this is of a very late date (see Sec II 5). However, there are at least 4 other places where burning, apparently of brushwood has occurred, including the long "fire trench" on the forward Outcrop Feature (Sec II 5). All of these fires took place close to the central axis of the Alignment. Whether they were a part of the ceremonial, or were lit merely to create a smoke haze through which it might be easier to observe the sun, it is impossible to guess, but there is ample evidence from many parts of the British Isles that the burning of fires played an important part in the celebration of the Solstices until very recent times, and that this practice probably originated in pre-history. (Note also practices in Scandanavia today).

(D) The Hidden Causeway (See Sec 4)

The Southward movement of the Sun to its Mid-Winter limit invariably gives cause for anxiety to primitive societies, who normally find it wise to conduct ceremonies intended to ensure that the procedure is safely reversed each year.

It would not, therefore, be surprising if such ceremonies had been carried out at Brainport, and up to now no other valid explanation has been suggested for the blocked and hidden causeway which leads off the lower Terrace towards the Mid-Winter Sunset, and which has clearly not been used as a means of access to the terracing.

(E) Other Considerations

The presence of petroglyphs close to the Alignment in the form of cup-marks is significant, as also is the carving of a double "Chevron" mark or Lozenge on a small boulder near to the back platform.

The purpose of the Earth Bank which runs across the SW end of the Alignment (See Sec 2) is also hard to interpret except, perhaps, as a form of physical boundary to the ceremonial area.

After seven year's investigation of the Site and close consideration of all the factors outlined in this Report, I am faced with the conclusion that in the Brainport Bay Alignment, we have a purpose-built centre of Solar observation which was in active use as such over a long period of pre-history.

APPENDIX I: DESCRIPTIVE LIST OF FINDS

(1) General Remarks

Recognisable artefacts of Flint, Quartz, other Stones, and Iron, have been found on the Brainport site, but they are relatively few in numbers considering the size of the area. As mentioned elsewhere in this Report there is a notable absence of any traces of pottery or domestic debris. In general the Flint was more plentiful on the back Platform although a small quantity was found also on the lower parts of the Alignment.

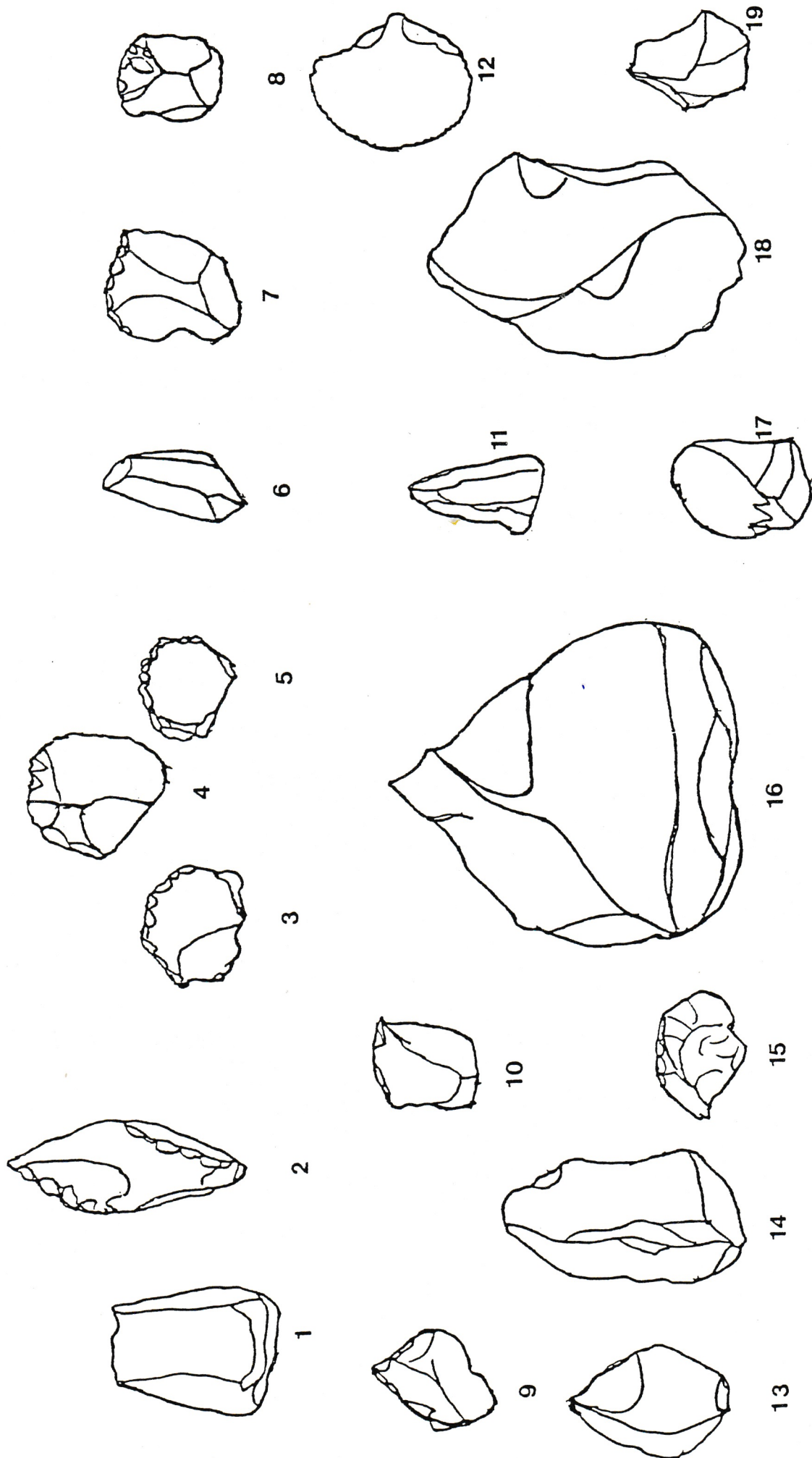
The small number of stone artefacts and both the Iron objects were all found in the area of the Terraces, and by contrast none was found on the Back Platform.

