MEGALITHIC SITES IN BRITAIN

BY

A. THOM

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C O N T E N T S

11

THE OUTER HEBRIDES

(Thom 1971:122–134)

MORE space will be devoted to these islands than to any other part of the country because of the relative inaccessibility of many of the sites and because of the very great amount of information which is to be obtained there. There are about a hundred miles of islands with only two passages through, except at the extreme south, and for many months of the year these two channels are rendered impassable by the seas breaking on the shallow water. In a heavy winter gale the courtyard at Barra Head lighthouse is filled with water from the waves dashing on the cliffs and the lighthouse is 680 ft above sea level. Many of the sites can, it is true, be reached by normal transport, but others lie on small islands where the would-be surveyor needs his own boat. Anyone who cares to take the trouble to visit the sites will find himself in country quite different from anything else in the world and will be rewarded by a glimpse of a way of life rapidly passing away.

The east side of the islands is generally rock and heather, but much of the west is flat and supports most of the population. The west coast shows some of the finest stretches of beach in Britain resulting in places in great sand dunes. Naturally practically all the sites are on the west, and are to be found from one end of the archipelago to the other, even at Barra Head itself, which incidentally is not on Barra but on Berneray far to the south. At the north, Lewis and Harris form one island and it is in Lewis that we find Callanish, near which, at the head of Loch Roag, lies the most important group of circles and alignments in Britain. This beautiful loch lies on the north-west coast, its outer bastions of rocks and islands protecting it from the fury of the Western Ocean, here subject to a gale frequency barely surpassed anywhere.

The importance of this group lies not only in Callanish itself with its Type A circle, its small ellipse, and its five alignments, but in the surrounding sites, most of which are intervisible and all of which have some important contribution to make to the present study. Amongst them are four ellipses and one or perhaps two alignments, while collectively they provide by their intervisibility several interesting declinations. There is as yet no complete survey and so the information to be given here must be regarded as tentative pending a complete examination.

The earliest drawing of the main site known to the author is that in Martin's book (1716). The survey by Macculloch (1819) is naive and crude. He measured in links but called them feet. This survey is, however, valuable in that it seems to be the only record, albeit difficult to interpret, of the stones which were upright before the 'reconstruction'

which took place later in the nineteenth century. The only subsequent accurate survey is that by Somerville (1912). Fig. 11.1 shows the central portion of Somerville's plan with the Type A circle and the ellipse superimposed.

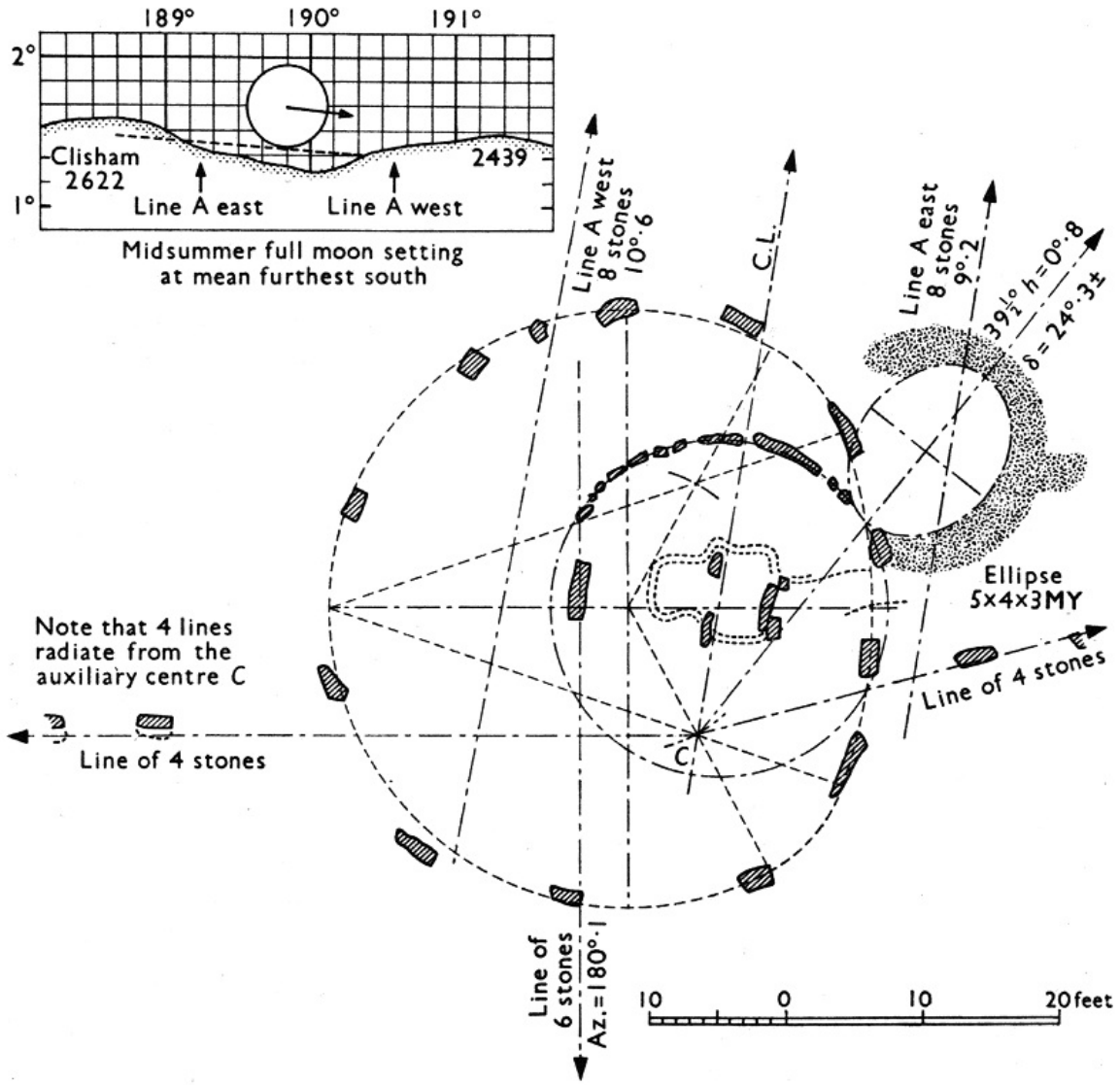

Fig. 11.1. Tursachan Callanish H 1/1. Stones after Somerville.

Running south from the great menhir is an alignment accurately in the meridian (azimuth = 180°.1). Four other alignments of tall stones run from the ring, the two to the north forming the avenue. It will be noticed that, as pointed out by Somerville, the centre line of the avenue and the east and west lines pass through one point. It now becomes apparent that this point (*C*) is one of the auxiliary centres for the main ring. We shall see that, except for the meridional line, astronomical requirements decided the exact positioning of the sighting lines and so of the point *C*. The meridional line was probably moved slightly to the west to allow it to pass through the large natural rock to the south

The author found that at night this rock was the natural place to stand to see the line of menhirs running accurately to the point under the pole, and so from this rock the times of transit of stars to the north could best be judged.

The clearance of the peat from the site which took place last century allowed Somerville to plot the outlines of the beds of small stones. It will be seen that the annular bed on the north-east of the main ring is bounded on its inner edge by an ellipse based on a 3, 4, 5 triangle, the major and minor axes being 5 and 4 MY. The axis of the ellipse also radiates from *C* at an azimuth of about $39\frac{1}{2}^\circ$ and this, with an estimated horizon altitude of 0°·8, gives a declination of –24°·3, which is within 0°·1 of the upper limb of the rising midsummer sun. A similar indicator of the solstitial sun will be found at Loanhead, Daviot (Fig. 6.6). Also at the Thieves (Fig. 6.12) the outline of a Type A circle is defined by a bank of small stones. We are at liberty to guess that these stones were originally retained by timber, which may of course have formed something impressive perhaps containing sighting gear. It will also be seen that the axis of symmetry of the main ring is exactly east and west and so parallel to the alignment running to the west which shows the setting point of the equinoctial sun. The alignment running towards the east shows, perhaps intentionally, the rising point of Altair in 1800 B.C.

Somerville accepted the stones he found upright as being in their original positions and found that the sides of the avenue were not parallel but that both lines showed the same declination to the north (32°·5). This was possible because of the slight difference of the hill horizon altitude for the two lines. But if we use only the stones which seem to have been upright in Macculloch's time the lines are parallel and 11 MY apart. The identification of the upright stones is, however, a little uncertain (Thom, 1966) and the matter awaits further investigation. This investigation would need to be done by archaeologists excavating the avenue by modern techniques. The importance of this apparently trivial matter lies in a suggestion first made by Professor G. S. Hawkins (1965 (1)) that the avenue was intended to be used looking south, when it gives one of the accurate lunar lines in Table 10.1. We know that some lines were so cleverly sited that they could be used in both directions and so the avenue may have been used for lunar observations to the south and for Capella rising to the north. If this is accepted the date of the erection would be 1800 B.C., which is also the date obtained by assuming the east line is for Altair.

The setting of the moon at its mean lowest declination is shown in Fig. 11.1. If the sides of the avenue diverged as supposed by Somerville we see what may have been intended. The lower limb reappeared on the flank of Clisham on what Somerville called Line A east and again vanished on Line A west. The azimuth of Line A west is not in dispute, so if the two were parallel both would show the disappearance on the slope to the right. As explained on p. 23, the lowest position attained by the moon at a particular time could be as much as 0°·15, i.e. 9', lower or higher than the mean lowest.

This variation is allowed for by the outline of Clisham. At the absolute lowest the lower limb would touch the bottom of the dip and at the highest would graze the summit of Clisham. This arrangement whereby the limiting positions are shown might be ascribed to chance were it not for the fact that we have reason to think that the same kind of

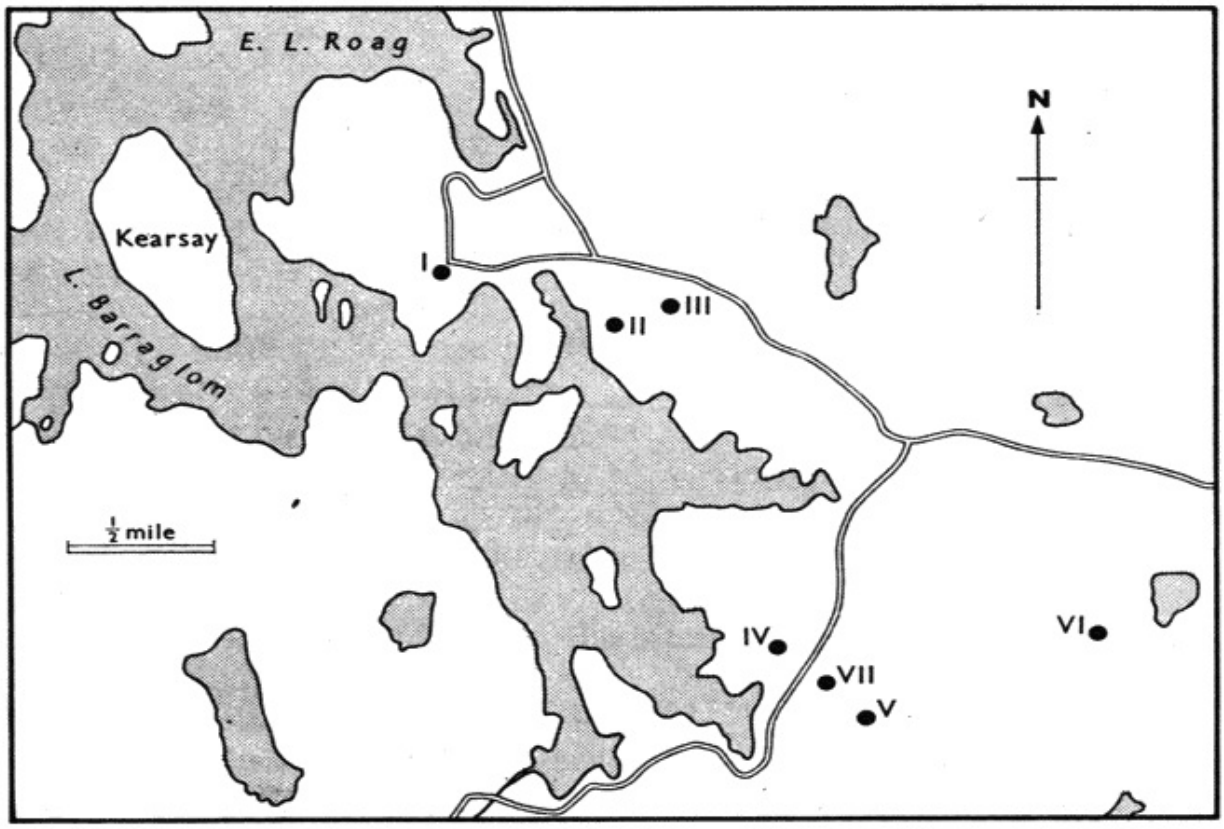

Fig. 11.2. Sites round the head of Loch Roag, Lewis.

arrangement obtains at several other sites. We shall see that at each of these the declinations 29°·95±0°·15 are shown almost exactly. The importance of getting independent confirmation of the exact conditions at these sites is difficult to overestimate. The discovery of this small variation in the inclination of the moon's orbit was made by Tycho Brahe. Is it possible that its effect was known in the Outer Hebrides in 1800 B.C.? Certainly the necessary observing apparatus for detecting the effect is there.

The positions of the seven known sites round the head of the loch are shown on Fig. 11.2. These sites will now be briefly described. Somewhat rough surveys are given for four, but all ought to be very carefully measured and examined before any of the dimensions and declinations can be accepted as final.

Callanish I, already dealt with, stands on a low peninsula in the loch and so has wide views in all directions.

Callanish II, *Cnoc Ceann* (Fig. 11.3), is a Megalithic ellipse in that it is based on an approximate Pythagorean triangle and has a calculated perimeter just over 75 MY.

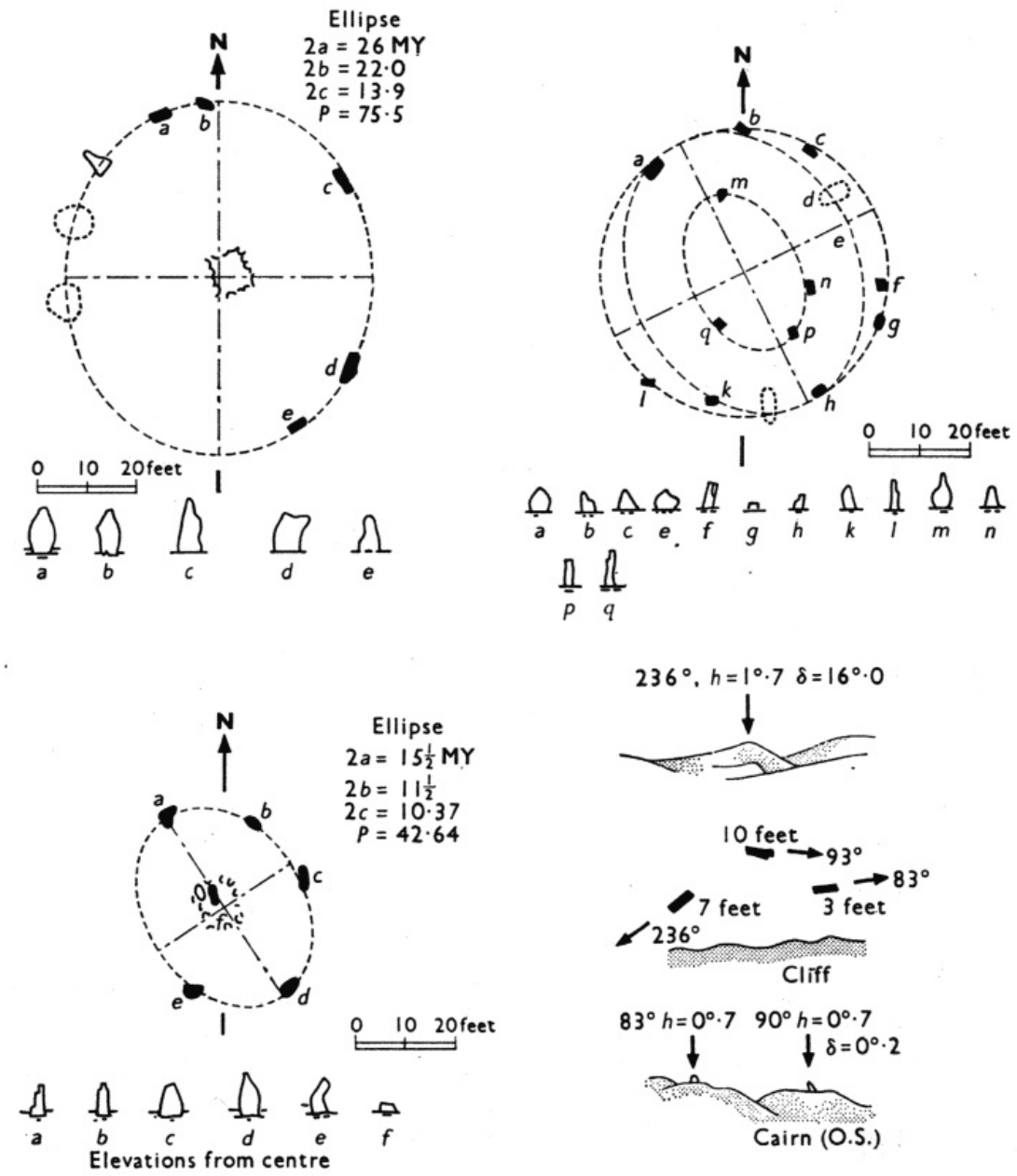

Fig. 11.3. Callanish II, H 1/2; Callanish III, H 1/3; Callanish IV, H 1/4; Great Bernay, H 1/8.

VI as viewed from *II* shows a declination estimated to be –19°·7. We have seen that one of the expected lunar declinations is –19°·58.

