

APPENDIX IV

STONE ROWS AND ASTRONOMICAL THEORY

(Extract from the *President's Address*, Plymouth Institution, 1906, dealing with startling claims by Sir Norman Lockyer in a work entitled *Stonehenge and other British Stone Monuments astronomically considered*.)

NO stone row on Dartmoor that attains any length is absolutely straight, and no circle of any dimensions is truly circular. Regarding orientation, there are two definite facts observable: the direction of length of the Dartmoor kistvaen points, with scarcely a single exception, somewhere within the NW. and SE. quadrants; the Dartmoor stone rows point, with slight exception, somewhere within the NE. and SW. quadrants,¹ but in either case there is a range of over one hundred degrees; and individual kistvaens and rows are fairly uniformly distributed throughout that range.

It is notorious that where a row descending a hill reaches a position out of sight of its point of origin, there it will deviate, sometimes wildly, from its course; if, climbing up the far slope of the valley, it once again gets within sight of its commencement, the alignment is again directed toward it, but exactitude is neither accomplished nor apparently desired.

Now, in this apparent indifference to mathematical accuracy, there is a difficulty for those who desire to make of the stone rows and circles early astronomical instruments of precision. A little ingenuity reduces the difficulty. The nutation of the earth's axis and precession of the equinoxes cause the apparent position of any star in the heavens to shift slightly as the years pass by. Take, then, a stone row which has one slight change in direction, you may say that one part was constructed at a given date, and the remainder added years later when the star had varied in declination. Since you may call either end of the row the earliest, this meets all possible cases of slight distortion, where only two directions are involved. Or, again, in travelling over ground of varying inclination, no stone row could be straight were it kept constantly directed on the rising or setting place of a star, for the height of the horizon would vary, and with it the star's amplitude. Hence it might be expected that alignments on uneven ground would curve. But this last solution of one of the difficulties confronting certain astronomical theories is also one of the most critical tests of the accuracy of such theory. Truly, the stone row on the Erme (see p. 204, fig. 72, Pl. 43), the longest known in the world, does pursue a serpentine course over the hills, but that course is entirely inconsistent with the suggested explanation. It turns too much, or it turns too little; it refuses to faithfully and consistently deviate in even the right direction. This is awkward, but not to be permitted to negative a promising hypothesis while human ingenuity yet exists. I proposed

¹ This generalization has been modified (see p. 242). (ED.)

the matter for Sir Norman Lockyer's consideration, and he replies in *Nature* of 13th July 1905. First by pointing out that a stone row may not always be what it seems—it might be a hedge or a road, for instance—secondly, in the following words:

“I think it possible that in the Staldon Moor Row we have a mixture of religious and practical intention, at which I have before hinted. Both Mr. Lukis and Mr. Hansford Worth have studied this monument, which is two miles and a quarter long. There is a circle at the south end about sixty feet in diameter, while at its northern end there is a cairn. Where the line starts from the circle the direction of the row is parallel to many sight-lines in Cornwall, and Arcturus would rise in the azimuth indicated. But this direction is afterwards given up for one which leads towards an important collection of circles, and it crosses the Erme, no doubt at the most convenient spot. More to the north it crosses another stream and the bog of Red Lake. All this is surely practical enough, although the way indicated might have been followed by the priests of the hut circles to the stone circle, to prepare the morning sacrifice, and go through the ritual.”

Thus Sir Norman, and so we come back to the white-robed priest, this time engaged in producing a combination of cathedral and signpost which must probably stand unique. I fear this ill-conditioned row had to be disposed of to clear the ground for further advance.

I am content to test the point of mixed uses for stone rows by Sir Norman Lockyer's own selected instance. Here is an alignment beginning with a circle and barrow, and ending in a barrow. It has associated with it at least one cairn. In this and its construction it is the counterpart of other rows, only its length is exceptional.

Wherever it curves it does so for the obvious reason that the point of origin is lost to view, and I may add that its departures from the right line cannot be accounted for by variations in the height of the horizon coupled with constancy to one bright particular star.

The important group of hut-circles to which it is said to directly lead is, I presume, at Erme Pound. It does not lead to this enclosure, but passes by on the other side of the river. And it takes about the worst possible ground of approach. The modern track (indicated on the Ordnance map) shows how it should have proceeded, had that been its objective. It continues northward, it is suggested, in order to point the proper crossing of Redlake and the adjacent miry ground. A quite unnecessary act on its part, as many other crossings are better and there is no serious difficulty anywhere. But why does it go further north still? It leads nowhere but to a barrow.

Beginning nowhere, topographically speaking, it ends nowhere, and as a directing mark is valueless. Now if there were priests, and they did indeed visit the circle of a morning, they would soon have beaten a track of quite sufficient distinctness for their feet to feel, even were their eyes elsewhere. You know the ordinary Dartmoor track, worn by casual and infrequent use; it is easily followed, and here I dare assert the priests must have made a comparative turnpike had they assiduously followed their duties.

