JHA iv (1973), 168–173

THE KERLESCAN CROMLECHS

A. THOM and A. S. THOM

It is known[1] that for setting out long lengths the builders of Megalithic sites in Britain normally used a unit of $2\frac{1}{2}$ Megalithic yards (my) and that their closed rings had perimeters integral in this unit, which we have provisionally called the Megalithic rod (m. rod). All the main dimensions used in setting out the Avebury ring are in rods and many are in fact in multiples of 10 m. rods, that is, 25 my.[2] Most of the long rows in Carnac are also in rod units, and we have shown[3] that Le Menec was set out so carefully that we can there determine for this unit a definite value of 6·802 ft, which makes the Megalithic yard 2·721 ft or 82·94 cm. The present paper shows that the large cromlechs at Kerlescan, like those at Le Menec, were also set out in Megalithic rods, and that both of them incorporated right-angled triangles with integral or near integral sides.

The North Cromlech

In the woods immediately to the north of the Kerlescan alignments there remains about half of the largest enceinte or ring we have so far found in the Carnac area.[4] Like Avebury, the geometry is based on an internal integral right-angled triangle, but there are no cusps in the ring, the stones are much smaller, and there is no ditch or bank. Overall it was probably slightly smaller than Avebury, but the precision of setting out seems to have been almost as great. Parts of it are now buried in whin and bramble so thick that even at Easter, when the leaves were off the trees, it was possible to approach a 5 ft menhir within a few yards without seeing it. Because of this and the trees, surveying was difficult, but our experience had, by this time, convinced us of the extreme accuracy with which the more important works had been set out, and so we decided that we must make an effort to make an accurate survey.

Our main traverse, made with a steel band, ran close to all of the stones in the ring. It closed to 9 inches, and as it was also checked by internal chained lines we believe that our survey is nowhere in error by more than a few inches. A much reduced copy is shown in Figure 1. The boundary between woodland and agricultural land was not surveyed and may be in error by several feet. The extreme north row of the Kerlescan alignments is shown, and also other menhirs and stones in the neighbourhood.

Le Rouzic mentions 7 upright and 36 fallen menhirs, but our count shows that in or near the ring there are 36 upright and 6 fallen. It is certain that Le Rouzic's figures are reversed, because if he or anyone else had re-erected the stones they would not have been so exactly on the geometrical construction as they are seen to be.

The basis of this construction is the triangle with sides 23, 25 and 34 m. rods, which has an angle only 6 arc minutes over 90°. The arcs centred on the vertices have radii of 40, 30 and 38 m. rods. These are joined by straight lines. This outline was constructed with the greatest care on tracing paper, and slid

