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AVEBURY (2): THE WEST KENNET AVENUE

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According to Stukeley there were two avenues of stones leading to the Avebury Ring. Of the western avenue there is now very little to be seen, but occasionally additional evidence turns up in the ground that this avenue did exist.

There is however definite evidence for the avenue from the southeast, the so-called West Kennet Avenue. It starts at the concentric rings at the Sanctury and runs down the hill (the modern road follows the same line here) and passes through the buildings at the foot of the hill. Thereafter, its course is revealed by occasional stones until within about 3000ft of the entrance to the main Avebury Ring, whence onwards it has been excavated and the stones re-erected or marked by plinths set up in what were considered to have been their original positions. It is difficult to know how successful the restorers were in placing the stones and plinths exactly in their original positions.

An examination of Figure 71 in *Windmill Hill and Avebury*[1] shows that there is insufficient evidence as yet to reveal the manner of the ultimate approach on

TABLE 1. Coordinates (in feet) of the stones in part of the Avenue at Avebury.

Stone	$-x$	y	Stone	$-x$	y	Stone	$-x$	y
37	2855	219·0	26	1988	99·7	15	1153	54·5
	2859	170·0		1999	53·4		1142	5·0
36	2775	213·0	25	1914	83·9	14	1067	77·4
	2780	161·3		1926	36·0		1052	27·0
35	2696	207·8	24	1852	67·5	13	986	96·5
	2702	155·0		—	—		968	49·4
34	2620	200·1	23	1762	49·9	12	910	126·0
	2627	146·5		—	—		893	78·7
33	2535	192·3	22	1689	34·6	11	837	149·0
	2545	140·4		1692	−14·0		816	105·3
32	2456	185·0	21	1606	26·8	10	762	173·5
	2465	136·2		1611	−17·6		740	127·6
31	2386	172·8	20	1536	21·6	9	683	196·6
	2393	123·0		1530	−29·7		666	152·6
30	2304	159·7	19	1450	12·3	8	611	223·0
	2313	111·6		1447	−36·0		596	175·4
29	2226	147·8	18	1371	3·4	7	527	247·0
	2230	101·0		1373	−44·1		517	195·0
28	2147	134·0	17	1294	15·6	6	464	672·0
	2152	83·5		1291	−34·0		—	—
27	2069	117·4	16	1226	25·4			
	2076	70·8		—	—			

The origin of the coordinates used is at (781·9, 76·1) on the survey of Avebury Ring. The azimuth of the x-axis is 142° 00′ and of the y-axis 232° 00′.