In general, the paucity of Finds on a site so long in use would seem to indicate that regular cleaning of the area took place and/or that access, particularly to the lower "ceremonial" parts, was to some extent restricted.

(2) Flint (Numbers refer to Fig VIII)

- 1 Residual pebble core. Whitish Flint. 2 cm x 2.3 cm x 1.8 cm thick. Back Platform NW side.
- 2 Perforator. Reddish-brown Flint. Lightly patinated on worked faces (4.4 cm x 2.2 cm). Back Platform.
- 3 Scraper. Brown Flint. Heavy patination (2 cm x 1.5 cm). Lower Terrace N Quadrant
- 4 Scraper. Coarse grey Flint. (2.5 cm x 2 cm). Back Platform.
- 5 Scraper. Grey Flint. (1.5 cm x 1.8 cm x 7 mm thick). Perhaps broken End-Scraper adapted. Back Platform.
- 6 Fractured point. Mostly Cortex. (1 cm x 1.9 cm). Projection.
- 7 Scraper. Grey translucent Flint. Some patination of struck surfaces. (2.3 cm x 1.9 cm). Back Platform.
- 8 Small poorly-made scraper. Uneven flake of whitish Flint (1.9 cm x 1.5 cm). NE of Projection.
- 9 Bi-colour Flake worked to a point. Perhaps incomplete Transverse Arrow Head. (1.8 cm x 2.1 cm). SE side of Projection.
- 10 Dark coloured flake pitted by burning. Probably Scraper. (2 cm x 1.3 cm). Main Outcrop feature. Central.
- 11 Fractured Point. Mostly Cortex. (2.4 cm x 1.3 cm). Projection.
- 12 Large flake of whitish-specked Flint. Serrated edge indicating use as Scraper. (2.8 cm x 2.8 cm). NW of Projection.
- 13 Residual Core. Pinkish flint. Perhaps subject to heating. (2.8 cm x 2 cm). Lower Terrace.

FIG. VIII BRAINPORT BAY : FLINT. SCALE 1 : 1



- 14 Naturally fractured (Un-struck) pebble. Grey translucent Flint. (4 cm x 2 cm). Upper Terrace NE of Pyramid Stone. This piece is of interest since Flint does not occur naturally near the site.
- 15 Flake entirely composed of Cortex lightly worked to form a Scraper. (2.2 cm x 1.5 cm). Projection.
- 16 Residual core of grey-speckled flint. The largest piece found on the site. Struck on four faces. (6 cm x 6 cm). With Quartz Scatter close to Pointer Stone No 1. Main Outcrop.
- 17 Residual pebble Core of whitish Flint. Discoloured by burning. (2.7 cm x 1.7 cm). Back Platform.
- 18 Naturally fractured pebble. Grey translucent Flint. cf No 14. (5.2 cm x 3.2 cm x 2.5 cm thick). Lower Terrace N Quadrant. As 14, perhaps deposited.
- 19 Residual Core of good greyish-white Flint. (1.8 cm x 1.9 cm). N of Pointer Stone No 1. main Outcrop.