Callanish III, *Cnoc Fillibhir Bheag* (Fig. 11.3). If the author's somewhat hurried survey is substantiated this must be accepted as a most interesting

arrangement of two ellipses with the auxiliary circle for the larger clearly indicated. It is the only place where this arrangement has so far been found. One wonders if the erectors realized that the ellipse was a projection of the auxiliary circle. Particulars of the two ellipses show some interesting features:

$2a$	$2b$	$2c$	P
21	17	12·33	59·86 MY
$12\frac{1}{2}$	8	9·60	32·59

If 12·33 is accepted for $12\frac{1}{2}$ we see that the foci of the outer ellipse lie at the ends of the major axis of the inner. If the major axis of the inner ellipse is accepted as 12·33 the calculated perimeter is 32·30. With such a small number of stones it is doubtful if a more accurate survey will decide the matter but it makes little difference. The remarkable fact remains that both ellipses satisfy the requirement that the perimeters be multiples of $2\frac{1}{2}$ and yet they are related in the manner above described. Since the diameter of the auxiliary circle is a multiple of 7 its circumference would be assumed to be $3\frac{1}{7}$ x 21 or 66. This reminds us of Moel ty Ucha (chapter 7) where the basic circle was a multiple of 7 and the modified ring a multiple of $2\frac{1}{2}$.

Callanish IV, *Ceann Thulabeg* (Fig. 11.3). Here, again, we have an obvious Megalithic ellipse with a perimeter of 42·6 MY. The line to the north stone at V, and only the north stone is visible, passes through VII and on to a hill top, South Cleitshall. The declination (–22°·8) is difficult to explain unless we accept it as belonging to one of the intermediate calendar dates discussed at the end of chapter 6.

Callanish V, *Airidh nam Bidearn* (Fig. 11.4). The sketch plan was made by Dr. A. S. Thom in 1957 and the other information is taken from the Ordnance Survey. Unless something very close locally obstructs the view to the southsouth-east the mountains at the head of Loch Seaforth are visible from the site and the moon in its mean furthest south position would have risen as shown at the top of the figure. It will be seen that the moon could be 9 or 10 minutes lower before the lower limb grazed Sitheart an Airgid and 9 or 10 minutes higher before the upper limb cleared Mor Mhonadh. It will be seen that the azimuth of the alignment suggests that these mountains am the foresight. The outline to the north was also constructed from the Ordnance Survey but the two httle hills shown over Callanish II are too near to permit of any great accuracy. It would appear that the setting moon at its mean furthest north just cleared these hills. Callanish I is also visible and shows the setting point of the midsummer sun. VI perhaps by accident shows the declination (+ 13°·6) of an intermediate calendar date.

Callanish VI is situated on a low eminence at about 125 ft O.D. with I, II, IV, and V visible. Them are here two slabs $5\frac{1}{2}$ ft and 3 ft high with orientations of about 323° and 270°. The latter indicates IV, which shows a declination of about 0°·0. Callanish I is indicated by the other stone and shows a declination of +16°·9. So from this site we

two calendar declinations, with perhaps an intermediate date from the line to V, which shows a declination of about –12°·9.

Callanish VII seems to be a ring of stones, 10 MY diameter, situated on the line between IV and V some 50 ft south-south-east of a ruin.

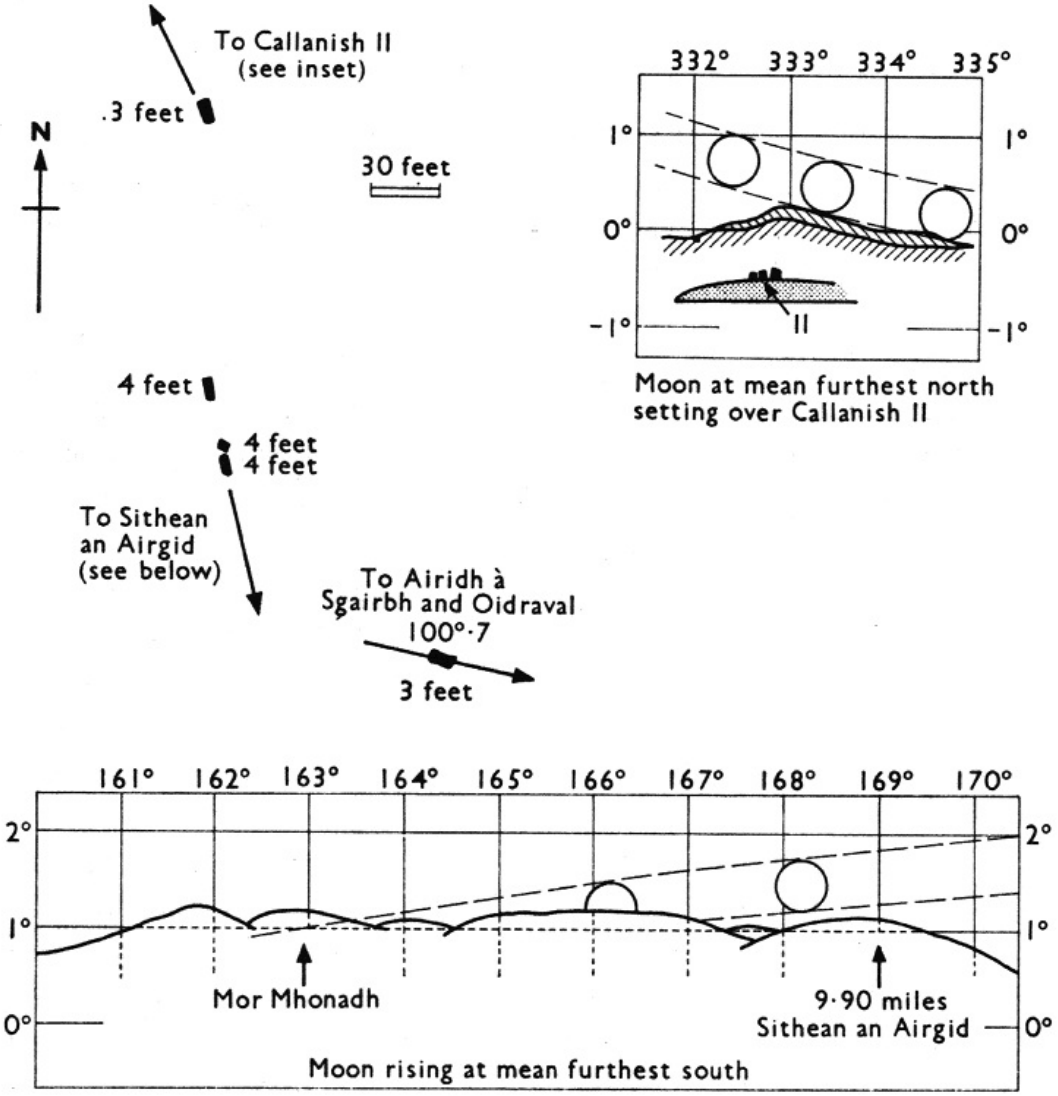

Fig. 11.4. Callanish V, H 1/5, sketch plan of site.

Great Berneray. On this island there is a site overlooking the narrows of Loch Barraglom which connect East and West Loch Roag. The arrangement of the three large slabs here is sketched in Fig. 11.3. It is seen that each slab indicates a hill top, but the cairns shown on two of these have not been visited and may be modern structures. Across the narrows on the Lewis side there is (or was) a single stone. These two sites so far as is known are not intervisible with any of the Callanish sites.

At *Carloway* near the mouth of Loch Roag stands *Clach an Tursa*. This 8-ft high stone has two fallen neighbours each about 16 ft long. The group appears to have formed an impressive alignment with an azimuth of perhaps about 153°.

Steinacleit. This site lies some fifteen miles further north. The outline is a Megalithic ellipse but the stones are small and may have retained some kind of cairn or tumulus. The polygonal ridge round the main site is not the only enclosure of this kind in Scotland, and has something in common with the structure high up above Macrihanish in Kintyre. There are other remains near Steinacleit, amongst them a small outlier to the east.

Clach an Trushel (H 1/12). This is perhaps the tallest if not the largest stone in Scotland. It is about 20 ft high and may have been part of an alignment. It is not flat enough to define an azimuth accurately but it might be said to indicate Steinacleit, which is visible on the horizon about 1·4 miles distant. If this was intentional perhaps the declination belongs to Altair, but one would expect a stone of this size to have a more important duty.

On the other side of Lewis in the Eye Peninsula stands, in a commanding position, a somewhat amorphous group of stones called *Dursainean* (H 1/13). This site is intervisible with *Clach Stein* (H 1/14) and a 6-ft slab in the valley some 600 yds to the north-east (H 1/15), not mentioned but perhaps marked on the 6-in O.S. This slab stands on a long mound and is orientated about 304° giving a declination of 16°±. The higher stones in Dursainean are just visible on the horizon giving a declination of –19°·3, one of the lunar lines. Dursainean is also the foresight from Clach Stein for another lunar declination, but the small stone beside Clach Stein is orientated on Suilven, that most spectacular of British peaks, on the other side of the North Minch 40·4 miles distant. If the corresponding declination (– 4°·5) is accepted it can only belong to one of the intermediate calendar dates.

Coming south from Loeb Roag there are no sites known to the author in the mountainous Forest of Harris. But they begin again on Taransay, where there is a large stone (Clach an Teampuill) on the low neck of land in the island. The horizon to the north is obscured, but from the slab, which stands roughly north and south, it ought to be possible to see Clach Mhic Leoid on the Harris shore. Unfortunately this was not checked. The line leads to a col and shows a declination of –21°·8 on the shoulder of Heilisval More, obviously one of the primary calendar declinations. Clach Mhic Leoid itself is an impressive stone orientated 280° and so pointing slightly to the north of Boreray, the most northerly island of the St. Kilda or Hirta archipelago. This precipitous island is 1245 ft high and so its peak (fifty-five miles away) projects above the sea horizon otherwise unbroken except by Hirta itself. In Fig. 11.5 Boreray's appearance is shown from Clach Mhic Leoid and from three stones in North Uist, Benbecula, and South Uist. It is seen that in every case the island is hull-down. These sites will be discussed in their proper place, but meanwhile it may be noted that all give primary calendar declinations. The setting sun has been shown on all in what seems the most obvious position, but it will be understood that in any given year it might never be seen in the position shown because on one night it might be to the left and the next have moved to the right past the peak.

The movement per day along the horizon for three of these sites would be greater than the diameter of the disk.

There is a stone on Ensay in the Sound of Harris, perhaps giving the midwinter sun rising on the Skye mountains, but there is a much more important site on Berneray, another island in this rock-strewn sound. The stone here, *Cladh Maolrithe*, stands

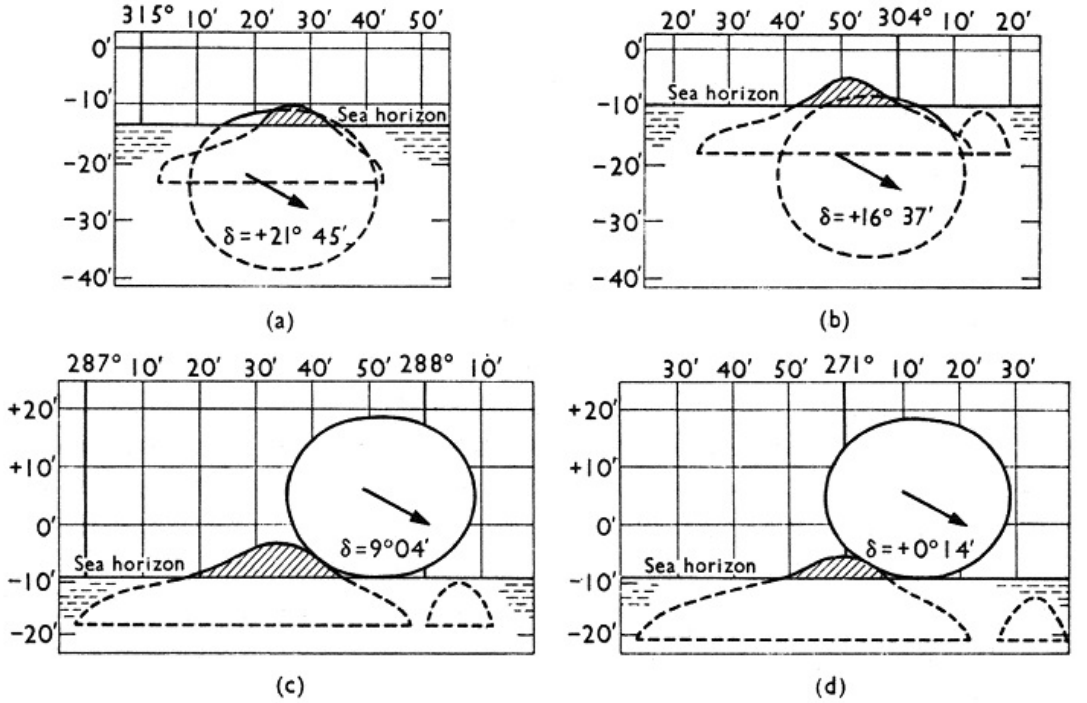

FIG. 11.5. Boreray as seen from menhirs at (*a*) An Carra, South Uist, H 5/1, 59·4 miles; (*b*) from orientated stone in Benbecula, H 4/4, 52·3 miles; (*c*) from Clach ant Sagairt (orientated), North Uist, H 3/2, 48·5 miles; (*d*) from Clach Mhic Leoid (orientated), Harris, H 2/2, 55·2 miles. The declinations in Table 8.1 are those of the island summit.

inside a large grass (and stone) ring and is orientated on a boulder some distance outside the ring. The line so defined indicates the small islet of Spuir in the offing. The corresponding declination (+13°·2) gives another of the reliable inter-mediate calendar lines.

North Uist. The positions of the sites in the west of the island are shown in Fig. 11.6. *Clach Mhor à Chè* is an impressive menhir accurately orientated on Craig Hasten and so showing the declination of Altair about 1700 B.C. (see p, 162). This may or may not have been the intention but Craig Hasten was examined and proved to be a huge rectangular natural rock standing on an eminence and so forming a natural landmark. Close to it, to the southeast, there is in the field what seems to be a small erected stone which is perhaps the backsight for the rising equinoctial sun. The site at Claddach illeray (H 3/15) was noticed just north of the shore road. It seems to have been a small stone circle, but the only stone now upright is a slab standing near the centre in the meridian. The stone which gives its name to Ben a Charra is a large upright slab orientated about 250°.

Leacach an Tigh Chloiche is, as the name implies, a house of stone on the ridge. It is the most important site in the island and consists of a mixture of open kists and upright stones. The latter seem to form an ellipse 20 x 13 MY, which gives a calculated perimeter of 52·42. From the south these stones stand out on the skyline so clearly that they were noticed from the circle *Sornach Coir Fhinn*, nearly three miles away but much lower. There are two large slabs projecting through the deep peat inside the latter circle. Both

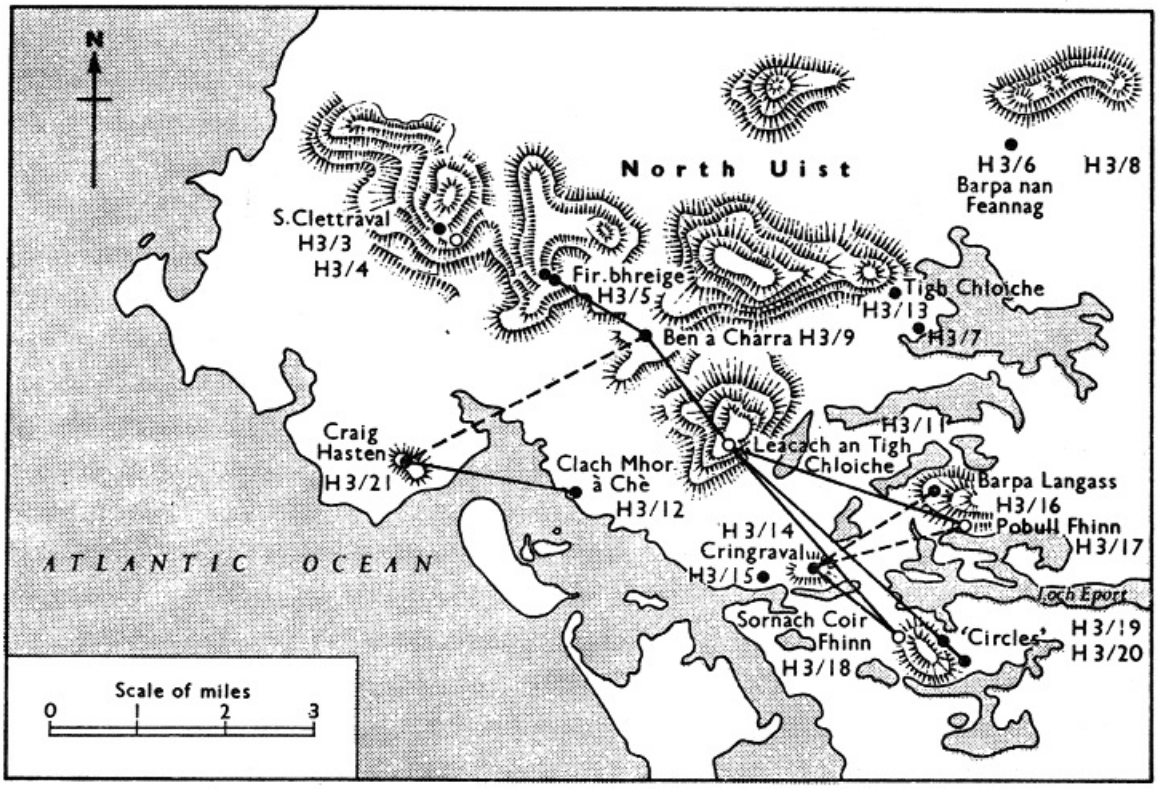

FIG. 11.6. Sites on the west coast of North Uist. (The seventh series of the 1-inch O.S. map interchanges the names of H 3/17 and H 3/18.)

are orientated on Leaeach an Tigh Chloiche, but as one is wedge-shaped one of its faces may be intended to indicate the site on Cringraval, where the stones stand out again on the horizon. Both lines give primary calendar declinations. The view to Leacach an Tigh Cloiche is shown on Fig. 11.7, where we see from the *centre* of Sornach Coir Fhinn the solstitial sun setting behind the stones. A few nights before and after the solstice the observer could, by moving to the right, get the edge of the disk on the stones, and the slabs at Sornach Coir Fhinn are to the right of the centre. So this circle may show us the same kind of adjustment as will be discussed in connexion with Ballochroy (pp. 151-3).

The sketch plan also shows how the large menhir at Leaeach an Tigh Chloiche points roughly in the direction of Wiay, which lies close to the southeastern corner of Benbecula. The moon in its mean most southerly position is shown rising behind Ben Tuath, the hill on Wiay. It will be seen that here again the position of the sighting point is such that the two extreme positions are marked at ±10', almost exactly Tycho Brahe's range.