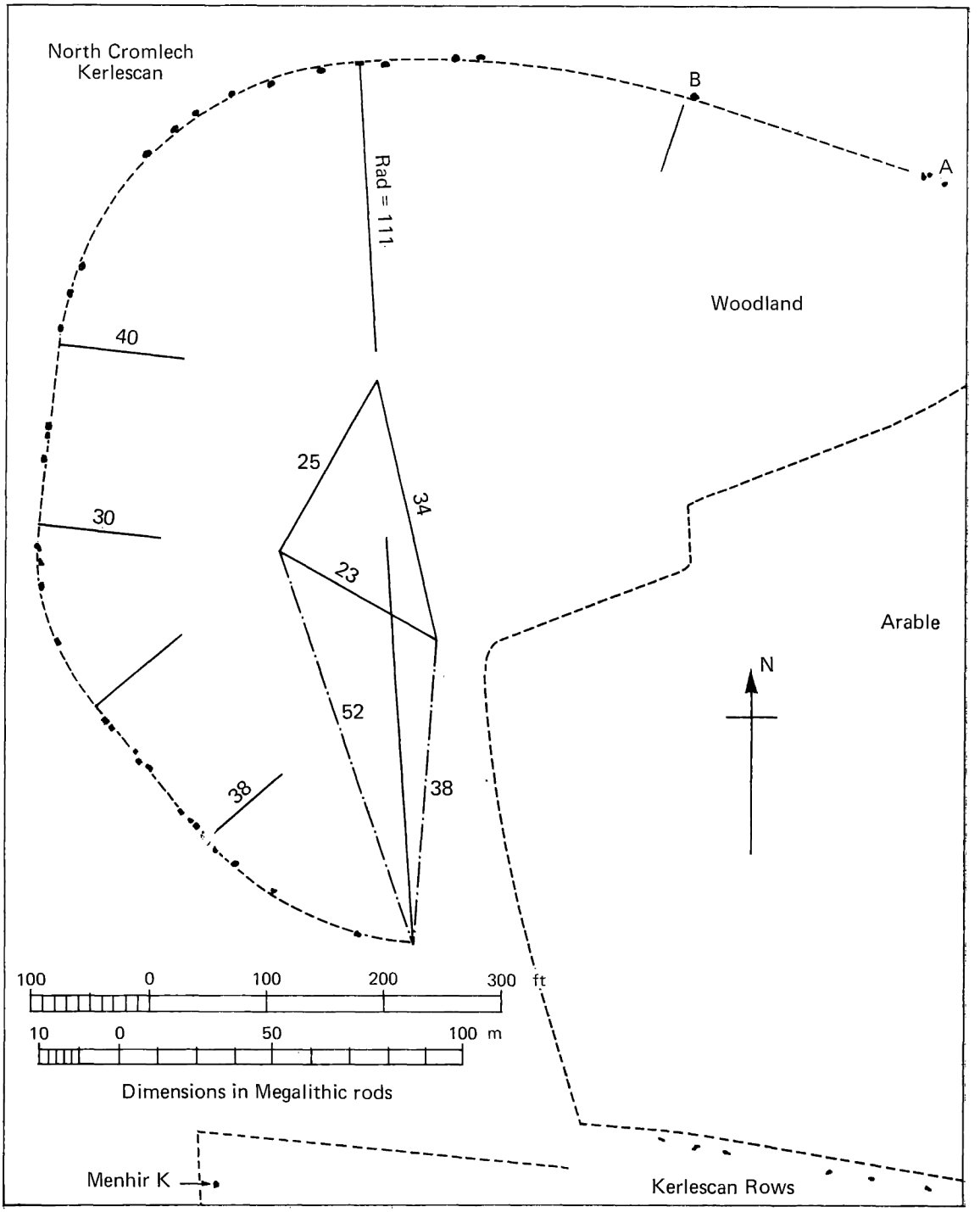

FIG. 1. The north cromlech at Kerlescan.

about on the large scale survey till the best fit was found. This demonstration is most impressive, showing as it does that the line passes through the majority of the stones and misses the others by only a narrow margin. It will be understood that Figure 1 is really two figures superimposed, the survey and the geometry.

We have assumed that the flat arc on the north side is centred on the south arc as shown. A careful trigonometrical calculation shows that its radius is 111·12 m. rods. This may have been accepted as 111 m. rods (error 0·1%) but this part of the construction depends largely on one stone (marked *B*). It is also true that we might assume that there is a straight part from *B* to the three stones at *A*, but there does not yet seem to be enough evidence to be certain of this part of the ring. For this cromlech we can obtain no overall check by calculating the perimeter, but that this was originally integral is certain. If anyone cares to attempt a reconstruction of the remaining part of the ring which will satisfy this condition he will find how difficult a problem the builders had in all these rings. It is of course possible that there remains still some evidence which we have overlooked; at the time we made the survey we had only a somewhat vague idea as to where to look for other stones or evidence of other stones.

In an earlier paper[5] the astronomical significance of the much larger stones *S* and *K* has been explained, of which *K* is shown in Figure 1. They appear to have no connexion with the cromlech which was perhaps of an earlier date.

The West Cromlech

An accurate 1 : 500 survey of the stones in this cromlech was made by Robert Freer and his team in 1972. This is shown to a smaller scale in Figure 2 with the original geometrical outline superimposed as accurately as possible. There are now no menhirs on the north arc, but the small plan given by Hülle[6] shows that there was some trace of this arc in 1947. The geometrical outline (Figures 2 and 3) assumes that the radius of each of the three arcs was 60 m. rods, that $ER = 19$, $RF = 20$ and $AR = RB = 22$.

This seems a very simple construction, but when we proceed to set it out we appreciate that, like many of Megalithic Man's designs, it embodied several peculiar properties. To set out the figure put $PR = 38$, $RQ = 41$, and then PQ is 56. Bisect PQ at T so that $TQ = 28$. Since the radii are all 60, $SQ = 60$ and ST is almost exactly 53. The figures can now be completed when it will be found by calculation that the line ST passes within 0·073 m. rods of the northeast corner. Further calculation shows that the perimeter of the completed figure is 150·11 m. rods, which on the ground would have been indistinguishable from 150. Thus the radii and the perimeter are all multiples of 10 m. rods.

Mr Robert Freer, who is currently working on the Kerlescan alignments, has found that the centre *R* plays a part in the geometry of the Kerlescan alignments which adjoin the cromlech on the east side, but these are not yet fully analysed.