(3) Flint not illustrated in Fig VIII

One residual Core (77) largely cortex.

Three poorly-made Scrapers (57, 62, 65).

Six Flakes usable as Blades (A, B, C, D, E, F).

Twenty-five smaller flakes some of which could have been used as barbs or small blades.

Much of the Flint from Brainport is of poor quality, pebbles were reduced to the smallest possible residual pieces and almost pure cortex was used to make some relatively crude artefacts. This may be seen to reflect the scarcity of Flint locally.

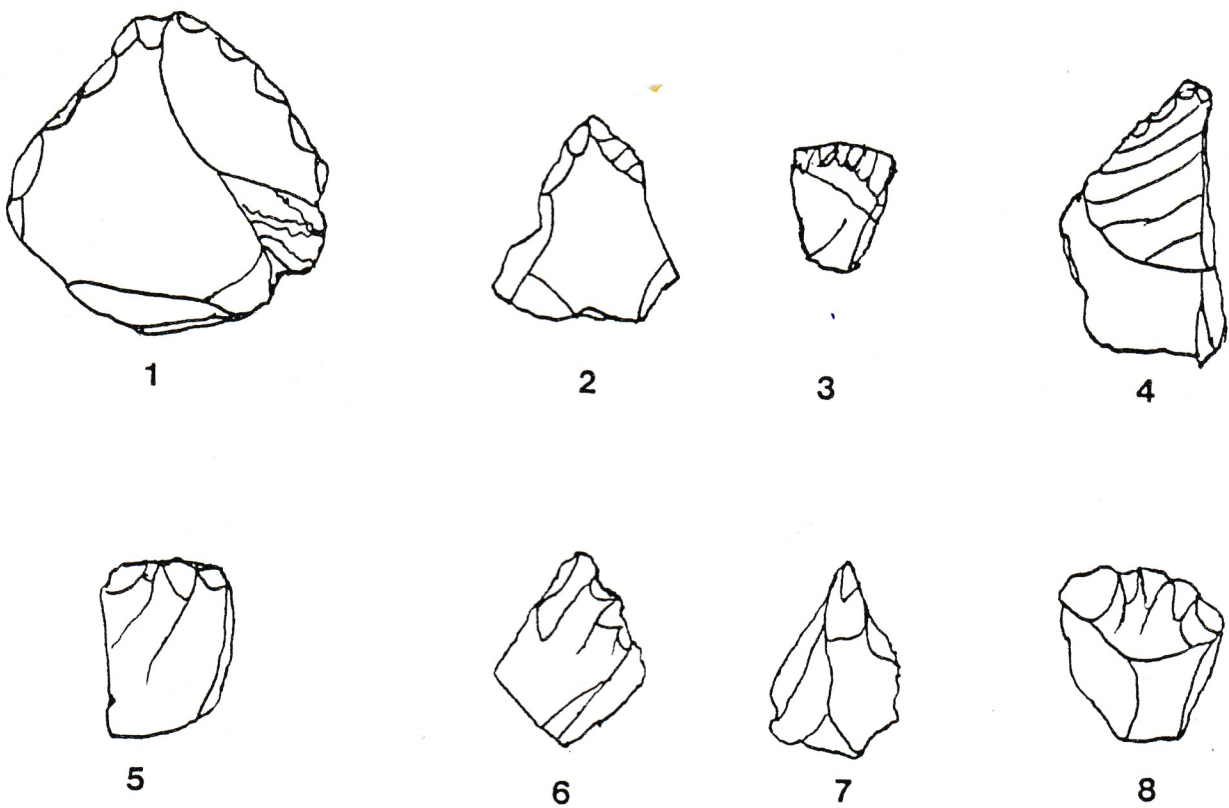
(4) Quartz Artefacts (Fig IX)

Examination of a very large number of Quartz flakes has only yielded eight which clearly show that they have been chipped to form useful artefacts. It could be that the use of Quartz in "Scatters" of a ceremonial or religious nature may have largely precluded its use for more common purposes.