The points on the profile as calculated from the Ordnance Survey contours are shown by black dots. The distance to Wiay is large enough to permit of these points being correct to ±1' in altitude and ±7' in azimuth, and so we can be reasonably sure of the particulars given, but it is desirable to have a profile accurately made on the spot. We have now seen that there are three sites in the Hebrides showing not only the lunar declinations but

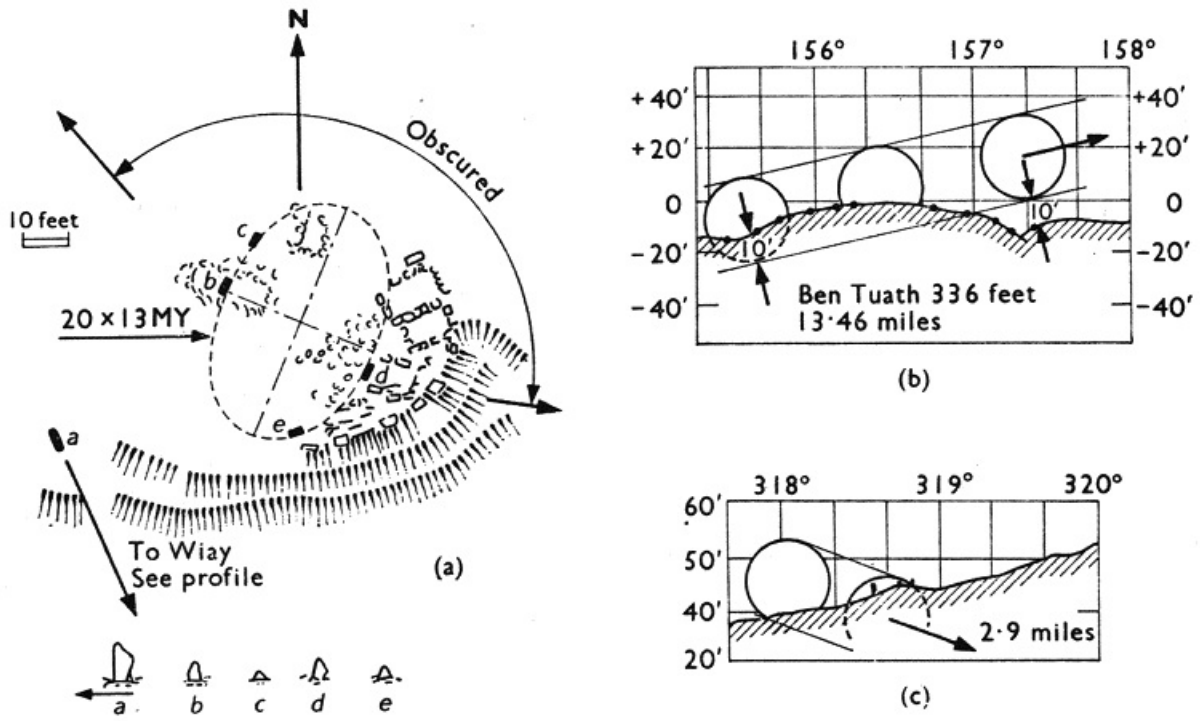

FIG. 11.7. (*a*) Leacach an Tigh Chloiche, H 3/11 (57° 34′ 38″, 7° 21′ 17″), scale sketch; site is at 260 ft O.D. on a ridge running down towards south-west. (*b*) Moon rising over Wiay (island) at mean furthest south as seen from Leacach an Tigh Chloiche. (*c*) Mid-summer sun setting over the stones of Leacach an Tigh Chloiche as seen from the centre of the circle at Sornach Coir Fhinn (H 3/18), which has two orientated stones inside. Azimuths and altitudes ±2′.

the declination limits correct to a minute or so. While the distance as the crow flies from Leacach an Tigh Chloiche to Callanish is only fifty miles, the journey today by public transport would probably involve crossing to the mainland and at best would mean chartering a ferry to cross ten miles over the Sound of Harris in addition to seventy miles of road travel. We see that the group of sites we are looking at belonged to a different community to that on Loch Roag.

Looking towards Leacach an Tigh Chloiche from the stones on South Clettraval (H 3/3) gives a declination of –19°·2, which is again one of the 'expected' lunar values, but this site has not been visited. Looking from Leacach an Tigh Chloiche to the south-east, Scurr nan Gillean in Skye nearly sixty miles away stands 2503 ft and gives the declination of the upper limb of the mid-winter rising sun, but the exact values on the slope of the mountain are not known. Curiously, the two ruined sites called 'Circles' on the O.S., but more like kisted tumuli, are exactly in line with this site and give one of the primary calendar declinations.

Thus it appears that The House on the Ridge is one of the most important sites in Britain, placed in such a position that it yields at least four declinations and possibly several more. Its position, dictated by the lunar line to Wiay, fixed the position of Sornach Coir Fhinn and so of Cringraval and almost certainly of several more of the sites shown in Fig. 11.6. Particulars of some of these and of other North Uist lines will be found tabulated. One of these ought to be mentioned. It is reported that the huge stone, Clach ant Sagairt, has been artificially erected, the claim being based on the packing seen below the base. It is orientated to point to Boreray, but bad weather prevented full verification of the calendar declination given from here by this universal foresight.

Benbecula has two or perhaps three circles, one of these at the North Ford being in a ruinous condition, but much more interesting is the stone just west of Ben Rueval. This stone is not shown on any O.S. map, but lies just south of the old cart-track round Ben Rueval to Loch Uskavagh and a little to the west of Loeb na Ba Una. It is a small upright slab so accurately orientated on Boreray that it first drew the author's attention to the importance of this foresight by giving accurately the declination for one of the important calendar dates.

The largest stone in South Uist is An Carra, and like the great stone in North Uist it gives the name to another, Ben a Charra, and perhaps to the pass behind. It is 16 ft high and 5 ft wide at the base. It is orientated at about 53°, probably to indicate the sun rising on the shoulder of Hecla with a primary calendar declination of about $21\frac{1}{2}°$. But its main use was to give the same date in the evening with Boreray as an accurate foresight. This is the fourth and last of the stones in the islands using Boreray to give a primary calendar date. There is only one other position from which Boreray could be so used and that would be in the mountainous region in the Long Island, where, as already mentioned, we find no sites.

Almost buried in the sand dunes behind Ru Ardvule there are several stones, only one now upright. From here Maoil Daimh, one of the foothills of Hecla, appears behind An Carra to give the lower limb of the rising midsummer sun. Less than a mile away, near the west end of the causeway over Loch Kildonan, there is a rough ring of stones which may be the remains of a circle. With the sand dunes removed this might be visible from the Ru Ardvule site and if so would indicate a line to the shallow col between Ben Shuravat and Layaval and so would give 129°·4, h = 1·0, declination = – 19°·6. This belongs to the lunar group, but is too uncertain to be used without considerable investigation.

In Barra, in addition to the stones on the west coast shown on the Ordnance Survey, there are at least two other sites. At the top of the pass through the {p.134>} island there is a stone 16 x $4\frac{1}{2}$ x 2 ft reported by Dr. A. S. Thom to be almost fallen flat. On the east coast near Brevig there is a site believed to be called *An D'Ord* consisting of two alignments and a large upright. One is a solstitial line and the other is nearly in the meridian. The barps or tumuli in the hills are well known to archaeologists.

On Vatersay there are two stones forming part of an oval, and on the most southerly of the islands, Berneray, we find remains which may well have been a circle and an outlier.

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Chapter 11: The Outer Hebrides. Thom, A. *Megalithic Sites in Britain*, Clarendon Press, Oxford, 1971:122–134.

12

A VARIETY OF SITES

(Thom 1971:135–159)

TABLE 12.1 contains all the sites surveyed by the author which contribute to the material of this book. The position of each site is shown by the map reference with sufficient accuracy to enable it to be located on the 1-in O.S. maps. The table also contains in code a brief description of what is to be found at each site and a reference to the figure which contains a reproduction of the survey or a reference to a publication where a reproduction can be found.

This chapter will give particulars of a few of the more interesting sites chosen to illustrate the different kinds of structures found.

In the Dartmoor district there are several circles similar to those found elsewhere but there are also numerous avenues consisting of double rows of not very large stones. The avenues often lead from (or to ?) small circles. These avenues have been described by various writers but there is no comprehensive study to enable a decision to be made regarding their possible astronomical significance. It seems best to ignore them all until they can be studied as a whole.

The so-called Recumbent Stone Circles are found only in the Aberdeenshire district and perhaps in the west of Ireland. The author has surveys of twenty-four sites showing either complete or ruinous examples. But there are many more judging by the list given by Keiller (1934) and the photographs and descriptions given by Browne (1921). A good example easy of access is to be found in Midmar churchyard (Fig. 12.6). Here we see the two flankers standing at each end of the recumbent stone. The flankers may be the tallest stones in the ring and the recumbent stone is always large, often impressively so. At Sunhoney (Fig. 12.5) it is 17 ft long. These two examples show a feature which is almost, but not completely, universal. In both, the left-hand flanker is nearer the centre than the right. In fourteen examples which were sufficiently complete to make a comparison possible twelve showed this peculiarity. The average distance by which the right flanker is further from the centre in the fourteen examples is 1·5 ft. At Midmar it will be seen that there are traces of a structure inside the flankers and recumbent stone. This feature is found in many of these circles and takes various forms, as can be seen by looking at the examples shown (see also Fig. 6.6). If originally the inner ring, traces of which are seen in many of these structures, contained a cairn or a tumulus, then presumably the tumulus had a spur reaching to the inside of the recumbent stone. Unfortunately tumuli were often in such a position as to form a too-convenient quarry from which local houses and churches could be built.

Table 12.1. *List of Sites*

Code in which descriptions are given:

C	Circle	3C	3 circles
CC	Concentric circles	3M	3 menhirs
CA	Flattened Circle Type A	CR	Recumbent Stone Circle
CB	Flattened Circle Type B	M	Menhir
CD	Flattened Circle Type D	S	Stone
CE	Ellipse	T	Tumulus, cairn
CI	Egg shape Type I	Al	Alignment
CII	Egg shape Type II	K	Kist

Site		Map ref.	Description	References	Remarks
A 1/2	Loch Nell	NM 906291	C, CB, M		*Clach na Carra*
A 1/4	Loch Seil	NM 801206	Al+M	Thom, 1966, Fig. 10	
A 2/1	Inveraray	NN 095090	M		
A 2/5	Kintraw	NM 830050	T, M, C	Fig. 12.1	
A 2/6	Carnasserie	NM 834009	Al		
A 2/8	Temple Wood	NR 827979	C, 3Al, etc.	Thom, 1966, Fig. 5	
A 2/12	Duncracaig	NR 833964	C, 2Al, M, etc.	Thom, 1966, Fig. 6	
A 2/14	Dunamuck S	NR 845925	Al		
A 2/19	Achnabreck	NR 856899	2M		
A 2/21	Dunamuck N	NR 847929	Al		
A 3/4	Tayvallich	NR 728861		Thom, 1966, Fig. 7	
A 3/6	Loch Stornoway	NR 742616	Al, M		
A 4/1	Escart	NR 847668	Al		Large menhirs
A 4/4	Ballochroy	NR 730524	Al, K	Fig. 12.2	
A 5/8	Colonsay	NM 387938			Solstitial
A 6/1	Camus an Stacca	NR 455647	M		
A 6/2	Strone	NR 508638	Al	Thom, 1966, Fig. 8	One standing
A 6/4	Knockrome	NR 548715	3M	Thom, 1966, Fig. 10	
A 6/5	Tarbert	NR 609822	2M		
A 6/6	Carragh a Chlinne	NR 513665	Al	Thom, 1966, Fig. 8	One fallen
A 8/1	Mid Sannox	NS 014456	M		Orientated
A 9/7	Stravannan Bay	NS 085553	Al	Thom, 1966, Fig. 7	
A 10/2	Lachlan Bay	NS 004943	M		Orientated
A 10/3	Ballimore	NR 933818	K, M		Passage
A 10/4	Kilfinnan	NR 926793	M		
A 10/6	Stillaig	NR 935678	Al, M	Thom, 1966, Fig. 8	
A 11/2	Blanefield	NS 533807	Al		
B 1/1	Strichen	NJ 937545	CR		Re-erected?
B 1/5	Upper Auchnagorth	NJ 839563	C		Perhaps CC
B 1/6	Easter Aquorthies	NJ 733207	CR	Fig. 12.3	
B 1/7	Kirktown of Bourtie	NJ 801249	CR		Ruinous
B 1/8	Sheldon of Bourtie	NJ 823249	CC	Fig. 6.4	
B 1/9	South Ythsie	NJ 884305	CB		
B 1/10	Fountain Hill	NJ 880328	C		
B 1/11	Balquhain	NT 736242	CR, M		Perhaps CC
B 1/12	Wantonwells	NJ 620272	CR		Remains only
B 1/13	Old Rayne	NJ 680280	CR		Remains only
B 1/14	Inchfield	NJ 624293	CR		" "
B 1/16	Westerton	NJ 706190	C		Stones small
B 1/18	Ardlair	NJ 553280	CR	Fig. 12.4	Part only
B 1/21	Mains of Druminnor	NJ 510271	CR		Ruinous
B 1/23	Yonder Bognie	NJ 600458	CCR		Outlier removed
B 1/24	Blackhill of Drachlaw	NJ 672465	CR		
B 1/25	Charlesfield	NJ 700426	C		Ruinous
B 1/26	Loanhead, Daviot	NJ 748289	CR, CE, etc.	Fig. 6.6	
B 1/27	Sands of Forvie	NK 010260	CR, C, CC, etc.	Fig. 6.20	Stones small
B 2/1	Tyrebagger	NJ 859132	CR		
B 2/2	Sunhoney	NJ 716057	CR	Fig. 12.5	
B 2/3	Castle Fraser	NJ 715124	CR		
B 2/4	Esslie, South	NO 717916	CCE	Thom, 1961(2), Fig. 5	
B 2/5	Esslie, North	NO 722921	CCR		
B 2/6	Garrol Wood	NO 725912	CR, etc.		Perhaps Type B
B 2/7	Cullerlie	NJ 785043	C		Inner cells
B 2/8	Tarland	NJ 471052	C		Stones small
B 2/9	Tomnaverie	NJ 487034	CCR		

Table 12.1 (*cont.*)

Site		Map ref.	Description	References	Remarks
B 2/14	Leylodge	NJ 767132	CCR		Remains only
B 2/16	Tannagorn	NJ 651077	CCR		
B 2/17	Midmar Church	NJ 699064	CR	Fig. 12.6	
B 2/18	Tillyfourie Hill	NJ 643134	CR, T		Remains
B 3/1	Aquorthies, N	NO 902963	CCR, etc.	Fig. 12.7	
B 3/2	Old Bourtree Bush	NO 903961	CR?		Ruinous
B 3/3	Raedykes S	NO 832907	CC		Ruinous
B 3/4	Raedykes N	NO 832907	CC		
B 3/5	Kempston Hill	NO 876894	2M		
B 3/6	Glassel, Torpins	NO 649997	Oval		Pointed oval
B 3/7	Clune Wood	NO 795950	CR, etc.		Complex site
B 4/1	Carnousie Ho.	NJ 678505	2C, S		
B 4/2	Burreldales	NJ 676550	C		
B 4/4	Millton	NJ 550487	C		Part only
B 5/1	Urquhart	NJ 290640	C		
B 6/1	Little Urchany	NH 866482	CC		
B 6/2	Moyness	NH 951536	CC		Stones close
B 7/1	Clava	NH 757444	C, C, CE, 3T, etc.	Thom, 1966, Fig. 11 and Thom, 1961(2), Fig. 3	
B 7/2	Miltown of Clava	NH 751438	CC, T?		
B 7/3	Dulnanbridge	NJ 011246	Al, etc.		
B 7/4	Boat of Garten	NH 967210	CE	Fig. 6.19	
B 7/5	Daviot	NH 727412	CE	Fig. 6.17	
B 7/6	Dalcross Castle	NH 780484	C, 2S		
B 7/9	Cantraybruich	NH 778459	C		Part only
B 7/10	Easter Delfour	NH 845086	CC, T, M	Fig. 7.4	Compound
B 7/11	Clava Lodge	NH 760446	C		Very crude
B 7/12	Aviemore	NH 897134	CCA	Fig. 6.22	
B 7/13	L. nan Carraigean	NH 905154	CC, T		Outer ring?
B 7/14	Belladrum	NH 516416	C		Small
B 7/15	Mains of Gask	NH 680359	CC	Fig. 12.8	
B 7/16	Farr, West	NH 680335	CCA		
B 7/17	Farr, P.O.	NH 682332	C		Inner passage
B 7/18	Druid Temple	NH 685420	CCI	Fig. 6.13	
B 7/19	River Ness	NH 621380	CC		Inner passage
D 1/2	Wet Withers	SK 226790	C+		
D 1/3	Nine Ladies	SK 249634	C, M		
D 1/4	Ninestone Close	SK 226624	C		Re-erected
D 1/7	Barbrook	SK 279755	CB, S	Fig. 6.11	
D 1/8	Owler Bar	SK 284773	CB		
D 1/9	Moscar Moor	SK 215869	CA		
D 2/1	Mitchell's Fold	SO 305983	CA, M		
D 2/2	Black Marsh	SO 324999	CA	Fig. 6.10	
G 1/4	Ballantrae	NX 087818	Al, 3M		
G 2/4	Port Logan	NX 160425	8 or 9S		Widespread
G 3/3	Laggangarn	NX 222718	Al, 4M		Also ring
G 3/7	Torhouse	NX 383565	CA, Al, 2S		Second C?
G 3/12	Drumtroddan	NX 364443	Al		
G 3/13	Wren's Egg	NX 362415	S, 2S, 2S		Large stone
G 3/17	Whithorn	—	S, S		
G 4/1	Carsphairn	NX 553942	CE		Probably ellipse
G 4/2	The Thieves	NX 404716	2M, CB	Fig. 6.12	
G 4/3	Drannandow	NX 400710	C		
G 4/9	Loch Mannoch	NX 661614	C		
G 4/12	Cambret	NX 510582	CA, 2C, S	Fig. 6.9	2C destroyed
G 4/13	Kirkmabreck	NX 498562	Al, etc.		
G 4/14	Cauldside	NX 530571	C, 2S, T	Fig. 6.3	Also ring
G 5/1	Dalarran	NX 639791	M		Slab
G 5/9	Maxwellton	NX 920740	CE?		Ruinous
G 5/10	Communion Sts.	NX 860790	4Al		
G 6/1	Twelve Apostles	NX 947794	CB		Large
G 6/2	Auldgirth	NX 918852	C, 2S, etc.		Fake
G 7/2	Seven Brethren	NY 217827	CA, S		
G 7/3	Wamphray	NY 140960	C		Ruinous
G 7/4	Loupin Stanes	NY 257966	CA, C, Al		
G 7/5	Girdle Stanes	NY 254961	C		Part only