For the non-mathematical reader, it may be pointed out that to find a geometrical figure with arcs of integral radii and an integral perimeter is

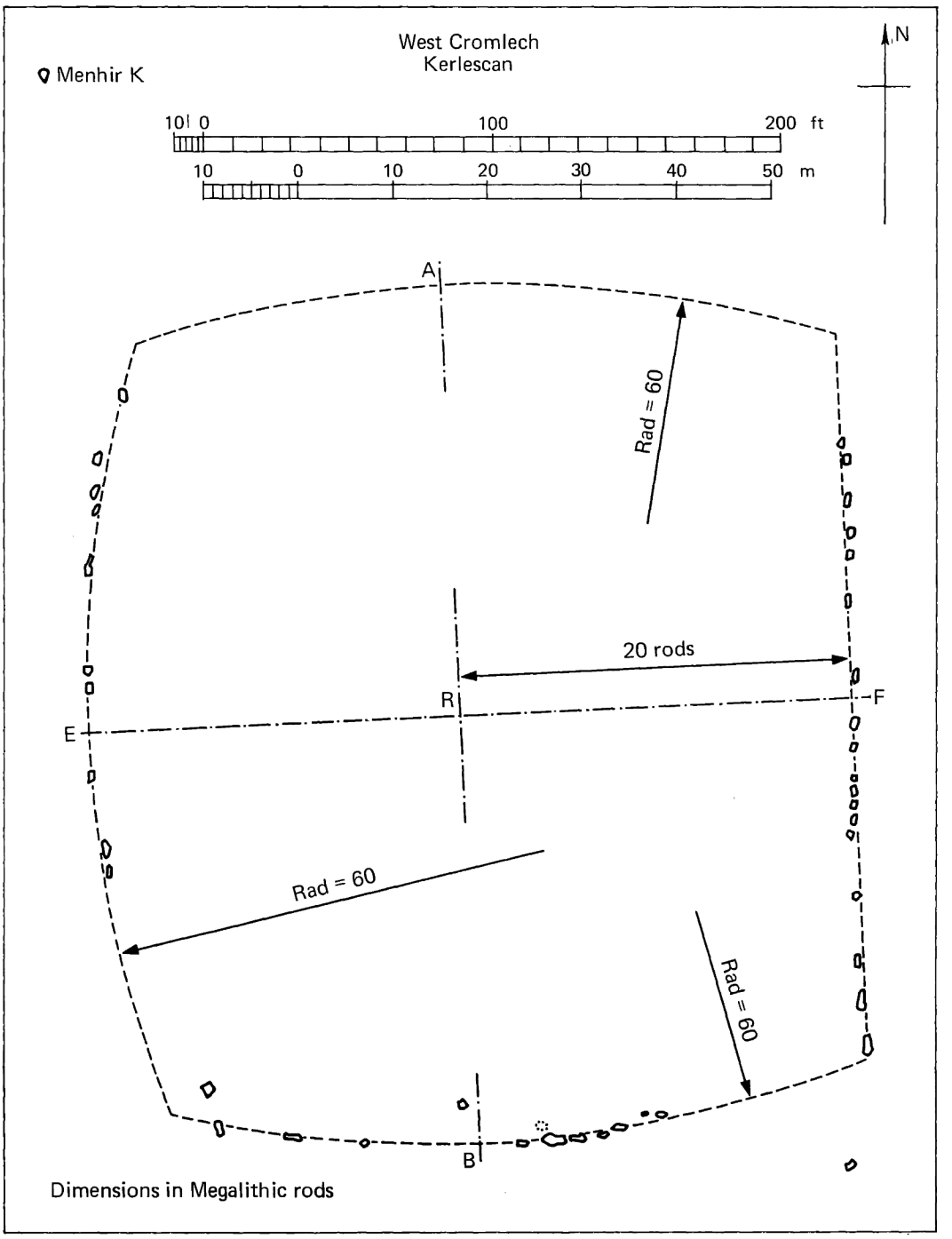

FIG. 2. The west cromlech at Kerlescan.

mathematically impossible. To come within 0·07% of perfection and at the same time to incorporate two almost perfect right-angled triangles and the corner condition, is indeed a remarkable achievement. Evidently the builders were so pleased with the design that they enshrined it in large stone menhirs.