- 1 Large heavy Scraper. Semi-chrystaline. (4 cm x 4 cm x 1.3 cm thick at base). Lower terrace.
- 2 Point. Semi-chrystaline. Worked both sides. (1.3 x 1.6 cm). Projection.
- 3 Small end-scraper. Milky. (1.1 cm x 1.3 cm). Projection.
- 4 Flake semi-chrystaline, worked on both sides to form an edge. Perforator? (3.3 cm x 2 cm). Black Platform.
- 5 End-scraper. Semi-chrystaline. (2.4 cm x 1.7 cm). Main Outcrop.

- 6 *Point. Semi-crystalline. Chipped on 3 sides. (2 cm x 2.6 cm). Projection.*
- 7 *Point. Semi-crystalline. Carefully chipped. (2.7 cm x 1.9 cm).*
- 8 *Scraper. Crystalline. Too thick and somewhat blunt. (2.3 cm x 2 cm x 1 cm at centre). Back Platform.*

FIG. IX BRAINPORT BAY : QUARTZ. SCALE 1 : 1



(5) Stone (plate VII)

The following stone artefacts were found in the excavated areas:

- 1 Rubbing Stone. Heavy half-stone. Crystalline limestone. Almost circular. (11 cm diameter x 7.5 cm thick). Smooth rubbing surface with grey-brown patination. Incorporated into top of Terrace revetment.
- 2 Rubbing Stone. Thick Granite flake. Slightly ovoid. (10 cm x 9 cm x 4 cm thick). Flat side smooth and patinated. On Terrace revetment (W Quadrant).
- 3 Small Hammer Stone. Large Limestone pebble. (9 cm x 8 cm). Thicker end dented with numerous impact marks. Upper Terrace.
- 4 Hone. Brown Sandstone. Triangular section grooved by much use as a blade-sharpener. (13.5 cm x 4 cm near centre). Pointed both ends. Lower Terrace NW Area.
- 5 Hone. Pale brown Limestone. (11 cm x 3 cm x 1.6 cm thick). Used for sharpening on one side only. Sharpening surface slightly concave denoting use as a point-sharpener. Near centre of lower Terrace.
- 6 Dibber? Triangular piece of cream-coloured granite (11.8 cm x 9.5 cm). An attempt has been made to improve the natural point by careful chipping along one side of the stone. This has been only half completed leaving a projecting ridge near the blunt end of the implement. Lower Terrace centre.
- 7 Counting Stones? (See Sec 5). Cache of 33 small water-worn Quartz pebbles averaging 2 cm in diameter. In compacted heap. S of Pointer Stone No 1.

(6) Iron Objects

- (A) Backed and Tanged Blade. (12 cm x 3.8 cm at widest point). Found deposited on top of Lower Terrace revetment. S Quadrant.
- (B) Broad double bar. Twisted at both ends. Slotted to a depth of 3 cm at the centre of one end, and to a depth of 1.5 cm at the other. (9.5 cm x 5.5 cm). Purpose unknown. On surface of infill behind Sighting Boulder (See Sec 3).

APPENDIX II: OUTLYING SITES

(1) The Slab Quarry (See Introduction and Fig II).

This area contains an extensive flat sheet of hard grey Schist in which numerous cracks and narrow fissures tend to run at right angles to one another. Here a number of massive slabs have been levered off the bedrock, and many, presumably "rejects", are lying under, and in some cases, projecting through, the bracken. Hollow spaces indicate where slabs have been removed from the site and numerous broken smaller pieces are scattered or piled up in the area.

The largest slab visible, which appears to have been abandoned during handling, measures 2.21m x 1.39m x 48 cm thick. In another place three slabs seem to have been stacked against one another perhaps in preparation for removal.

Yet another large slab has one end supported on a granite boulder from the shore, perhaps, to make leverage easier. There are no indications of metal tools having been used and the quarrying seems, therefore, to have been done with wooden wedges and wooden levers.

Recently a single cup-mark has been found on the bed rock near the centre of this area.

(2) Cup-marks

Cup-marks occur in two places close to the main Alignment structures (Fig II).

The larger group, consisting of 14 cups with no rings, are carved on a flat rock sheet of hard Schist approximately 30m NW of the lower terrace. They appear to be significantly arranged in groups of 3, 4 and 6, with one other two metres distant to the NE. It is impossible to say whether they are in any way connected with the Alignment.