Table 12.1 (*cont.*)

Site		Map ref.	Description	References	Remarks
G 7/6	Whitcastles	NY 225881	CB, M, Al		Special
G 8/2	Ninestone Rig	NY 518974	C		
G 8/5	Dere Street I	NT 750155	2Al, etc.	Thom, 1966, Fig. 20	
G 8/6	,, ,, II	NT 751161	C		Ruinous
G 8/7	,, ,, III	NT 752169	C		
G 8/8	,, ,, IV	NT 759159	2S		
G 8/9	Eleven Shearers	NT 790194	2Al	Fig. 12.9	Also ring
G 9/6	East Linton W	NT 581769	M		
G 9/10	Borrowston Rig	NT 560521	CII, 3S	Fig. 6.15	
G 9/11	Nine Stone Rig	NT 626650	C		Type?
G 9/13	Kell Burn	NT 643642	Al, etc.	Thom, 1966, Fig. 10	Not on O.S.
G 9/15	Allan Water	NT 470063	CI	Fig. 6.14	
H 1/1	Callanish I	NB 213330	CA, 5Al	Fig. 11.1	
H 1/2	,, II	NB 221326	CE	Fig. 11.3	
H 1/3	,, III	NB 226326	C, 2CE	Fig. 11.3	
H 1/4	,, IV	NB 230304	CE	Fig. 11.3	
H 1/5	,, V	NB 234299	Al, S	Fig. 11.4	
H 1/6	,, VI	NB 247304	2S		Slabs
H 1/7	Gt. Bernera	NB 163343	3M	Fig. 11.3	Slabs
H 1/8	Clach an Tursa	NB 204430	Al		2 fallen
H 1/10	Steinacleit	NB 306540	CE, 3S, etc.		
H 1/12	Clach an Trushel	NB 375538	M		+One fallen?
H 1/13	Dursainean	NB 524330	C?		Scatter
H 1/14	Clach Stein	NB 516318	2M		One fallen
H 1/15	Near H 1/13	NB 529334	M+		Not on O.S.
H 2/1	Clach an Teampuill	NB 010009	M		
H 2/2	Clach Mhic Leoid	NG 040973	M	Fig. 11.5	Slab
H 3/1	Cladh Maolrithe	NF 912807	M, S		In ring
H 3/2	Clach ant Sagairt	NF 880760	S	Thom, 1966, Fig. 8	Large
H 3/5	Fir Bhreige	NF 770703	2S		
H 3/6	Barpa nan Feannag	NF 857720	T		50×10 yds.
H 3/7	L. Scadavay	NF 837688	T, 2S		Great kist
H 3/8	Na Fir Bhreige	NF 888718	3S		
H 3/9	Ben a Charra	NF 787691	M		
H 3/11	Leacach an Tigh Chloiche	NF 800669	M, 4S, etc.	Fig. 11.7	
H 3/12	Clach Mhor à Chè	NF 770661	M		
H 3/13	Tigh Chloiche (E)	NF 833696	T		30 yds. diam.
H 3/14	Cringraval	NF 816645	2S		
H 3/15	Claddach illeray	NF 795646	C, 2S		Not on O.S.
H 3/16	Barpa Langass	NF 840658	T	St. Ac. 137	Type A?
H 3/17	Pobull Fhinn	NF 844650	C		Flattened
H 3/18	Sornach Coir Fhinn	NF 829630	C 2S	Thom, 1966, Fig. 14	
H 3/19	Craonaval N	NF 839629	T		
H 3/20	,, S	NF 842625	T		
H 3/21	Craig Hasten	NF 742667	Rock, S		
H 4/1	Gramisdale	NF 826562	C		Ruinous
H 4/2	Gramisdale (S)	NF 825552	C, S		
H 4/4	Rueval Stone	NF 814533	Slab	Fig. 11.5	Not on O.S.
H 4/6	Hacklet	NF 852528	T		
H 5/1	An Carra	NF 770321	M	Fig. 11.5	16 ft
H 5/3	Ru Ardvule	NF 727286	S, etc.		3 fallen
H 5/4	C. Ard an Ongain	NF 747269	4 kists		Perhaps circles
H 5/6	Loch Kildonan	NF 736277			
H 5/9	Pollachar	NF 748144	M		
H 6/3	Brevig	NL 688988	2Al		
H 6/4	Vatersay	NL 633942	M, S, ring		
H 6/5	Berneray	NL 564803	C, S		Ring, etc.
H 7/1	Uig Bay	NG 394628	S		Other traces
H 7/9	Strathaird	NG 5418			
H 8/4	Garrisdale	NG 209053			
L 1/1	Castle Rigg	NY 292236	CA, M	Fig. 12.10	
L 1/2	Elva Plain	NY 177318	C		
L 1/3	Sunkenkirk	SD 171882	C		
L 1/6	Burnmoor	NY 174024	CA, 4C	Fig. 6.5; Thom, 1966, Fig. 23	

Table 12.1 (*cont.*)

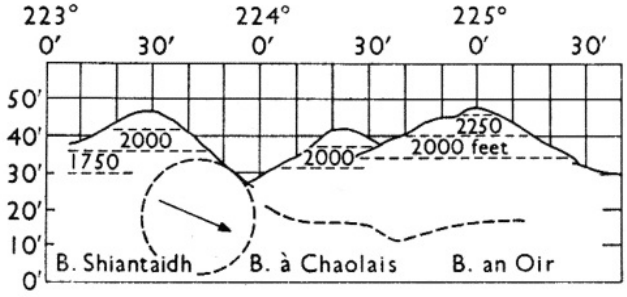
Site		Map ref.	Description	References	Remarks
L 1/7	Long Meg, etc.	NY 570372	CB, M	Fig. 12.11	
L 1/9	Glassonby	NY 572394	C		
L 1/10	Seascale	NY 034024	CD, M		
L 1/11	Giants' Graves	SD 136803	3M		
L 1/12	Lacra E	SD 147812	2C		
L 1/14	Dean Moor	NY 040223	C		
L 2/10	Gunnerkeld	NY 569178	CC		Ruinous
L 2/11	Castlehowe Scar	NY 587155	C		Rough
L 2/12	Harberwain	NY 597148	CD or E, C		Ruinous
L 2/13	Oddendale	NY 592129	CC		
L 2/14	Orton	NY 641080	CA		All fallen
L 3/1	Duddo	NT 931438	C		
L 3/3	The Five Kings	NT 955000	Al		
L 3/4	Lilburn	NT 971205	CB		
L 5/1	Birkrigg Common	SD 292740	CC		
L 5/2	Three Brothers	SD 495735	3S		Very large
L 6/1	Devil's Arrows	SE 389663	Al		Re-erected?
L 6/2	Fylingdales	NZ 920039	3M		
L 6/3	Stainton Dale	SE 984970	C		Cairn circle
M 1/3	Quinish	NM 413552	Al		
M 1/4	Dervaig A	NM 435531	Al	Thom, 1966, Fig. 8	
M 1/5	,, B	NM 440520	Al	Thom, 1966, Fig. 7	
M 1/6	,, C	NM 440519	3S		
M 1/7	Glengorm	NM 436571			
M 1/8	Tobermory	NM 500541	Al		
M 1/9	Ardnacross	NM 542491	2S, Al		
M 2/2	Duart	NM 725343	M. C		
M 2/6	Ross of Mull	NM 354224	M	Thom, 1966, Fig. 8(*f*)	
M 2/7	Dail na Carraigh	NM 371218	T, Al, 2S		
M 2/9	Ardlanish	NM 378189	2S		2 ft ring cut on flat stone
M 2/10	Uisken	NM 391197	M, T, etc.		T small heap
M 2/14	Loch Buie	NM 618251	2C, 4S		C perhaps T
M 4/1	Tiree N	NM 077484	M, T		
M 4/2	Tiree S	NM 974426	M, C		Poor C
M 6/1	Killundine	NM 586497	4S		Small rings
M 8/1	Loch Creran	NM 944408	C, 2M		
M 8/2	Barcaldine	NM 9441	2S	Thom, 1966, Fig. 8	
M 8/3	Benderloch	NM 903382	C, 2S		C on bluff
M 9/1	Lismore	NM 862435	M		
N 1/1	Mid Clyth	ND 295384	Rows	Fig. 12.12	
N 1/2	Achavanich	ND 190416	Oval		Unique
N 1/3	Upper Dunreay	ND 011661	Stone rows	Thom, 1964, Fig. 3	Parallel
,,	,, ,,	ND 008661	M		
N 1/5	Forse	ND 208363	C		Part only
N 1/8	Loch of Yarrows	ND 316430	2S		
N 1/9	Wattenan	ND 315413	Stone rows	Thom, 1964, Fig. 2	Radiating
N 1/13	Latheron Wheel	ND 180350	C		
N 1/14	Camster	ND 261439	Stone rows		Radiating
N 1/14	Watten	ND 223517	2M, etc.	Fig. 9.3	One fallen
N 2/1	Learable Hill	ND 892234	7Al, 3T, M	Fig. 12.13	
N 2/2	The Mound	ND 770991	C		
N 2/3	Shin River	NC 582049	2C		Small
P 1/1	Muthill	NN 824159	Al		
P 1/2	Doune	NN 755004	Al		
P 1/3	Killin	NN 577327	CE		
P 1/4	Weem	NN 802488	C		Small
P 1/5	,,	NN 830494	C		
P 1/6	Fortingal	NN 746470	9S		3 triangles
P 1/7	Aberfeldy	NN 880505	S		Small
P 1/8	Comrie	NN 755225	2S		
P 1/9	Clach na Trom-pan	NN 830330	M, T		Also ring
P 1/10	Fowlis Wester	NN 924250	C, M		
P 1/13	Monzie	NN 881241	C, M S		
P 1/14	Tullybeagles	NO 010361	2S		

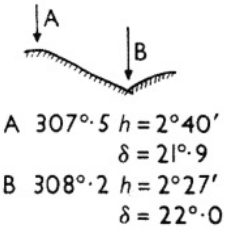
Table 12.1 (*cont.*)

Site		Map ref.	Description	References	Remarks
P 1/16	Meikle Findowie	NN 960385	CE		
P 1/18	Clachan an Diridh	NN 925558	3M	Fig. 12.14	Al
P 1/19	Croftmoraig	NN 797473	2C, CE, 2M		
P 2/1	Leys of Marlee	NO 160439	C		
P 2/2	Ballinluig	NN 977534	CE		
P 2/3	Blindwells	NO 125314	C		
P 2/4	Courthill	NO 184481	C		
P 2/5	Hill of Drimmie	NO 185500	C		Poor
P 2/6	Colen	NO 110311	C		Ruinous
P 2/7	East Cult	NO 072420	3M		Cups
P 2/8	Shianbank	NO 156272	2C	Thom, 1966, Fig. 26	
P 2/9	Guildtown	NO 143317	CE		Ruinous
P 2/11	Scone	NO 133264	CE		Ruinous
P 2/12	Dunkeld	NO 047410	Al		
P 2/14	Glenshee	NO 117701	C		Small
P 2/17	Dowally	NO 0048	Al		
P 3/1	Glen Prosen	NO 349601	Al, etc.	Thom, 1966, Fig. 20	
P 3/2	Blackgate	NO 485529	C		
P 7/1	Cairnpapple	NS 988718	CI, CE, etc.	H.M.S.O.	Complex
P 7/2	Galabraes	NS 988701	M, S		
S 1/1	The Hurlers	SX 258714	2C, CII, etc.	Thom, 1966, Figs. 27 and 28	
S 1/2	Nine Stones	SX 236781	C, Al		
S 1/3	Duloo	SX 236583	CA		
S 1/4	Stripple Stones	SX 144751	C		
S 1/5	Treswigger	SX 1375	C		
S 1/6	Leaze	SX 137773	C, S		
S 1/7	Rough Tor	SX 145800	CD, S	Fig. 6.1	
S 1/8	Dinnever Hill	SX 126800	CA	Fig. 6.2	
S 1/9	Nine Maidens	SW 936675	Al	Fig. 12.15	Good
S 1/10	Nine Maidens	SW 683365	C		Part only
S 1/11	Nine Maidens	SW 436351	C, 2S		
S 1/12	Porthmeor	SW 446367	CB, S		
S 1/13	Boscawen-un	SW 412274	CB, M	Thom, 1961(1), Fig. 4	
S 1/14	Merry Maidens	SW 433245	C, S, M		
S 1/16	Botallack	SW 387324	CA		
S 2/1	Grey Wethers	SX 639831	2C	Thom, 1966, Fig. 30	Re-erected
S 2/2	Merrivale	SX 553746	CB, M	Thom, 1955, Fig. 3	
S 2/3	Brisworthy	SX 565655	C		
S 2/4	Ringmoor Down	SX 562662	2C, rows		
S 2/5	Trowlesworthy	SX 576640	C, rows, etc.		
S 2/7	Lee Moor	SX 584622	C, rows		
S 2/8	Postbridge	SX 676787	CE	Fig. 6.21	
S 3/1	Stanton Drew	ST 601631	3C		
S 4/1	Winterbourne Abbas	SY 611904	CE	Thom, 1955, Fig. 3	
S 4/2	Kingston Russell	SY 578879	CB	Thom, 1955, Fig. 3	
S 4/3	Hampton Down	SY 596865	C		
S 5/2	The Sanctuary	SU 118680	Concentric		8C
S 5/3	Avebury	SU 102700	See text		
S 5/4	Woodhenge	SU 151432	6CI	Fig. 6.16	Outliers
S 5/5	Winterbourne Bassett	SU 094755	C, S		All fallen
S 5/6	Day House Lane	SU 182824	C		Part only
S 6/1	Rollright	SP 296309	C, S, etc.	Fig. 6.8	
W 2/1	Penmaen-Mawr	SH 723746	CE, C, etc.	Fig. 6.18	
W 4/1	Penbedw Hall	SJ 170680	C		Arc only
W 5/1	Moel ty Ucha	SJ 057371		See text, Chapter 7	
W 5/2	Tyfos	SJ 028388	Cairn C		
W 5/3	Meini Hirion	SH 583270	2M		
W 6/1	Kerry Pole	SO 157860		See text, Chapter 7	
W 6/2	Rhos y Beddau	SJ 058302	C, 3Al	Fig. 12.9	
W 8/1	Rhosygelynnen	SN 906630	Al	Thom, 1966, Fig. 33	
W 8/2	Rhos Maen	SO 143580	C (ruin)	*Arch. Camb.* 1861	The Fedw Circle
W 8/3	Four Stones	SO 245607	C, 2M		
W 9/2	Gors Fawr	SN 134294	C, 2M		Long Al
W 9/3	Cwm-Garw	SN 119310	2M		
W 9/4	Castell-Garw	SN 145270	2C, 2M		Ruinous

Table 12.1 (*cont.*)

Site		Map ref.	Description	References	Remarks
W 9/5	St. Nicholas	SM 913354	C, M, 2S		Ruinous
W 9/7	Parc-y-Meirw	SM 999359	Al	Thom, 1966, Fig. 33	
W 11/1	Saeth-maen	SN 9560	Al	Thom, 1966, Fig. 33	
W 11/2	Y Pigwn	SN 833310	C, CC, S, Al		
W 11/3	Maen Mawr	SN 851206	CI, M, 3S	Thom, 1966, Fig. 34	
W 11/4	Usk River	SN 820258	CE, C, Al	Fig. 6.23	
W 11/5	Ynys Hir	SN 921383	C, etc.		
W 13/1	Gray Hill	ST 438935	C, M, Al, etc.		





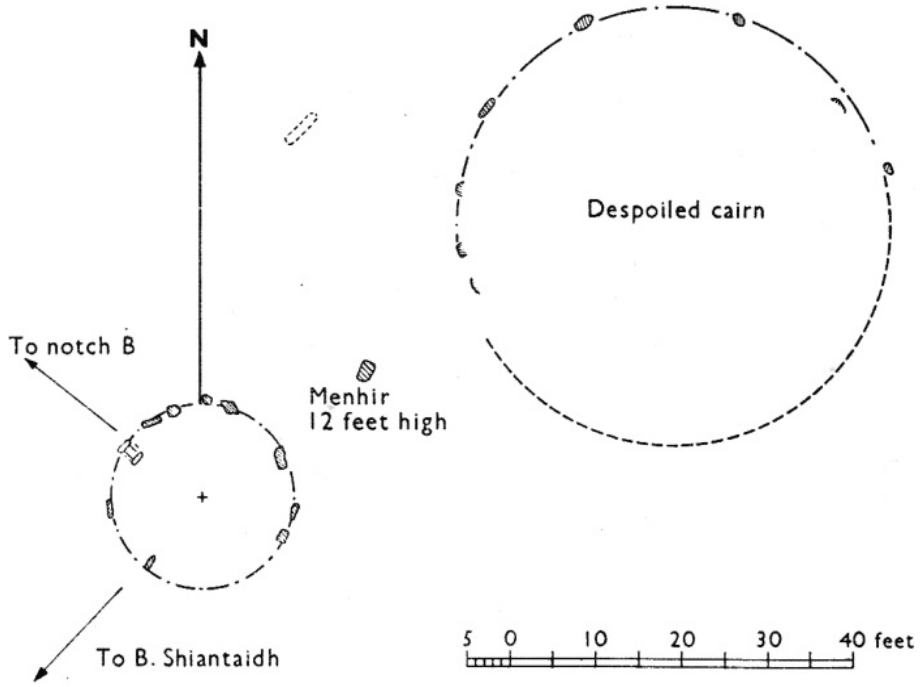


FIG. 12.1. Kintraw, A 2/5 (56° 11′ 17″·4, 5° 29′ 48·″4). Inset, view to south-west over near ridge from top of cairn; with cairn at full height the slope of Ben Shiantaidh would be visible.