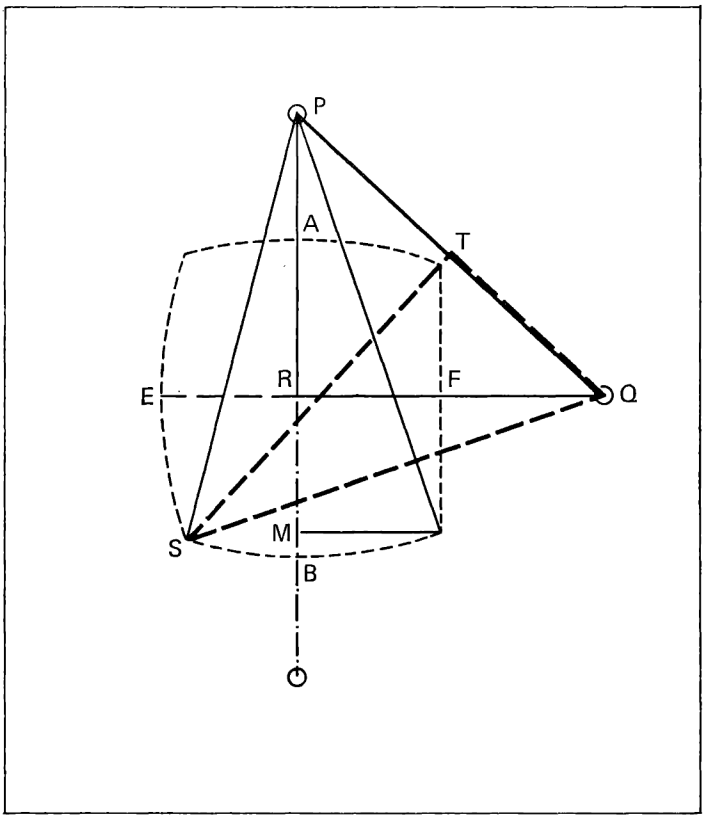

FIG. 3. The geometry of the west cromlech at Kerlescan.

These two cromlechs give three approximate Pythagorean triangles, namely

23, 25, 34 (error in hypotenuse 0·09%)

38, 41, 56 (error in hypotenuse 0·17%)

and 28, 53, 60 (error in hypotenuse 0·10%).

They also show the importance of the Megalithic rod as a unit and emphasize the unit of 10 m. rods found in cromlechs at Le Menec, Avebury, etc. But the ring at Avebury embodies a property not found at Kerlescan; it has cusps, the distances along the arcs between these cusps are integral in m. rods, and three of them are integral in a unit of 10 m. rods.[7] The fact that this has hardly been noticed since its publication in 1967 shows that people have not appreciated that Avebury, to its builders, probably represented the culmination of their geometry and that it shows the solution to what was probably the most ambitious problem they ever attempted.

At Kerlescan North Cromlech the 23, 25, 34 triangle must have been used instead of the simple available 3, 4, 5 triangle because there were other unknown stringent conditions to be met. What were they?

Acknowledgements

The plans on which this paper depends were made by groups working with us in 1972, mainly on a survey of the Kermario alignments: Mr and Mrs R. Freer, Dr and Mrs Alexander Strang Thom (son of Dr Archibald Stevenson Thom), Beryl Austin, Dr T. R. Foord, Helen Foord, Joanna Foord, and M. Jean-Luc Quinio. The project was financed by The Carnegie Trust, The Lloyd Foundation of Cleveland, Ohio, and the Hulme Fund, Brasenose College, Oxford.

REFERENCES

1. A. Thom, *Megalithic sites in Britain* (Oxford, 1967), 53, 68, 72, 90.
2. *Ibid.*, frontispiece.
3. A. Thom and A. S. Thom, "The Carnac Alignments", *Journal for the history of astronomy*, iii (1972), 11–26, p. 25.
4. Zacharie Le Rouzic, "Inventaire des Monuments Megalithiques de la Région de Carnac", Extrait du Bulletin de la Société Polymathique, 2, Rue Noé—Vannes (1965), 60.
5. A. Thom and A. S. Thom, "The Astronomical Significance of the Large Carnac Menhirs", *Journal for the history of astronomy*, ii (1971), 147–60.
6. Werner Hülle, *Steinmale der Bretagne* (Ludwigsburg, 1967), 60.
7. Thom, *Megalithic sites in Britain*, 90.

Editorial Note: A major study of the Kermario alignments and a Note entitled "A Megalithic Lunar Observatory in Islay", both by A. and A. S. Thom, will appear in our February issue. Among the other articles in this issue will be "The Foundation of the First Göttingen Observatory" by Eric Forbes and a detailed critique by D. T. Whiteside of the use of ovals by Kepler in the period 1600–1605.