And why, I ask, should the priests from Erme Pound and the adjacent enclosure have required to frequent Staldon Circle in bad and misty weather when in fact they had an excellent stone row of their own actually touching one of

their enclosures on Brown Heath? Whatever the value of the suggestion that the southern end of the long alignment in Erme Valley was constructed to point to Arcturus, the statement that the remainder of the row was a track line to guide priests or wayfarers to and from Erme Pound or across Redlake seems to me to do violence to every feature of the case. It could hardly have been made by anyone really familiar with the neighbourhood, which by the way I believe the author of the latest astronomical theory has never visited.

Let us clearly understand Sir Norman Lockyer's views on the astronomical uses of Dartmoor stone rows and circles. He began his labours with Egyptian temples, next attacked Stonehenge, then the Cornish remains, and, I believe, Maes Howe in the Orkneys, and has ended for the time on Dartmoor. His astronomy is of course beyond criticism, and, indeed, all that is required is a good star map, a knowledge of the precession of the equinoxes and a table of declinations and amplitudes.

He assumes priest astronomers, and that they were interested in the May and solstitial year, and above all in sunrise on May Day and at the solstices. This being so, he assumes that they used certain morning stars as heralds of the sun's advent on these especial days, and pointed stone rows and other monuments to the place of rising of these stars. The Pleiades were to his mind the favourite constellation, but Arcturus, Betelgeuse, Sirius, Antares, and the sun itself, are also involved.

In all, six stars and the sun are utilized for this theory, and the other variants are: dates from 2170 B.C. to 700 B.C.; seasons, May morning, November, February, December, and August; pointers, stone rows, the undefined centres of circles, modern stone directing-posts (selected), selected barrows out of many, medieval crosses, menhirs, 'priests' houses', by which title cromlechs are, it appears, to be known in future, earth banks, and natural hills. The construction of a single monument is, if necessary, assumed to have been spread over 400 or 500 years or more.

Granted the same wide range, you can obtain coincidences anywhere. I am prepared to prove that the rope-walks of Devon and Cornwall all have astronomical significance if you will accept as proof the results of such method as I have described.

Coincidences, I have said, must arise; I will emphasize this from our theorist's own work. At the Hurlers, in Cornwall, he found that a line from the southern circle to a medieval cross pointed to November sunset; he promptly annexed the cross, saying that it replaced an ancient menhir. Around the Hurlers are many barrows; out of these four were selected. One gives a line to Arcturus, 1900 B.C.; another to Sirius, 1690 B.C.; a third to November sunrise; and a fourth to Antares, 1720 B.C. But all these bearings are not from the same circle, nor are all the barrows utilized: the selection is that of such as serve the theory, and no other principle is involved.

We then come to Merivale (see p. 215, fig. 74). There we are told that the avenues were directed on the Pleiades in 1580 B.C. and 1420 B.C. respectively, and the Pleiades are selected because it is on equally good authority asserted that the Hecatompedon at Athens was aligned on that constellation in 1495 B.C. There are cairns and a kistvaen handy, but these return no favourable result. There is, however, a circle, which in fact is a misshapen ellipse, and there are five or six modern or comparatively recent stone directing-posts, marking out

a line toward Foggintor. Two of these separately aligned with the assumed centre of the circle are also brought into use.

The reason assigned is that they give astronomical bearings and are larger than boundary stones should be. The first is true, the second founded on ignorance. Six-foot bound stones are not uncommon and can be purchased at half a crown apiece.

More startling still, a small branch row, which would ordinarily be judged an afterthought to the southern avenue, is alleged to have been directed to Arcturus in 1860 B.C., or 280 years before the erection of any part of the remainder of the monument. The South Avenue itself must, according to the hypothesis adopted, have been under construction for a period of at least 160 years.

In considering the Merivale avenues, Sir Norman provides for us a criterion which may be applied to his other selected instances with a view to estimating his consistency. He determines that the 'blocking-stone' was really a sighting stone erected at that end of the row toward which the priestly observer looked, and hence at the end over which the particular star to be observed would rise or set.

Challacombe stone rows, not far from Grimspound, lie on the north slope of a hill and point $23^{\circ} 37'$ NW. or SE. (see p. 226). Southward they terminate in a fine blocking-stone, which, viewed from the north end, breaks the southern horizon (Pl. 47, 2). Northward one row appears to have a small blocking stone, which, viewed from the south end, is lost under the mass of Birch Tor (Pl. 47, 1). Observe that if you or I wished to point a stone row to the north horizon we should select a southern slope, and so let it be directed to the sky, and a north slope if we desired to point to the south horizon. In no case should we direct it to the base of a hill and have to transfer the alignment by estimation up the whole slope before we reached the sky line. The hill above the north end has an elevation of $4^{\circ} 50'$. Again the theory clashes with the plain probabilities of the case: the southern blocking-stone has to become a 'terminal menhir', the difficulty of the northern hill is ignored, and the row claimed as pointing to setting Arcturus in the northern sky as warning the sunrise of the summer solstice 1860 B.C. If this be so, one must despise the judgment of the primitive astronomer. His obvious advantage lay in constructing this row on the south slope, letting it break the sky line, and obtaining a greater angular elevation of the horizon, thus making the direction "useful for a longer period of time"; and he would have placed his blocking-stone at the north and not at the south end, if it was to act as a sighting point for a northerly direction.