An example where there was no such temptation is that on Tillyfourie Hill (B 2/18), but the whole site would need extensive excavation to discover what lies below. At Ardlair or Holywell (Fig. 12.4) there are three outliers roughly in line, and the line seems to lead more nearly from the recumbent stone than

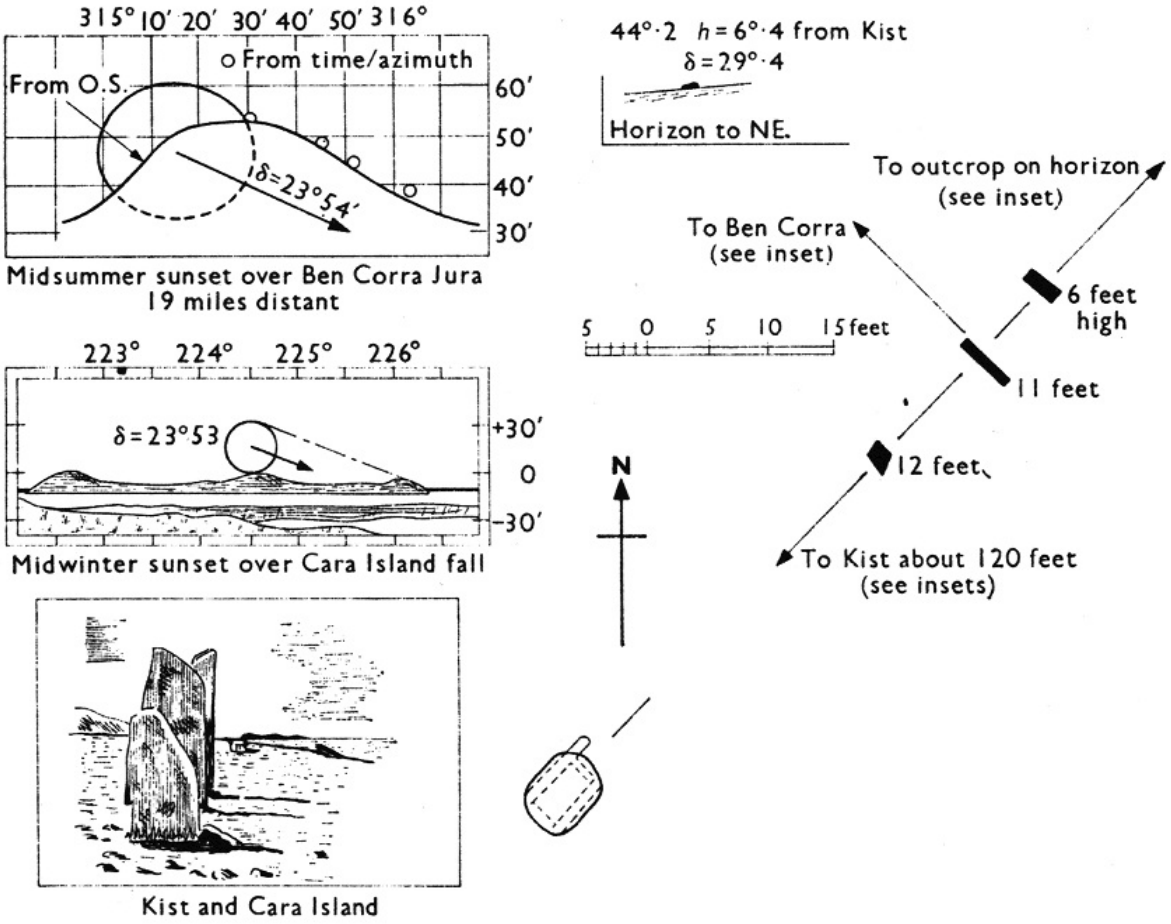


Fig. 12.2. Ballochroy, Kintyre, A 4/4 (55° 42' 44", 5° 36' 45")

from the centre. From the stone the declination is –13°·0, a value which exactly suits an intermediate calendar date, date, but this is insufficient evidence on which to base a claim that the recumbent stone was always the backsight. The recumbent stone is sometimes slightly inside the main ring as at Midmar. It is nearly always in the south quadrant, with a preference for the south-west end of this arc. In four or five examples it is near the south point. One example was found with the stone on the north side. This circle near Strichen has been otherwise ignored; it is reported to have been rebuilt, but whoever rebuilt it seems to have known to place the left-hand flanker nearer the centre than the right.

Where a site contains two or more apparently concentric rings these are not always set out to the same centre. Systematic excavation by archaeologists such as that recently applied by Professor Stuart Piggott to Croftmoraig may show that the rings belong to different periods, but it may be that the separation of the centres at the Mains of Gask

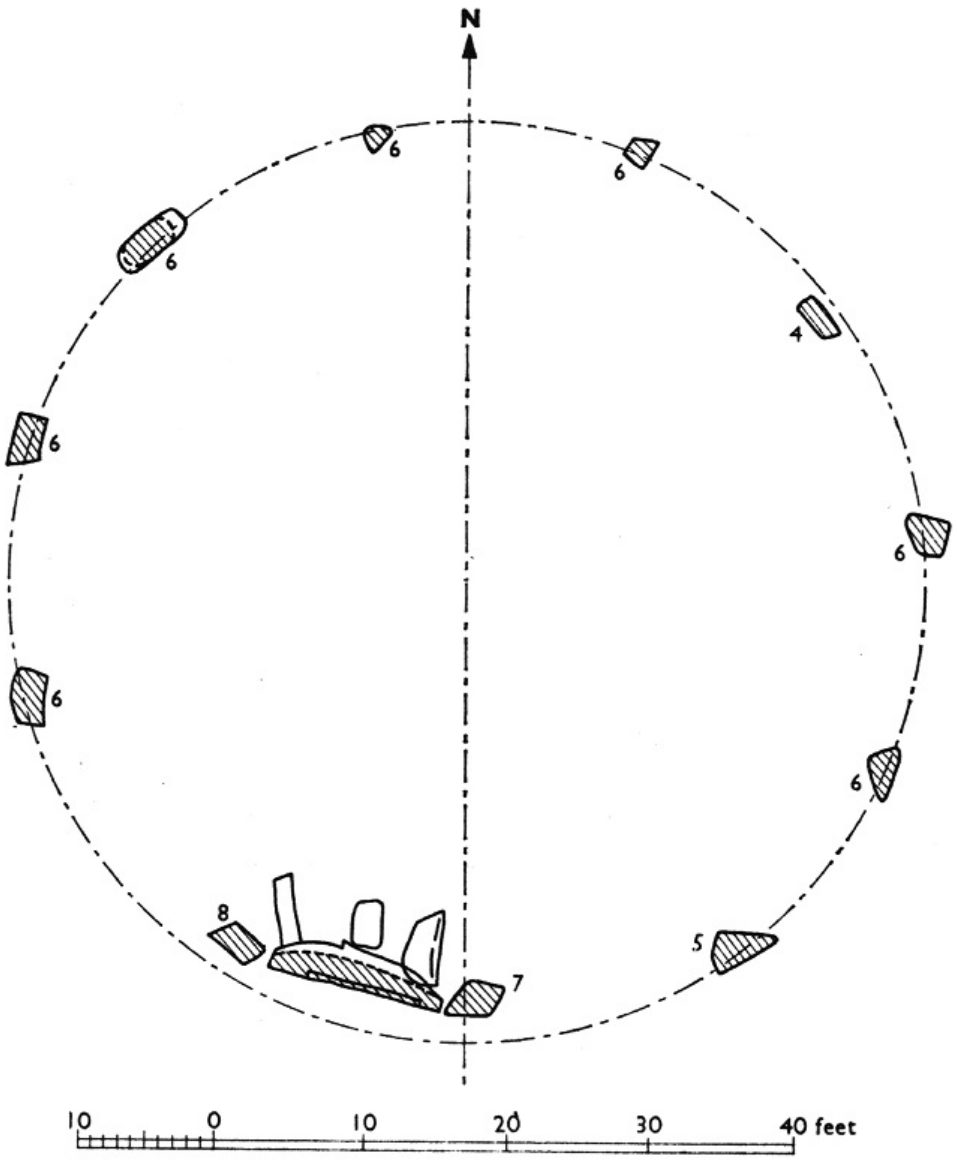


Fig. 12.3. Aquorthies Manar, B 1/6 (57° 16'·6, 2° 40'·7)

(Fig. 12.8) was intentional. The centre of the inner ring is two Megalithic yards north of that of the outer. The huge slab in the south-west quadrant of this circle should be noted. As elsewhere in this volume the elevation of the stone is roughly to the same scale as the plan. In the northern part of the country it is common to find the largest stone, whether it be in the ring or outside it, in this quadrant. Long Meg is an example, but Long Meg is not wide and is so dwarfed in plan by the scale of the site that it shows accurately the midwinter setting sun. Other examples are seen at Druid Temple (Fig. 6.13), Daviot (Fig. 6.17), and Easter Delfour (Fig. 7.4). At the latter site the narrow top of the stone again shows the setting solstitial sun, but in most sites the stone is so large that we cannot now deduce any declination. If we knew the reason for placing the largest stone in this quadrant we might understand why the recumbent stones are so often placed there.

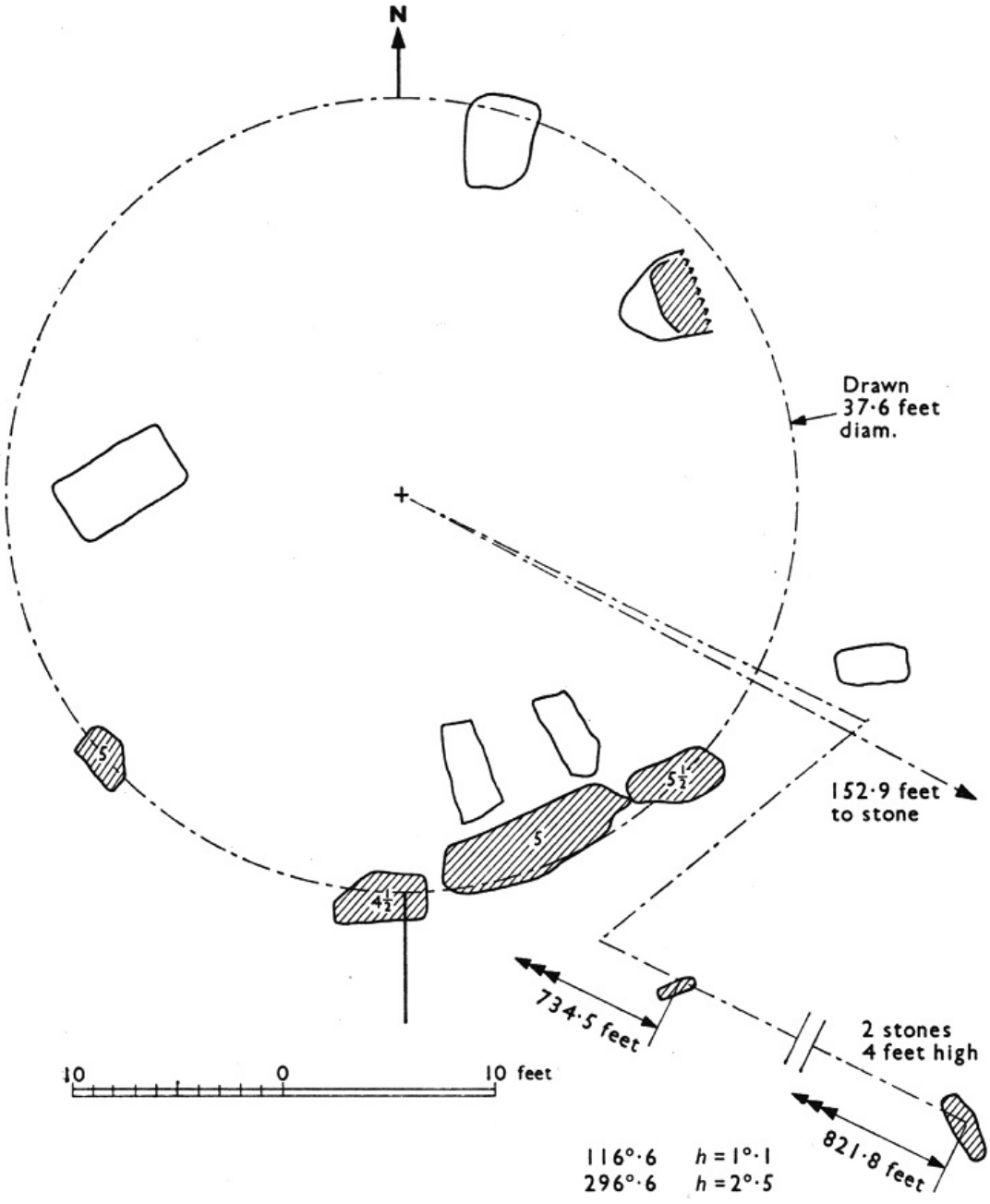


Fig. 12.4. Ardlair, B 1/18 (57° 20', 2° 44')

The biggest Type B flattened circle is Long Meg and her Daughters (Fig. 12.11). This circle had a neighbour apparently in the next field but no trace remains. It is to be hoped that crop markings will eventually reveal its position and so allow details to be obtained by excavation. The so-called Little Meg is a ruinous small circle which, were the ground cleared, would from the main circle be on the line to Fiends Fell and so gives one of the calendar declinations. One of the stones carries spiral markings and reminds us of the large number of places where cup-and-ring markings are found in association with standing stones.

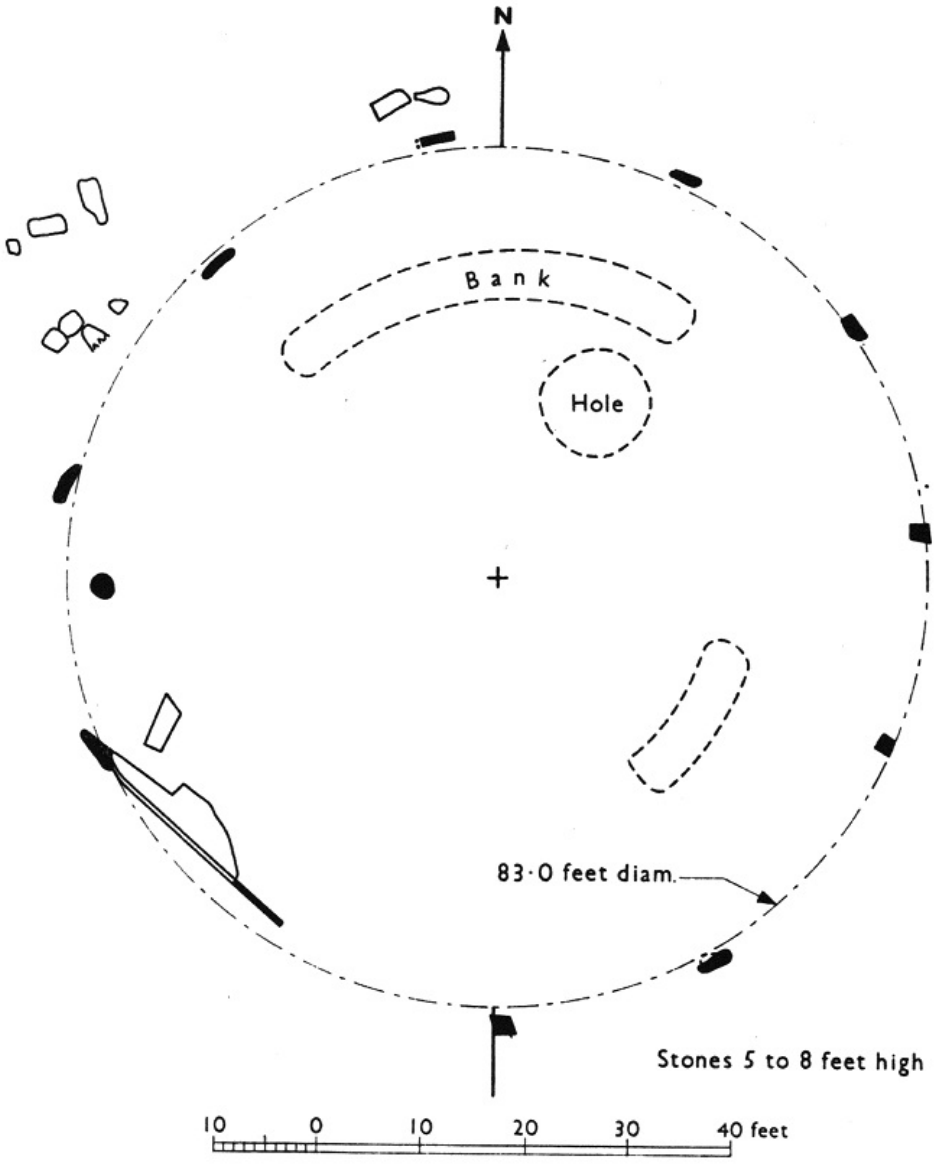


Fig. 12.5. Sunhoney, B 2/2 (57° 8'·5, 2° 28' 2·8)

The other well-known circle in the north of England is Castle Rigg near Keswick. In this circle we see in what a remarkable way the geometry of a Type A construction has been made to serve the astronomical requirements. The stones of the ring show seven solar or lunar declinations. One would draw attention to this and pass on were it not for the fact that four of the azimuths giving these declinations are defined by the Type A geometry. In Fig. 12.10 the Type A construction has been superimposed on the survey with the axis of symmetry at an azimuth of 67°·0, and from what follows this must' be within a few minutes of the orientation used by the builders. The azimuths of all the lines in the construction can now be calculated. The diameter *ACB* passing through the right-hand auxiliary centre *C* is at an azimuth of 67°+60° or 127° which, with the known hill horizon altitude, yields a declination of –16°·0 or exactly the upper limb of the sun