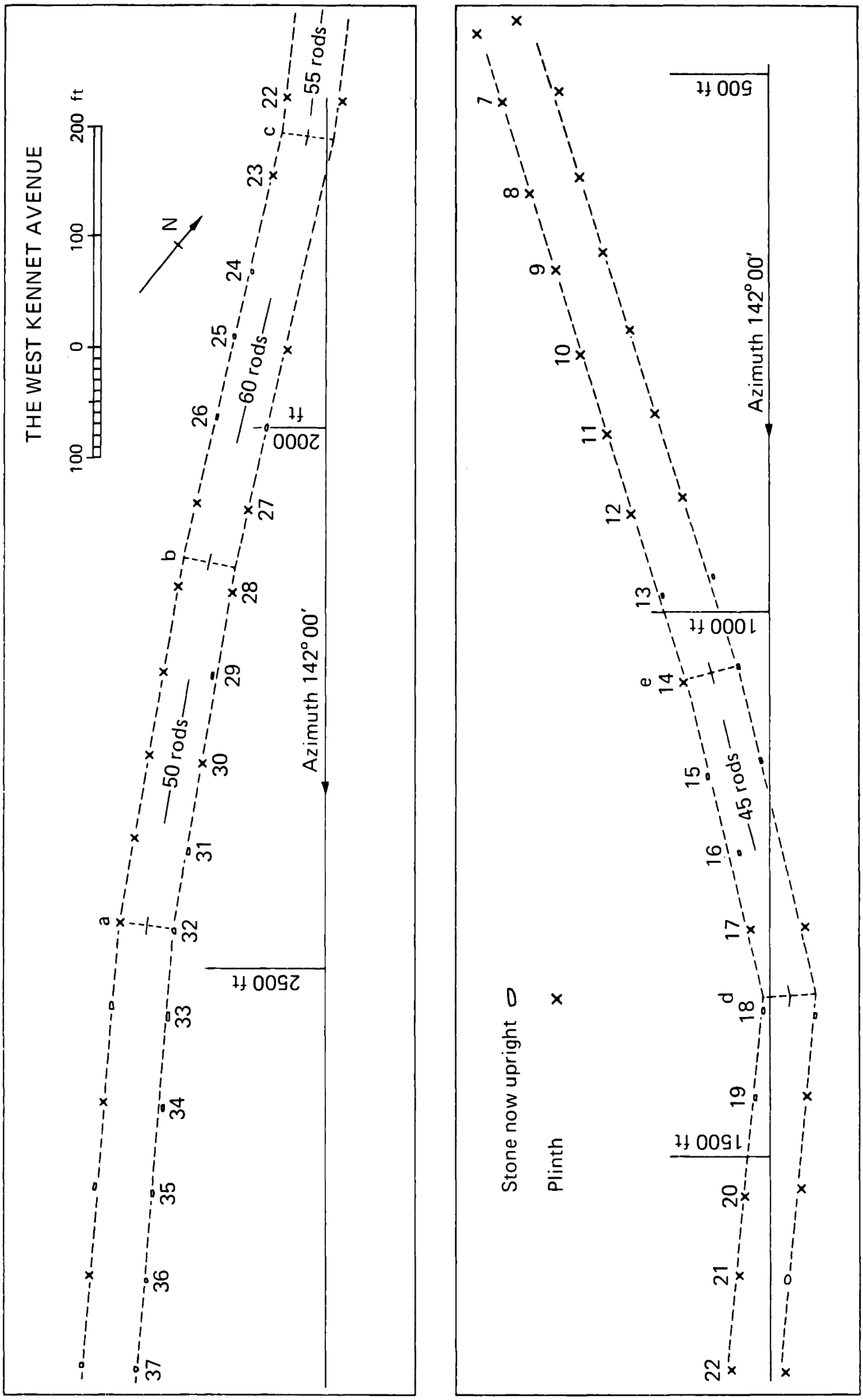

FIG. 1. West Kennet Avenue from Stones 37 to Stones 6.

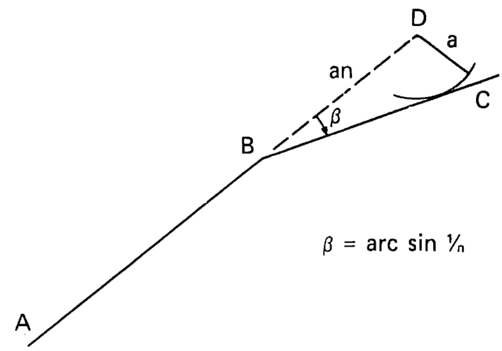

FIG. 2. Setting out angle $\beta = \sin^{-1}(1/n)$. Produce *AB* by *an* to *D*, where *a* is any convenient number. A rope of length *a* is used by a man who moves until he appears to a man at *B* to be furthest to the right. *DBC* is then an angle whose sine is $1/n$.

entry of the Avenue to the Avebury Ring. In this paper, therefore, we deal only with the section of the Avenue from Stones 6 to Stones 37.

Starting at one of the stations on the main survey of the Avebury Ring, we ran an open traverse through this, the adjacent part of the West Kennet Avenue, and to prevent a serious accumulation of error we checked the azimuth astronomically at three positions along its length. The survey was plotted to a scale of 1/500 which makes it over 5ft long and so only a reduced copy can be shown here (Figure 1). As with the ring, to do justice to our survey (and to the work of the erectors) it is necessary to resort to a numerical presentation of the results. Accordingly the coordinates of the individual stones are given in Table 1. The zero of coordinates was the survey station at (781·9, 76·1ft) on the survey of the ring, and we chose as the zero line, a line through this at an azimuth of 142°00′. The position of each avenue stone relative to the adjacent side of the avenue traverse was measured on our survey and thereafter the coordinates were found entirely by calculation. It is hoped that the values given in the Table 1 are correct to better than 1ft in x and 0·5ft in y.

The Geometry of the Avenue

From the positions of the stones shown in Figure 1 it can safely be assumed that the avenue was intended to be uniform in width. If we assume further that the six sections, *oa* to *ef*, identified in the figure were intentionally straight, we may ask whether or not the changes in direction at each corner are consistent with any simple geometrical construction. If these angular changes (β) are not merely haphazard, then presumably neither were the intended lengths (λ) of the four identified sections.

After a considerable amount of work the following geometrical construction is tentatively proposed:

(i) *ab*, *bc*, *cd* and *de* to be integral in (multiples of 5) Megalithic rods, namely 50, 60, 55 and 45 mr, respectively; with
(ii) each angle (β) to be of magnitude $\sin^{-1}(1/n)$, where n is an integer.