The smaller group of 2 shallow cups close together is on the top of a small outcrop of Micaceous Schist approximately 12m due W of the Lower Terrace. These are badly weathered, and may once have been surrounded by a line. If this was the case, they would have formed a "Spectacle" mark. (Possibly connected with "Eye" symbolism).

(3) The "Oak Bank" Site

Mention should here be made of what has become known as the "Oak Bank" site on the top of the wooded cliff on the NW side of Brainport Bay.

This site contains a large fallen Megalith which, from its position, could have indicated the Mid-Summer Sunset position from a point on the main Alignment. It also contains two unusual line-bisected cup-marks, one of which appears to indicate the Sunset position at the "Megalithic" Equinox with a high degree of accuracy.

All these features could have made a useful addition to the main site for calendrical purposes at various times of the year.

Unfortunately, their discovery came too late for detailed inclusion in this Report.

(4) Site in Wood E of Main Alignment

Approximately 25m E of the Alignment inside the edge of the FC plantation there is what appears to be a fallen Megalith 2.7m in length and broken into 4 pieces.

Samples from all four pieces have been petrologically examined by the Stratigraphic Laboratory, Britoil, Glasgow, and found to be all part of the same stone. (July 1983).

It is quite possible that this stone may have been intended to be lined-up with the Standing Stone on Cnoc Mhor on the E side of Loch Fyne, (Pt 98 NR006946), as a pointer towards the Equinox Sunrise position.

APPENDIX III: THE QUARTZ "SCATTERS"

The three Quartz "scatters" at key points of the Alignment are an interesting feature of the Brainport site.

It was noticed that a high proportion of the Quartz used in these "scatters" was broken or splintered, and that comparatively few water-worn pebbles appeared to have been used. This feature of scattered Quartz has been noted before on other sites, notably at Culcharron Cairn, Benderloch (Peltenberg. Proceedings Soc. Ant. Scot. 104) and at Strichen Recumbent Stone Circle. (D & E 1980 Abramson).

It was, therefore, decided to carry out an experimental comparison between samples from all three "scatters" on the Alignment, and numerically similar samples taken from undisturbed areas of soil nearby.

It should be pointed out that in the case of Brainport there was an ample supply of water-worn Quartz pebbles available a short distance away on the beach.

The three samples from the "scatters" comprised all the pieces, from within a 1m square and averaged 40 pieces of varying size.

The samples from the outlying sites comprised the same number from each "dig" and one of the three samples was from a gravel bank close to the high tide mark. The other two were from soil in two locations between 30 and 40 metres NW of the Alignment. The results were as follows:

1	SCATTER I (Projection of Rear Platform)	Fractured pieces Pebbles	86% 14%
2	SCATTER II (In front of Sighting Boulder)	Fractured pieces Pebbles	80% 20%
3	SCATTER III (Round Pointer Stone No 1)	Fractured pieces Pebbles	84% 16%
4	GRAVEL BANK	Fractured pieces Pebbles	9% 91%
5	SOIL "A"	Fractured pieces Pebbles	20% 80%
6	SOIL "B"	Fractured pieces Pebbles	32% 68%

Conclusions

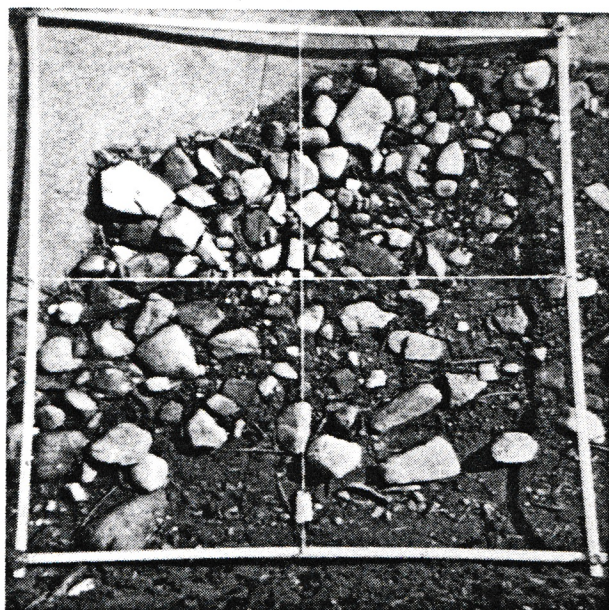
The results confirm a very marked preference in all three "scatters" for fractured pieces over the readily-available pebbles. In two out of the three "scatter" locations up to three fitting pieces of the same lump were found lying close together which seems to indicate that some of the Quartz was fractured "in situ". The most likely explanation would seem to lie in the desirable "whiteness" of fractured pieces by comparison with the dull and often discoloured pebbles.