But Trowlesworthy (see p. 209) presents an even better instance of haphazard coincidences utilized to support preconceived theories. I premise that Sir Norman has never visited the stone row of this hill, and that six-inch Ordnance maps are not a very closely contoured.

The double row is curved. This is shown, but none too accurately, on the Ordnance: there the curvature is five degrees, in fact it is $7^{\circ} 30' 0''$. Five degrees, according to the theorist, means that this row was fifty years under construction; correct this, and we shall not be far wrong in substituting seventy-five years. It pointed to Arcturus in, say, 2100 B.C., we are told. If so, why is there a circle at the north (or Arcturus) end? Elsewhere we are led to believe that the circle was the place occupied by the observer; it should therefore be at the south end. But in any case the matter is unimportant, for it is the fact that each end of

the avenue is invisible from the other, a rather startling circumstance in any monument used as a pointer.

The single row is supposed to have been dedicated to the Pleiades, its date 1680 B.C. It too is kinked, in this case to the extent of $6^{\circ} 30'$. A blocking-stone at the eastern end and a comparatively high stone at the west conform to the criterion before given and accord to the proposed assignment of the monument. But the east end is provided with a circle, which is contrary in its suggestion, as indicating that the observer stood here and looked west. Emmett's Post, a somewhat doubtful tumulus, is worked in and aligned with the circle of the avenue on the solstitial sunset in December. We may let that pass, with the sole remark that there is also a stone cross not very far from Emmett's Post, and if the cross at the Hurlers is adopted for a sight line, why not this mediæval monument also? But the Ordnance shows another tumulus or barrow lying temptingly in Azimuth s. 64° E. of the same circle. This, we are told, gives the May year sunrises in November and February. It calls from the astronomer the remark, "The remains here are most interesting. This is the only monument on Dartmoor in which I have so far traced any attempt to locate the sun's place at rising either for the May or solstitial year." It is rather hard to have to destroy this assertion, but in truth the barrow is behind a hill and cannot be seen from the circle; which goes to show that mere inspection of Ordnance maps does not suffice for archæological investigations, and that so inclusive are the conditions which Sir Norman Lockyer allows himself that our rude forefathers could not avoid having their works swept up into his all-capturing net, even when they took the precaution to negative the idea of sight-lines by placing each of two objects on alternate sides of an obscurant rise in the ground which must convince everyone that here at least astronomical significance is absolutely inconceivable.

When a scientist, eminent in his own particular branch, attacks problems of a baffling nature, armed with a few Ordnance sheets, and prepared by visits to occasional localities of interest, his lightest word, on the faith of his well-earned reputation, is apt to be treasured by the general public. I wish to enter a caveat. I assert not, I deny not. Stone rows may have been astronomical observatories, or very probably they were not. In any case, one can devise a much simpler, but equally fanciful, explanation, which inclusively embraces all stone rows and all kistvaens, and requires the sun alone, out of the whole host of the heavens. Given a little time, yet other schemes could be brought into existence, consistent with the facts. Such artificial products prove nothing, except the ingenuity of their inventor. But they should avoid utilizing directing-posts, crosses, and tumuli on the far side of intervening hills, and should not claim such precise knowledge of the supposed cult of the May and solstitial years. One could prefer not to call cromlechs 'priests' houses', or to assert that barrows, cairns, and graves found associated with stone rows were later additions. And when a stone row fails to conform to a theory it is not well to dub it a footpath. These appear to me to be blemishes. Of Sir Norman Lockyer's absolute desire to aid in the solution of what has long been, and must, I fear, remain, a mystery, I have no lingering doubt. His work is one of all honesty of purpose, and the defects are due to insufficient acquaintance with the whole of the circumstances. None the less, it is a duty which is owing to the public that his great authority in matters astronomical should not be allowed to bias our minds or divert our criticism

when he wanders in archæological paths. And if occasionally the one available argument is the *reductio ad absurdum*, believe me, it is adopted in no unkindly spirit.

He is not the first to bring astronomy forward to explain our megalithic monuments. In 1750 Chapple had constructed out of Drewsteignton Cromlech (Fig. 60) a complete observatory. A few years later Polwhele cited his discoveries, and added, after setting them forth minutely, "All this is wonderful indeed."