Figure 2 demonstrates the ease with which a simple corner can be laid out on the ground using such a construction. (Had $\tan^{-1}(1/n)$ been used it would have

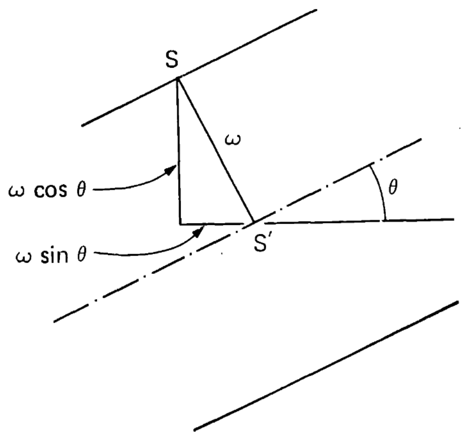

FIG. 3. Projection of Stone S on centre line at S'. Coordinates of S are (x, y) and of S', $(x—\omega \sin \theta, y—\omega \cos \theta)$.

involved the accurate setting out of a right angle.) We have taken n to be 14, 16, 8, 3 and 14, respectively, for the corners a, b, c, d and e. We make no claim that this is the only solution, but an inspection of Figures 1 or 4 shows that it cannot be very far from what was actually used. Unfortunately, the data themselves are just not good enough to allow an objective determination of accurate values of λ and β to be made, and thus to test rigorously even the simplest of geometrical hypotheses.

In Figure 4, we have projected each stone S on to the centre line at S' by applying the half width taken arbitrarily as 9 Megalithic yards (see Figure 3).

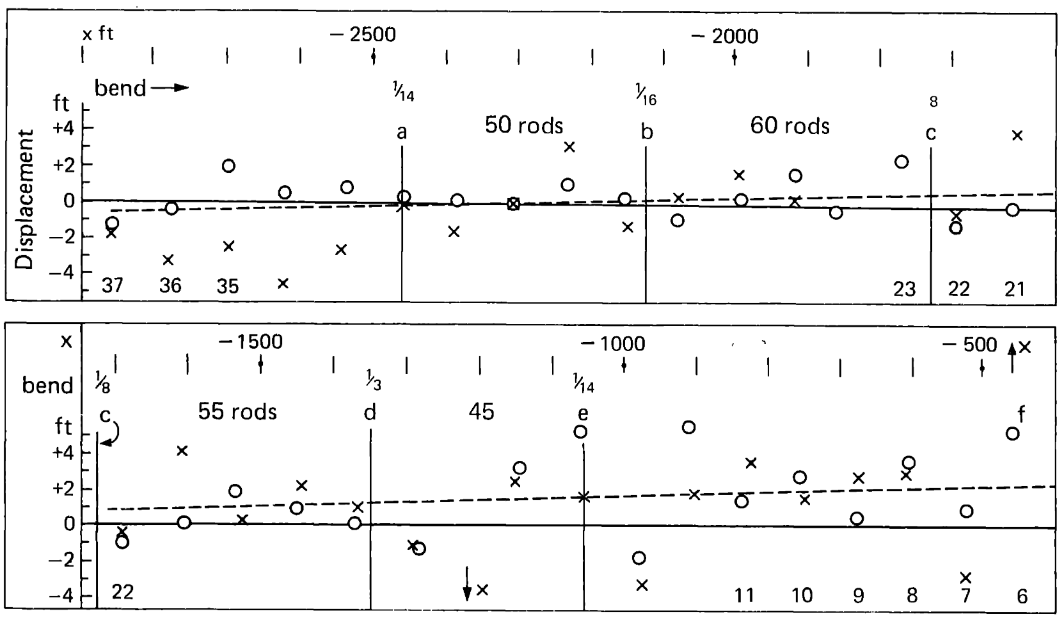

FIG. 4. Showing the amount by which each stone or plinth is displaced from the lines of the geometrical construction which is described in the text. (Stones on southwest row are shown by rings, those on the northeast row by crosses.) It appears that slightly better agreement would be obtained if the construction were rotated 4 arc minutes anticlockwise.

This makes the width 18 Megalithic yards or 49·0ft. The actual mean width is close to 50ft, but it seems better to retain 49, because it may be possible that the re-erectors made use of the simple value 50ft as affording some assistance in replacing the stones and plinths. Having found the coordinates of the projected positions of each stone, we proceeded as follows: the coordinates of the centre line at *a* (Figure 4) were assumed to be $(-2461, 160{\cdot}6)$ and the direction of *ab* relative to the x-axis was taken as $-9°20'$. This, with the assumed bend angles and section lengths given above, provided the information for the determination of the amount by which each projected stone lay above the assumed centre line. There is a tendency for the points towards the right to rise, indicating that it might have been better to have assumed the direction of *ab* as $-9°16'$ instead of $-9°20'$. The effect of this correction is indicated approximately by the broken line on Figure 4.

An examination of sections *de* and *ef* (Figure 4) shows that it is impossible to be certain that we have interpreted the data correctly in assuming that the bend at *d* was arc sin $\frac{1}{3}$. This is unfortunate because it would be useful to know how angles were constructed. At Kerlescan in Carnac we are attempting to find out how the long lines were set out and information from Avebury might support our solutions there.

Meantime it appears that when the next section of the avenue to the south has been excavated it should be possible to make a more complete examination of the geometry of the layout.

REFERENCE

1. A. Keiller, *Windmill Hill and Avebury* (Oxford, 1965).