Back Platform. Projection from N.W.



Back Platform. Projection. Quartz scatter.



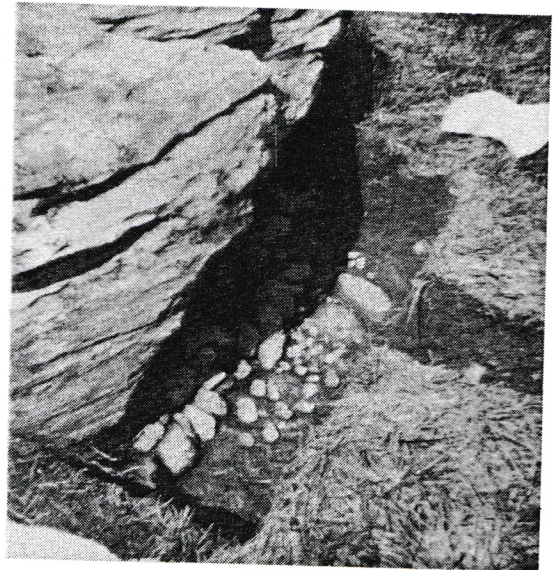
Back Platform. Pebble surface (1M square).



Observation Boulder from W., showing in-fill platform.



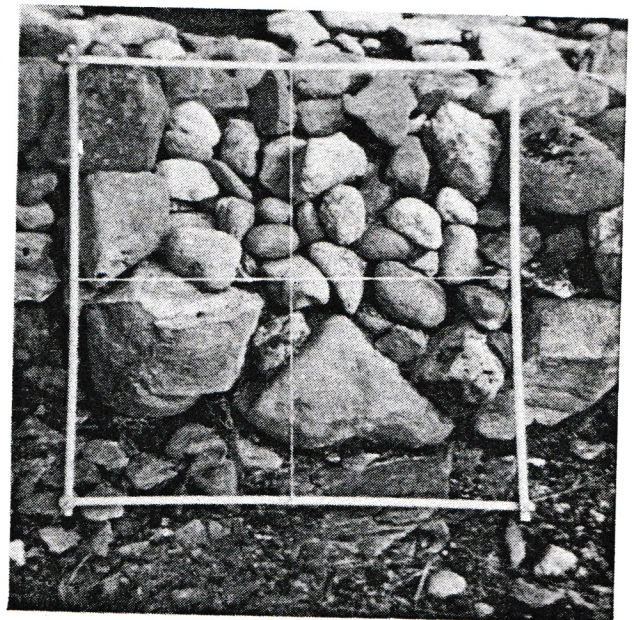
Observation Boulder from N.E.



Observation Boulder. Quartz scatter at N.E. side.



Causeway (foreground) and terracing.



Lower Terrace. Revettment construction within 1M square.



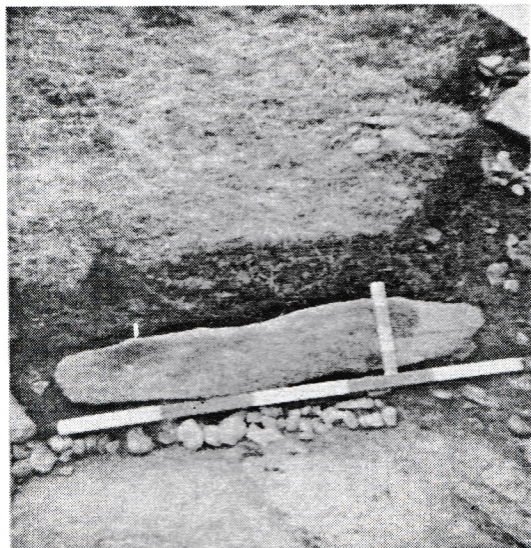
Lower Terrace. W. Quadrant. Lowest course of revettment



Lower Terrace. "Tumble" at E. side under re-constructed section.



Upper Terrace. Stone No. 2 in rock cleft looking N.E.



Lower Terrace. Stone No. 2 as found.



Upper Terrace. Stone No. 2 socket hole, showing capstone on left.



Upper Terrace. The "Pyramid" Stone from W.



Upper Terrace. Stone No. 2 from S.E.