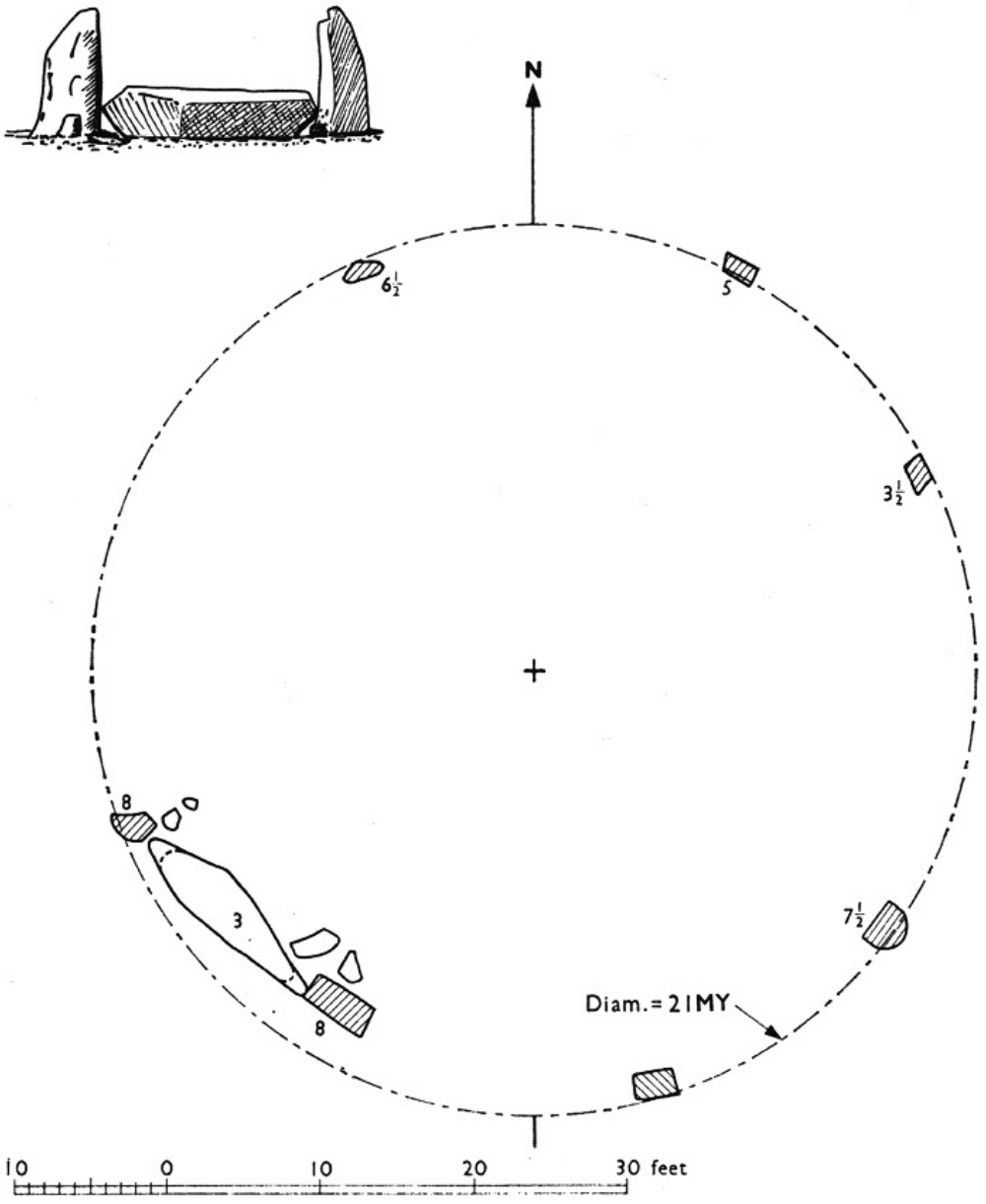


Fig. 12.6. Midmar Church, B 2/17 (57° 08'·9, 2° 29'·8)

at the ideal calendar declination of –16°·27. Looking along the same line in the opposite direction shows a declination very close to that of the upper limb of the midsummer sun. The azimuth of the transverse axis or of the parallel line through *C* is 67°+90° or 157°, giving a declination of –29°·9 ±0°·2. The exact altitude is uncertain but there is no uncertainty about this being the moon rising in its most southerly position. The calculated angle between *E* and *F* is 142°·48 making the exact azimuth of *F* 142°·52, which yields with $h = 4°·4$ a declination of –23°·5 differing by only 0°·1 from the upper limb of the midwinter sun. Apart from small uncertainties in the horizon altitudes, most of which were photographically determined, there can be no doubt about the above values.

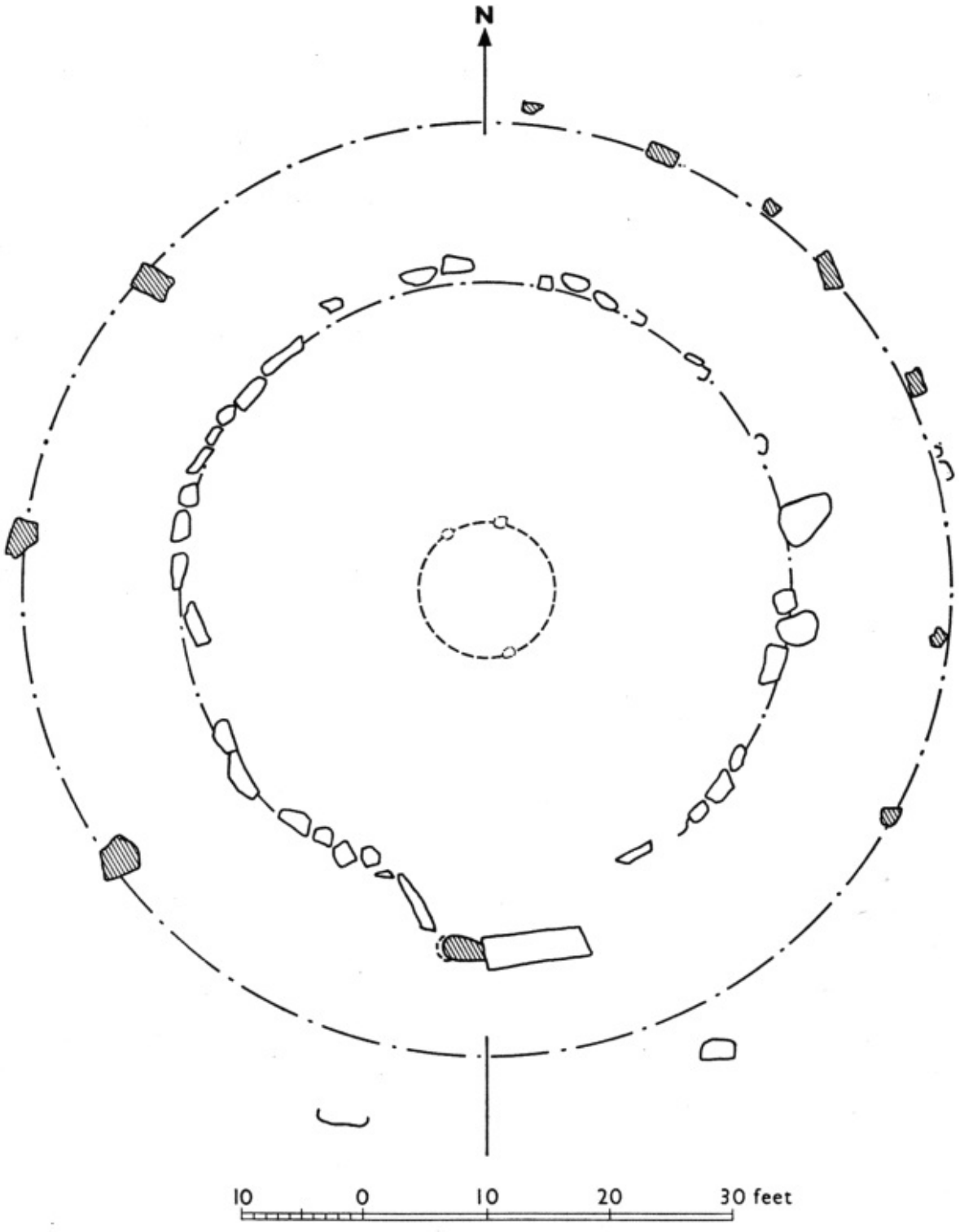


Fig. 12.7. Aquorthies, Kingausie, B 3/1 (57° 03'·4, 2° 04'·8)

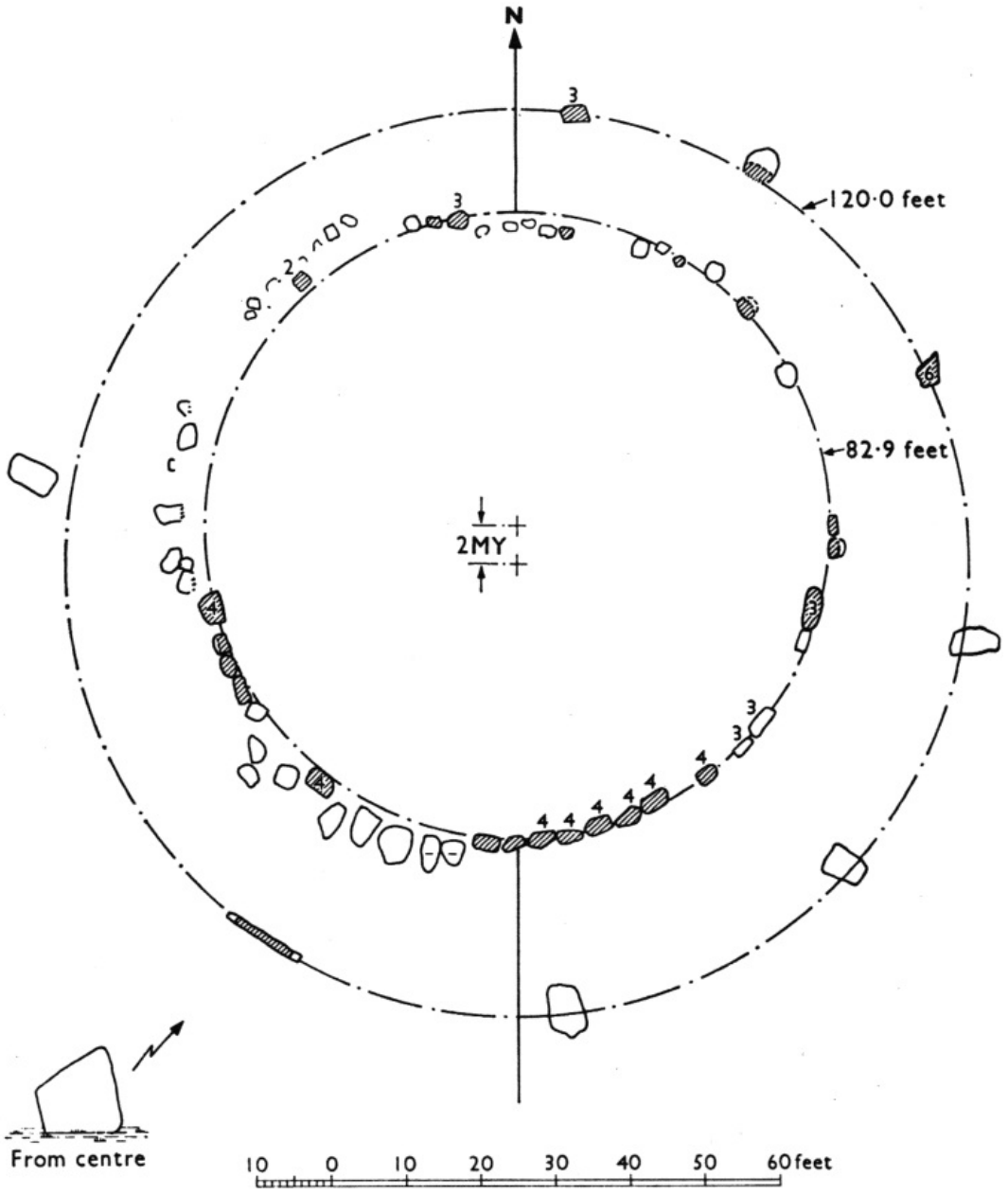


Fig. 12.8. Mains of Gask, B 7/15 (57° 24', 4° 12')

But how was a position found which would permit a Type A circle to be orientated to give so accurately these four declinations ? Ask any engineer with experience of field-work to locate a site with similar properties and he will want a large group of surveyors working for an indefinite time fully equipped with modern instruments and calculating facilities. Add that the ring must occupy a level piece of ground and he will ask for equipment to level the ground when he has located the exact spot. It will be realized that it is only the mountainous nature of the country which makes it possible to find a site with the necessary properties, and yet Castle Rigg, as tens of thousands of visitors know, is beautifully situated on a flat level part of a field.

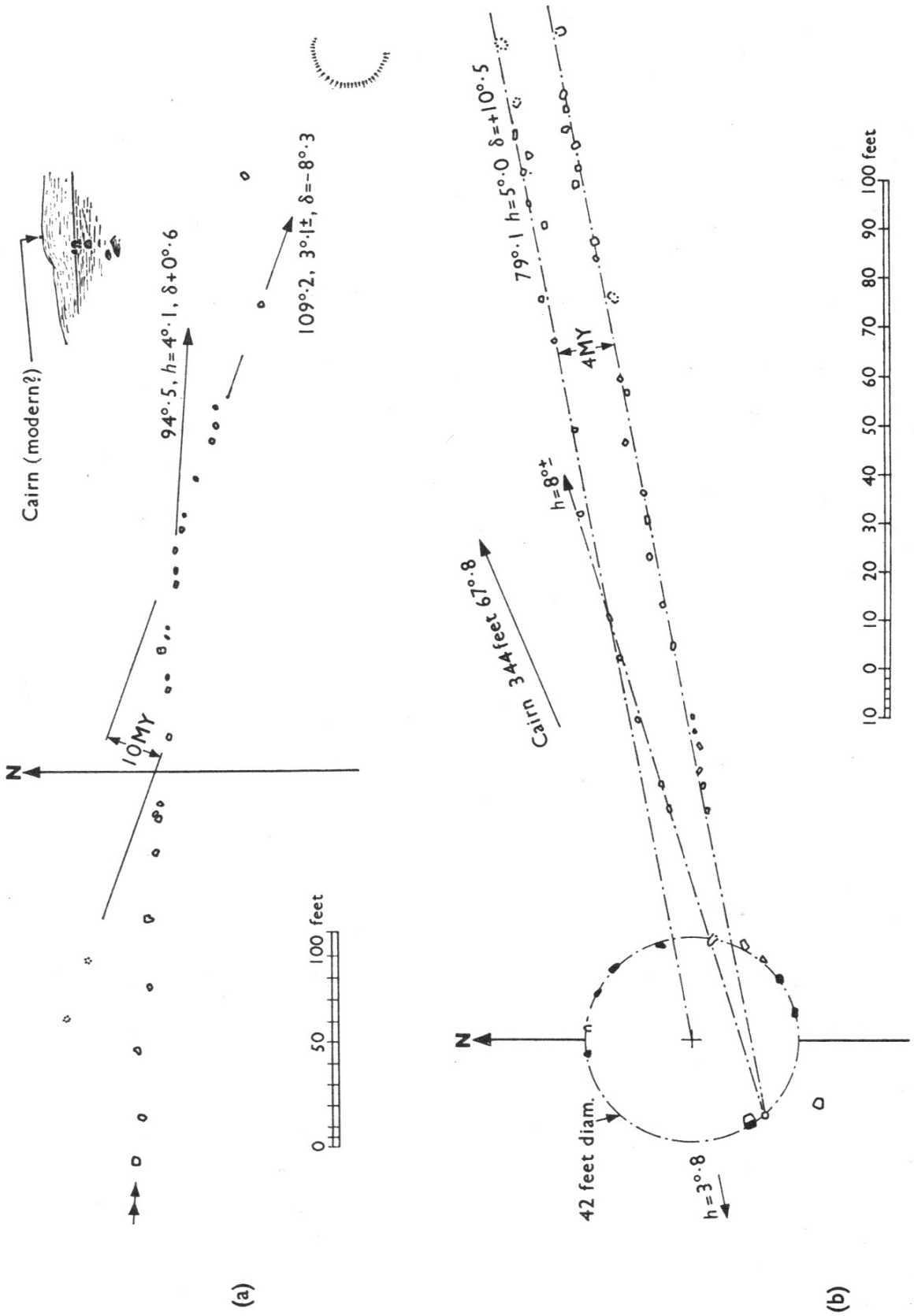


FIG. 12.9. (*a*) Eleven Shearers, G 8/9. (*b*) Rhos y Beddau, W 6/2 (52° 51′·7, 3° 23′·9).

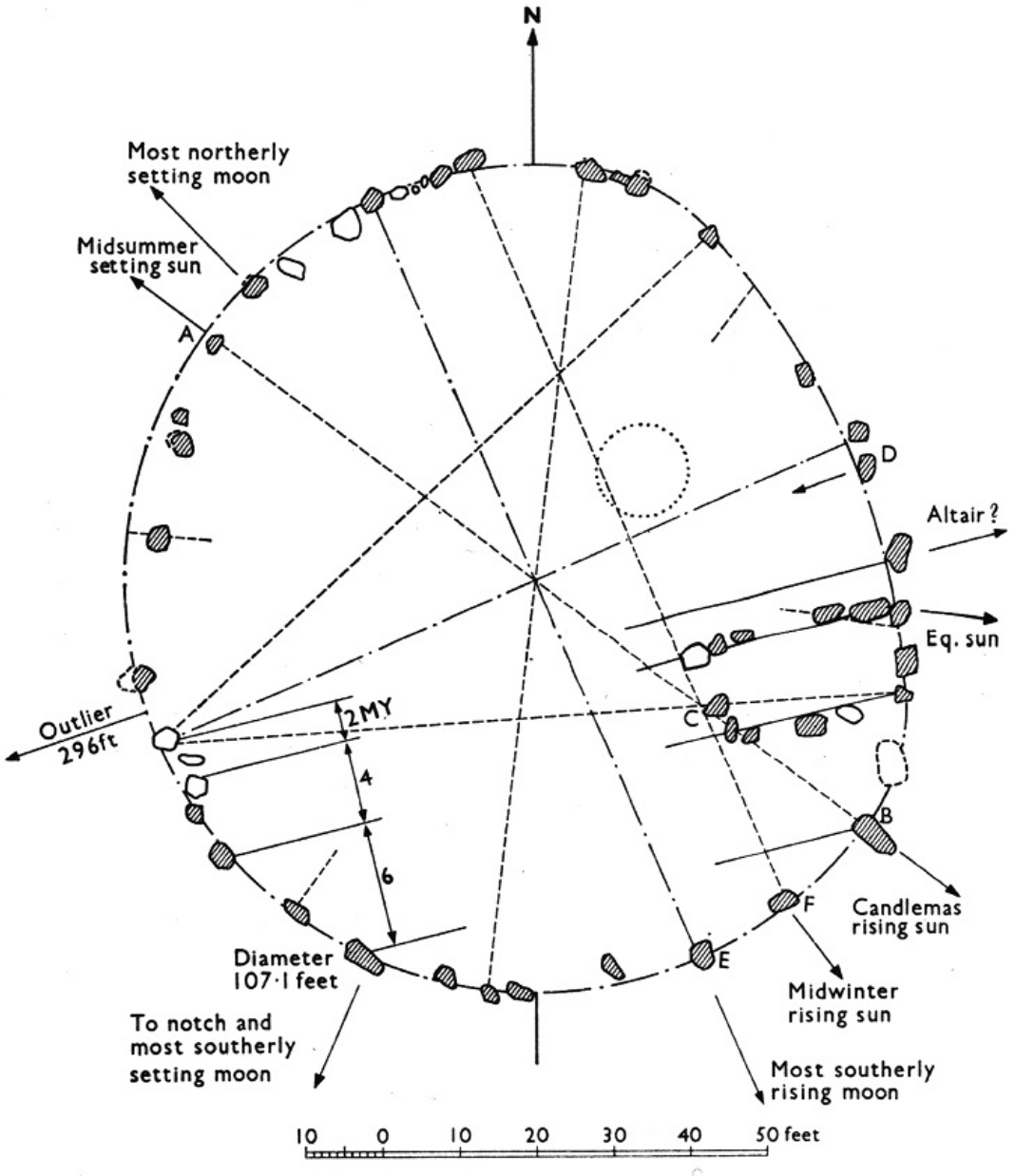


Fig. 12.10. Castle Rigg, L 1/1 (54° 36'·1, 3° 05'·5). Survey at base of stones.