Main Feature. Pointer Stone No. 1



Main Feature, showing "step-up" in level.



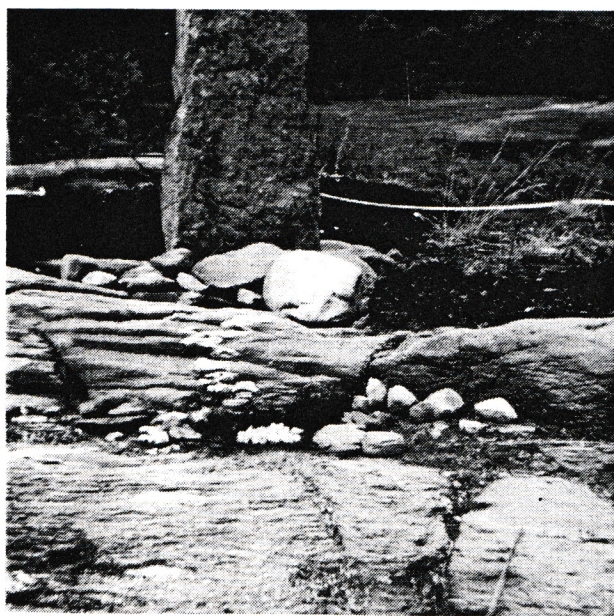
Main Feature. Paved area looking N.E. showing Stone No. 1



Main Feature. The fire trench partially excavated to bed-rock.



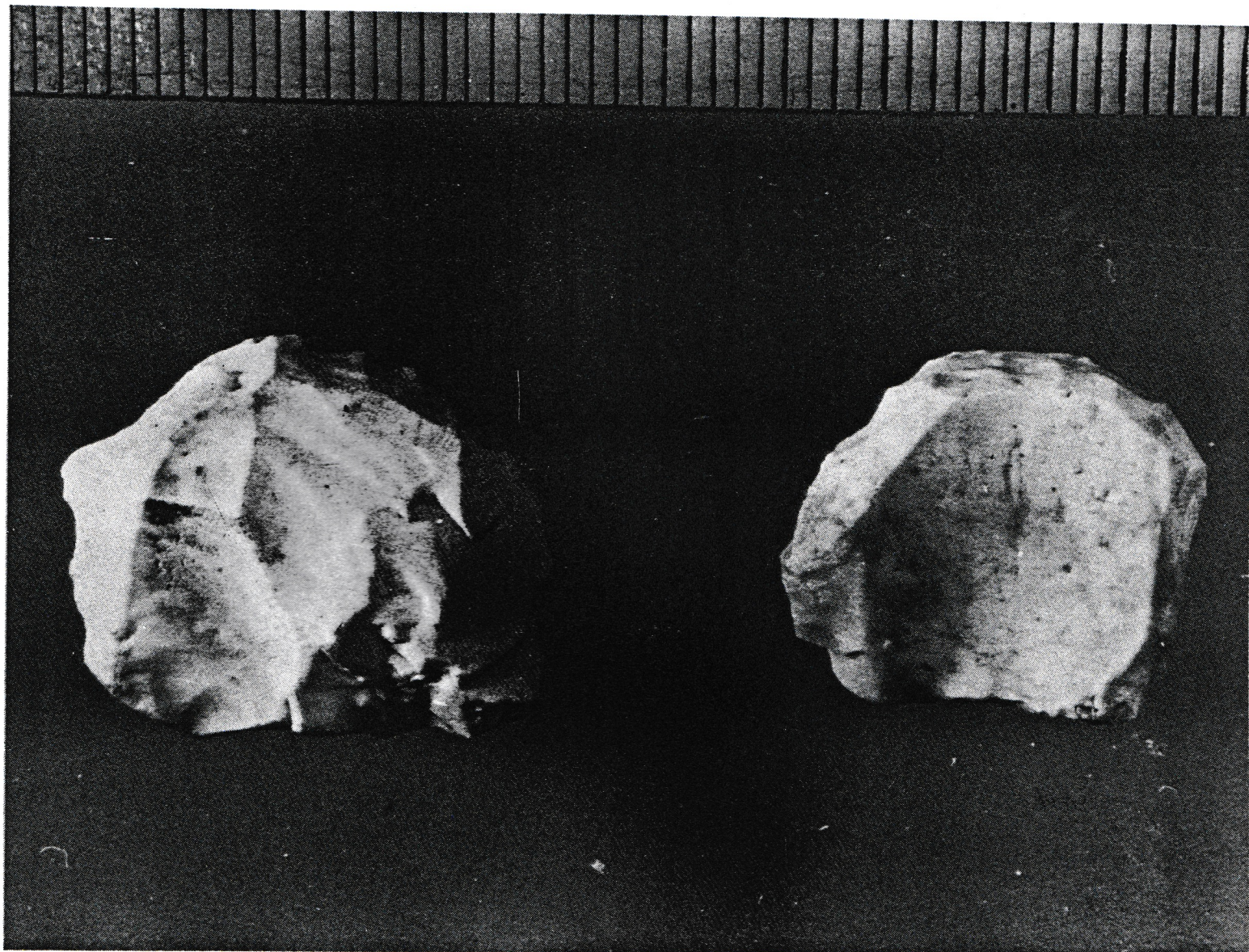
Upper Terrace. Pyramid stone from N.W.