The other declinations shown by this circle have no connexion with the geometry. The setting points of the moon at its most northerly and southerly positions are shown by two large stones. The equinoctial rising sun (declination = +0°·6) is shown by two stones, one being in the ring, and this point in the ring is also on one of the four parallel lines spaced 2, 4, and 6 MY apart which are indicated on the figure. All four pick up points marked by stones at each end and two of them define the inside of the stones in the cove or cell. The use of this structure, or of the lines if they were intentional, is quite unknown. It will be seen that the stone at *C* conforms to the universal rule of being, not on the centre, but beside it.

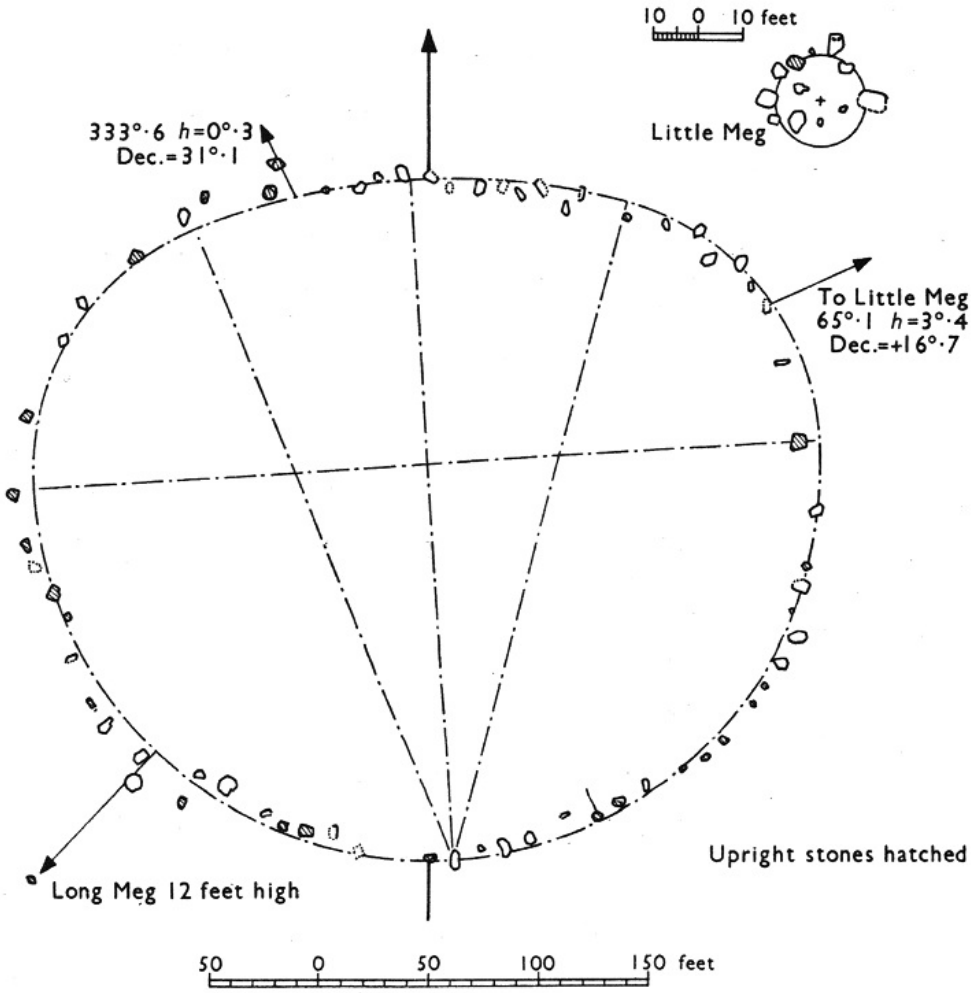


Fig. 12.11. Long Meg and her Daughters, L 1/7 (54° 44', 2° 40')

This centre being on the right is the same as that which occupies such an important position at Callanish.

Looking from the stone *D* across the ring the large outlier some 300 ft away is seen exactly over the main centre. On this evidence the outlier must be important and in fact this was one of the lines which convinced the author of the necessity to examine the calendar hypothesis in detail.

The most interesting and instructive solstitial site is that at Ballochroy on the west coast of Kintyre (Fig. 12.2). The line of the stones and the kist shows the midwinter sun setting on the fall of Cara, but equally if not more important is the orientation of the stones indicating unambiguously Ben Corra in Jura. The outline of the mountain shown was calculated from the Ordnance Survey. Since the distance is nearly twenty miles this can be done accurately, but as a check four points on the slope were measured by theodolite, the azimuth being obtained astronomically. These points are shown by little rings and are seen to agree as closely as can be expected considering that the instrument was a small theodolite reading to minutes. Note that the slope of the outline is slightly steeper than the slope of the sun's path.

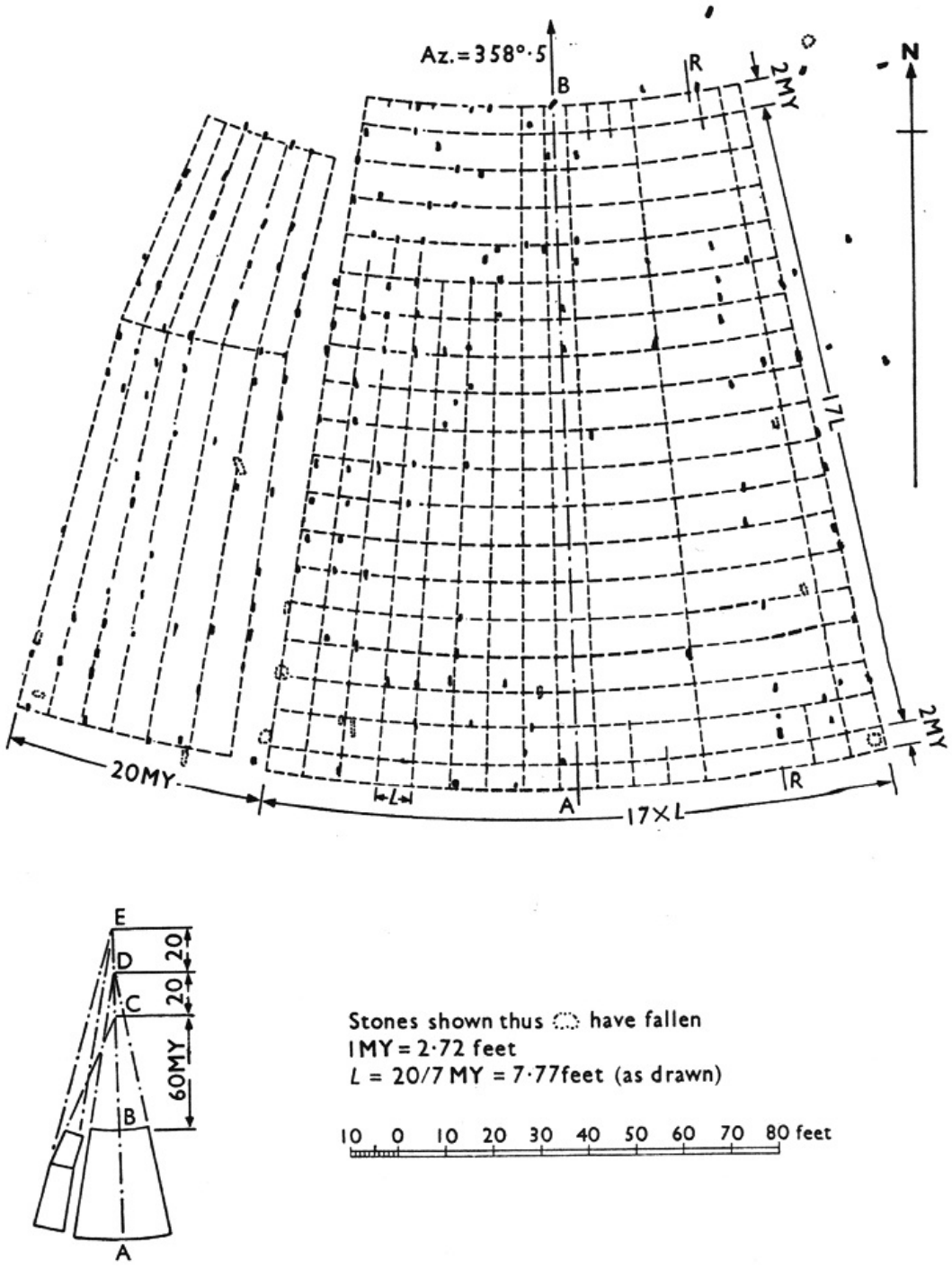


Fig. 12.12. Mid Clyth, N 1/1 (58° 20', 3° 12')

The distances on the site are such that the declination of the sun grazing the top of the slope as viewed from the north-east stone is almost the same as that of the sun grazing the bottom of the slope as seen from the list. Both are about 23° 54' as calculated with a temperature of 50° F or a minute greater if the temperature is assumed to be 65°. Unfortunately refraction at low altitudes is a very uncertain quantity and is liable to be affected by local conditions and of course by temperature and pressure.

The observing technique on a day near the solstice would be for the observer to stand on the line of the stones in such a position that the sun just vanished at the top of the slope. When the edge reappeared lower down he would move to the left keeping it grazing until it finally vanished. He would then mark the extreme position he had reached. A repetition of the experiment made on the next evening would reveal if the sun's declination had decreased or increased and so would show whether or not the solstice had been passed.

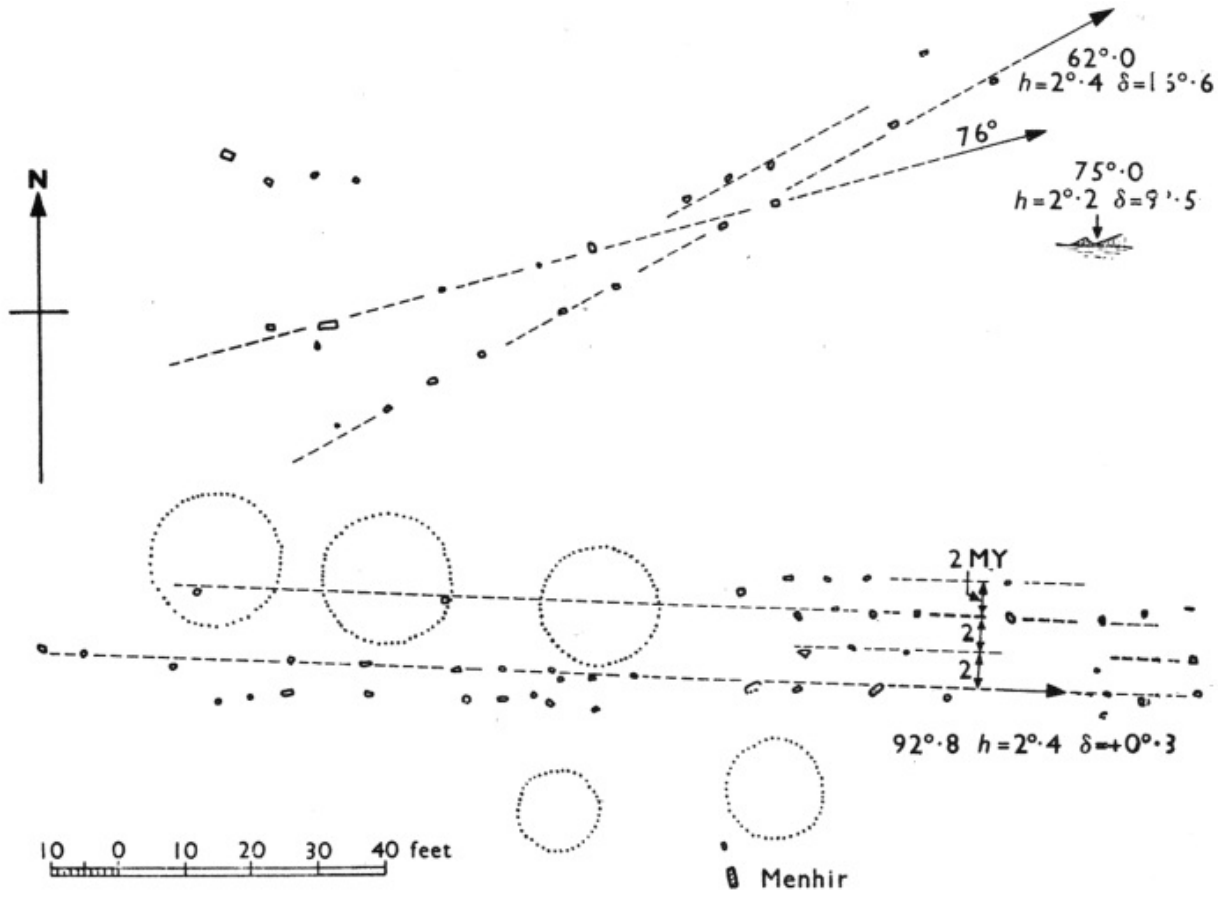


Fig. 12.13. Learable Hill, N 2/1 (58° 11', 3° 53')

The conditions are such that it would take the sun about three minutes of time to run down the slope and so there would be time for the observer to adjust his position. But there must have been difficulties, because twenty-four hours before or after the exact time of the solstice the sun's declination is only about 0'.2 less than the maximum, and we have seen that a few degrees change in the temperature or indeed a change in the meteorological conditions over the sea could affect the refraction by much more than this. These difficulties are almost certainly reflected in the arrangement of the stones at Ballochroy. Just as these people had almost certainly detected changes in the extreme positions of the moon they would certainly have detected what they must have thought were anomalous movements in the sun's extreme position. Perhaps at Ballochroy they were attempting to investigate the irregularities.

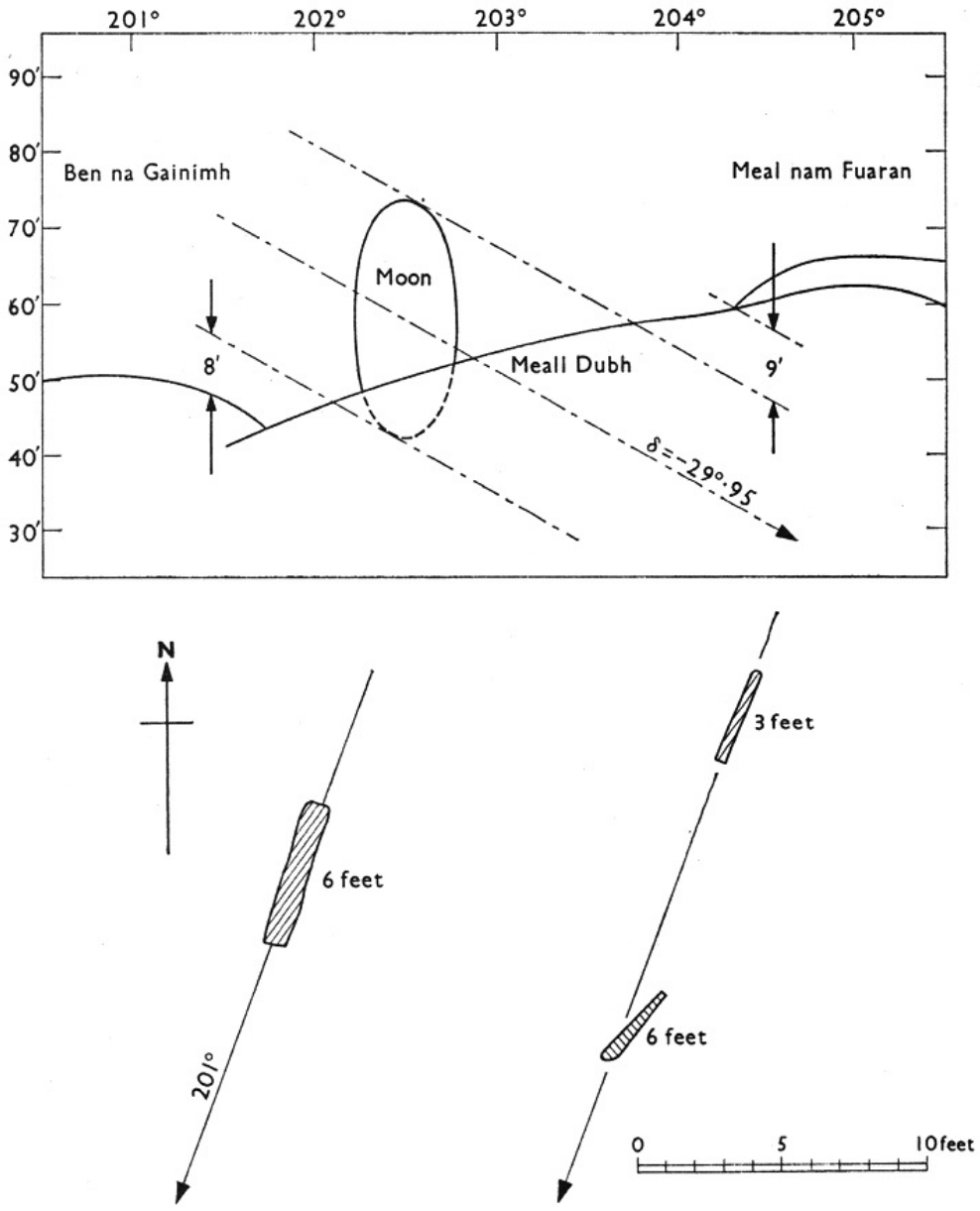


Fig. 12.14. Clachan an Diridh, P 1/18.