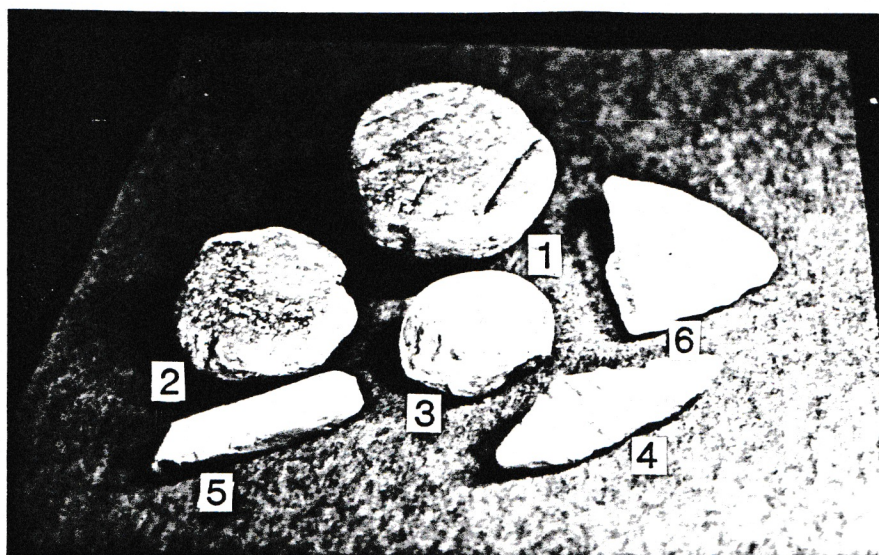
Main Feature. "Counting" stones in situ E. of Stone No. 1



Main Feature. The 33 "counting" stones as uncovered.



Flint scrapers (enlarged, Mm. scale above).



Stone artifacts recovered from site (numbers as per Appendix I).

RELEVANT BIBLIOGRAPHY

Code

- A General Background
- B Prehistoric Solar Significance
- C Prehistoric Religion and Ritual

- A *The Environment of Early Man in the British Isles (Evans)*
- B *The Prehistoric Settlement of Britain (Bradley)*
- A *Introduction to British Prehistory (Megaw & Simpson)*
- A *The Prehistory of Europe (Phillips)*
- A *The Archaeology of late Celtic Britain & Ireland (Lloyd Laing)*
- A *The Archaeology of Ireland (Harbison)*
- A *Prehistoric Heritage (Paturi)*
- A & B *The Megalith Builders (Mackie)*
- A & B *The Stone Circles of the British Isles (Burl)*
- A & B *Circles & Standing Stones (Haddingham)*
- B *In Search of Ancient Astronomies (Ed. Krupp)*
- B *Megaliths & Masterminds (Lancaster & Brown)*
- B *Megaliths & their Mysteries (Service & Bradbury)*
- B *Prehistoric Cornwall - The Ceremonial Monuments (Barnatt)*
- B & C *Early Man & the Cosmos (Haddingham)*
- B & C *Rites of the Gods (Burl)*
- C *The Celtic Mysteries - The Ancient Religion (Sharkey)*
- C *The Druids (Piggott)*
- C *The Avebury Cycle (Dames)*
- C *Earth Rites (J & C Bord)*

Papers

- B *Prehistoric Astronomical Sites in Scotland*
(Phil. Trans. R. Soc. Lond. A276, 1974) (Mackie)
- B & C *Bulletin No 3 Association Archeologique Kergal (Brittany)*