The apparatus there is of ample sensitivity. One minute or arc in the declination or in the refraction would produce roughly a 30-ft change in the observer's final position if he were using the technique described above.

Some thirty-five miles to the north there is a site (Fig. 12.1) which may be another solstitial observatory capable of giving a very accurate value of the obliquity of the ecliptic. It stands on a small level piece of ground on an otherwise steep hillside. It seems to be the only suitable place for a circle from which the midwinter sun would graze the bottom of the col at the foot or the Ben Shiantaidh slope. Ben Shiantaidh is one of the Paps of Jura near Ben Corra and so this site may be the counterpart for the other solstice to that at Ballochroy.

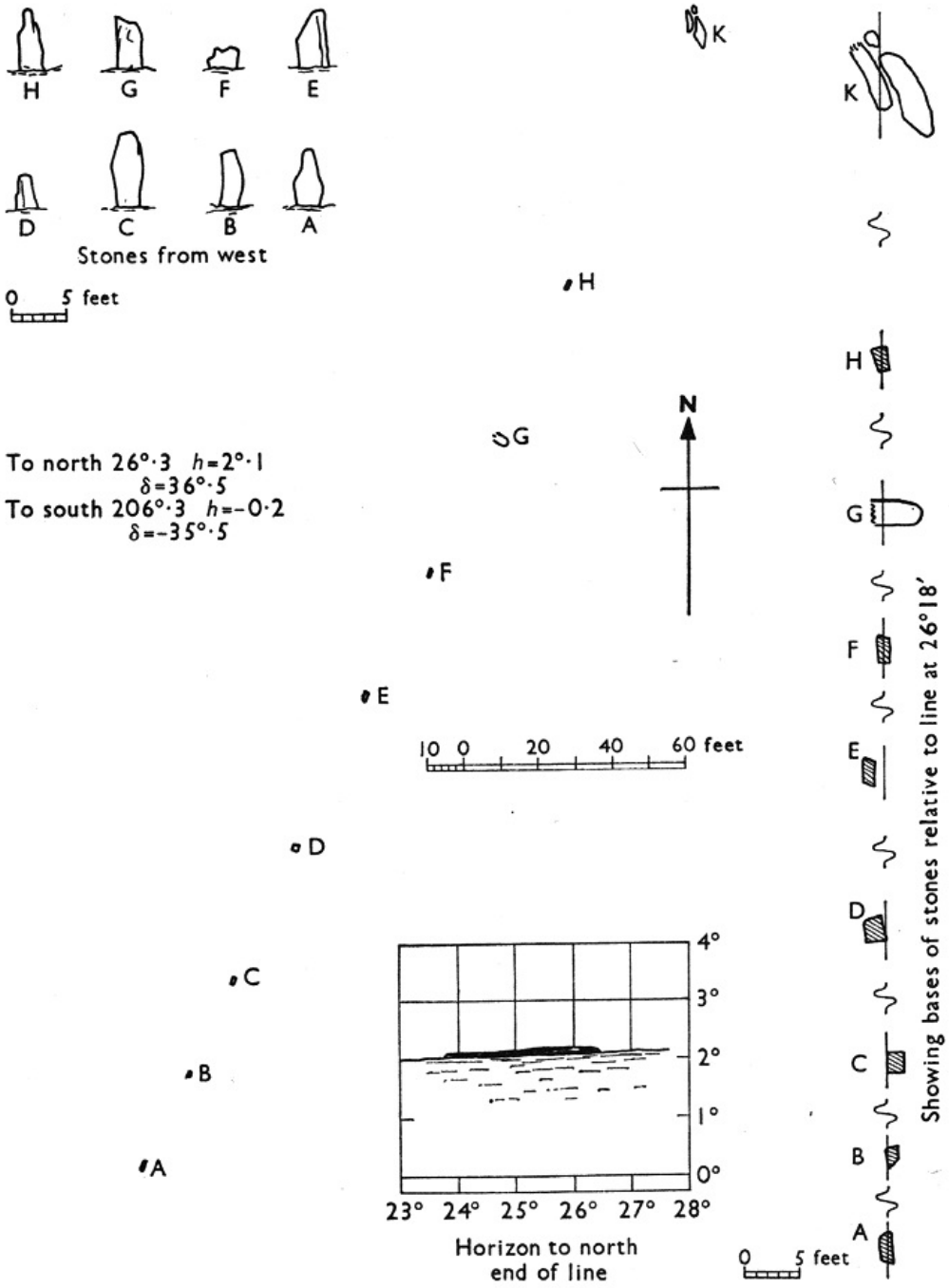


Fig. 12.13. Nine Maidens, S 1/9 (50° 28'·3', 4° 54'·4)

Because of an intervening ridge now tree-covered the phenomenon is not visible from ground level and it has not so far been possible to find how far the eye would need to be raised to see the col. It looks as if a few feet would be sufficient and the suggestion is made that the top of the original cairn would have been high enough. There is a very large collection of sheep banks with thick walls on the same plateau and if these were built with material from the cairn it must have been very large. On the evidence available it would seem that the cairn was built first with a level top from which the observer could

decide on the exact line. This line may then have been marked by the top of the 12-ft menhir. The declination of the sun in the position shown on the profile is 23° 54' S. The value of the obliquity of the ecliptic at 1800 B.C. was 23° 54'·3 but it was changing by less than a minute in a century. The close agreement makes it desirable to investigate the conditions at this site more

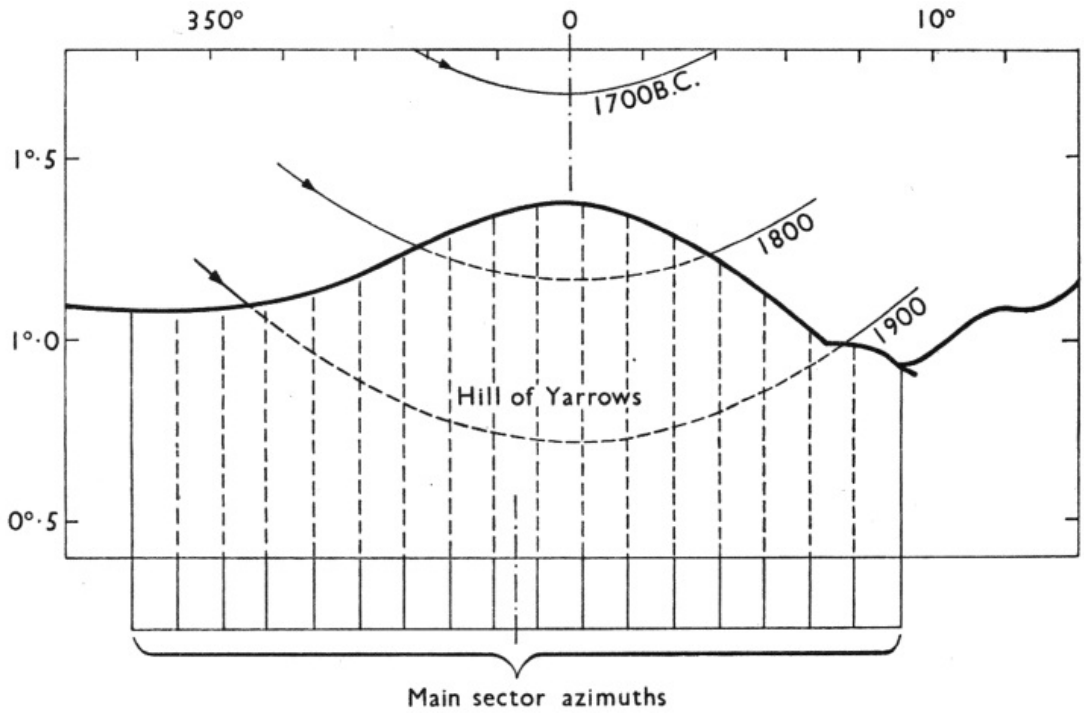


Fig. 12.16. Capella as seen over Hill of Yarrows from stones at Mid Clyth. The azimuths shown by the lines in the main sector are indicated.

fully. Ballochroy teaches us the technique of the moving observer but we do not know his exact final position. At this site the observer's position is very restricted and the greater distance to the mountains also makes for greater accuracy.

We find examples of parallel alignments in several parts of the country, but it is only in or near Caithness that the author has seen the fan-shaped constructions of which the outstanding example is that at Mid Clyth (Fig. 12.12). Here we find a main sector with an annex to the west. A few stones still in place suggest that there may have been a similar annex to the east. This would make the whole design symmetrical about a north-south line. It is possible that the missing stones were used in the foundation of the road which passes close to the site. An accurate large-scale plan was made of the 200 stones which were still there in 1959 and its orientation determined and checked. On the site one is immediately struck by the way in which each slab lies along the line in which it lies. An attempt was made to determine as accurately as possible the three centres from which these lines radiate. Referring to the key plan the dimensions are probably *BC* = 60, *BD* = 80, and *BE* = 100 MY. An analysis of the site is given in Thom 1964, from which it appears that the seventeen radial intervals in the main sector

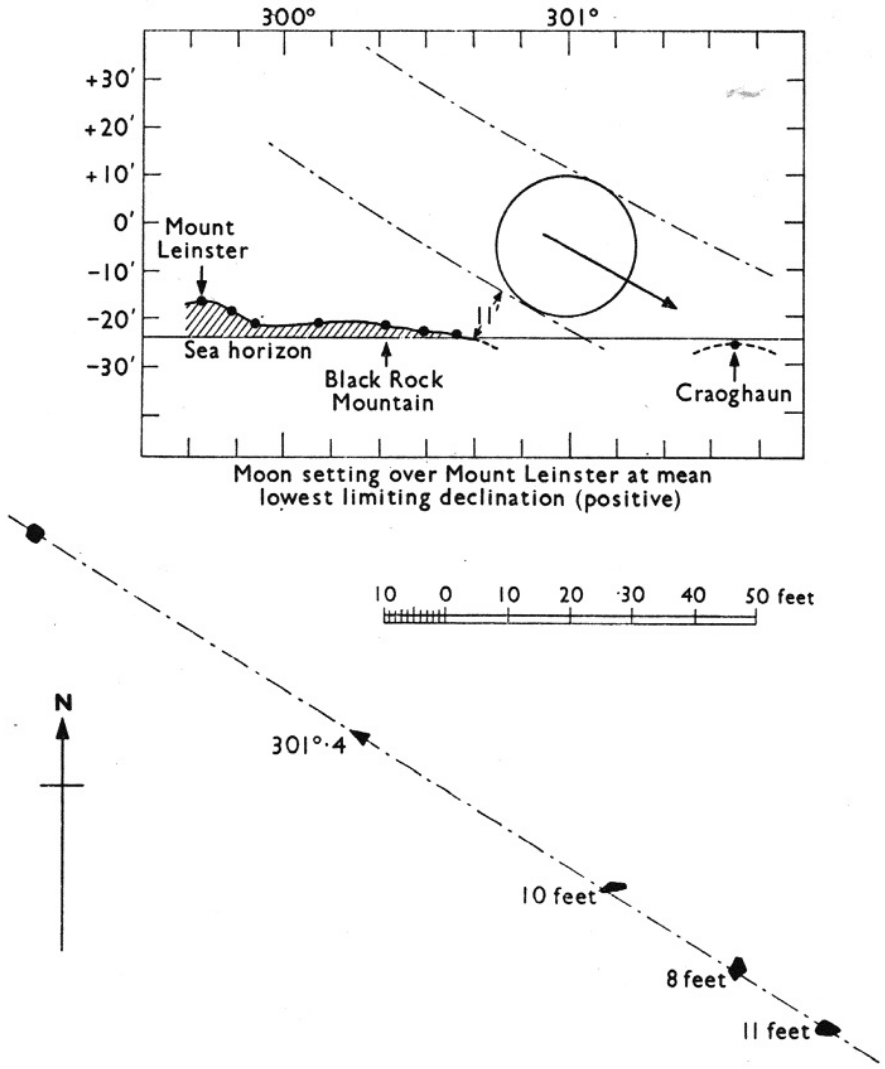


Fig. 12.17. Parc-y-Meirw, W 9/7 (51° 59'·1, 4° 54'·9). Inset, moon setting over Mount Leinster at mean lowest limiting declination (positive).

The top and bottom arcs have been added independently as shown. It will be seen that along the bottom arc it has been assumed that there are seventeen intervals each being the same as the radial intervals.

The site stands about 350 ft above sea level and is open to the sea horizon in the south. The ground on which the stones stand rises at some 4° from south to north, rather more steeply on one side than the other. After the last stones it falls, with the result that the positions of the centres cannot be seen except from the top of the sector. The consequent difficulties encountered by the erectors in setting out the site are obvious and show that there must have been reasons for choosing such an awkward position. We do not know these reasons and can only make suggestions. The horizon to the north, as seen

from the upper end of the site, is sketched roughly with a much exaggerated vertical scale in Fig. 12.16. Capella's apparent path for three different dates is indicated and from these it appears that about 1760 B.C. the star became circumpolar. Prior to that date it set on the west side of the hill and rose on the east. The azimuths given by the lines on the main sector are shown and it will be seen that these bracket the phenomena for over 150 years. If the main sector was intended to study the changes in Capella's position work on the site must have started about 1900 B.C. Subsequent to 1760 the only use would have been for observing transits. And this may have been the real use of the structure.

At the same definite time of night a star on or near the northern horizon would appear each night about 0°·85 further to the right. But the lines are spaced at 1°·26. This spacing suits much better stars transiting to the south. Provided the star's declination was not greatly different from zero, the daily movement in azimuth at the same time of night would be about 1°·2, and so by using a different line of the sector every night the arrangement would act as a kind of star dial which would show the identical hour for eighteen nights. A criticism of this use of the site is that the slope of the ground is down slightly towards the south.

Perhaps it ought to be mentioned that the lines in the northern end of the annex bracket the setting points of the upper and lower limbs of the moon in its lowest position, when it is setting on foresights formed by the Monadhliath Mountains.

If the stone rows of Caithness have so far defied explanation, we are encouraged to believe that for at least some of them an astronomical use existed when we look at the stone rows on the Sutherland side of the Helmsdale river. Those on Learable Hill above Suisgil Lodge are easy of interpretation. To the west the ground rises gently, but to the east across the valley there is a perfect clean-cut horizon. It is seen in Fig. 12.13 that there are three definite azimuths and each of these gives a calendar declination. The Statistical Account carries a survey of a good ellipse (see Table 4.4) but this was not found. It may be added that the survey of the main site in the Account is so wildly different from the author's in orientation that a second visit was thought necessary to make sure of the azimuths, which, in the end, were checked astronomically and geodetically. This site is in some ways very similar to the Eleven Shearers (Fig. 12.9 (a)) at the other end of Scotland. The latter is simpler but it also shows calendar declinations.

Sites at any great altitude are uncommon, but there is an interesting group of stones, Clachan an Diridh, at about 1170 ft O.D. These stones (Fig. 12.14) are in one of the new forests not many miles from Pitlochry. Perhaps this is a lunar site. The exact orientation of the stones intended by the erectors cannot be determined any closer than ±2°, unless indeed more stones are revealed by excavation, but it cannot be far from 201°. The outline of the mountains far to the south, to an exaggerated vertical scale, is shown on this azimuth. It will be seen that the path of the setting moon at its mean furthest south is enclosed by two points on the hill tops, and that these points allow for the variation of 9' on either side. This outline ought to be checked before the site is completely hidden by the growing trees.

Three or four miles from Fishguard there is another interesting lunar site. This is Parc-y-Meirw, a row of large menhirs in the bank by the roadside. The row is long enough to give a good azimuth and this is one of the good lunar lines discussed in Chapter 10. The alignment at the top end is not far short of 650 ft above sea-level, making it possible, at least in theory, to see the Irish hills. The outline of these hills was carefully constructed from the third edition of our 1-in O.S. by using the methods given on p. 25. It will be seen (Fig. 12.17) that Mount Leinster shows about 8' above the sea horizon just to the left of the alignment azimuth. The spur to the east consisting of the Black Rock Mountain runs into the sea about 11' from the track of the lower limb of the moon setting at its mean lowest limiting positive declination. The moon would then set exactly on the line of the stones. The mountains slightly to the north are below the sea horizon so there is no 9' upper limit such as we saw at other sites. Nevertheless, this is an important site as it shows that the 9'-oscillation was known to apply to the minima of the limiting declination curves as well as to the maxima. It would be interesting if someone could, on a clear day, pick out the outline from the alignment.

Much can be learned from those sites where the upper and lower limits of the 9'-oscillation are shown. There are, at the time of writing, four of these known and from each it is possible to find the amplitude of the oscillation. It is also possible to estimate the mean declination and by deducting the inclination of the moon's orbit to get a value for ϵ , the obliquity of the ecliptic. Assuming that all four are real we get for the amplitude of the oscillation a mean value of 9'·2. Tycho Brahe's value was $9\frac{1}{2}$' and astronomers today tell us the actual value is 9.

The mean deduced value of ϵ from the four sites is 23° 53'·54 with an unknown uncertainty which might be put at ±0'·7. The corresponding date is 1700 B.C. ±100 years. To improve the accuracy of this estimate requires not only precise measurements of the profiles made under conditions approximating to those obtaining in summer at the time of night when the erectors operated, we must also measure the actual refraction sustained by a heavenly body on the marks.

It may be remarked that most of the sites arranged for making these precise measurements made use of the southerly positions of the moon. Perhaps people of Megalithic times, like people of today, objected to spending time in these exposed sites at midwinter.

* * *

Chapter 12. A Variety of Sites. Thom, A. *Megalithic Sites in Britain*.
Clarendon Press, Oxford, 1971:135–159.

Further selections from *Megalithic Sites in Britain*:

1. Introduction, Statistical Methodology, Requisite Tools, The Megalithic Yard, Conclusions
2. Circles, Rings, Megalithic Astronomy
3. The Calendar, Indications of Lunar Declinations
4. The Outer Hebrides; Variety of Sites. [current selection]