Some further Notes on the Lows in the High Peak.

By T. Arthur Matthews.

N a former article[1] I tried to point out the importance of the angle 30° west of north as applied to lows, and have since proved its importance in very many instances. I have also, by its aid, found several previously unknown lows. Having found it invariably defined from all lows, probably well over a hundred, in different districts, I have come to regard it as a proof of the authenticity of anything I suspect to be a low. If the angle be marked, generally by a depression on the sky-line, or sometimes by two outside points being exactly in one gradient with the top of the mound, I am satisfied that the mound is a low. I mention this as I have something to say so utterly unreasonable that it is well to give chapter and verse.

Euclid defined a straight line as lying evenly between its extreme points, and no fault can be found with that definition. Colloquially, however, we are not quite so accurate. We speak of the Roman roads as running straight across country, though they run up hill and down dale. If such a road be marked on a map or plan, however, it will appear truly straight.

There is another kind of straightness which is not quite so obvious, three or more points being in one uniform gradient, or horizontal line. An engineer would say that they " bone," and there is no other word which conveys the meaning.

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1 Vol. xxix., p. 103, of this *Journal*.

Straight lines are so common in everyday life that we are apt to take them for granted. I want to point out that they are invariably artificial. The face line of a building may be perfectly straight, but it has been made so. Similarly a course of bricks in a wall may be exactly horizontal, but it has been made so.

I am going to commit myself to the statements that no three fixed points are ever in a straight line on plan unless they have been artificially made so; and that no three fixed points are ever in the same gradient unless by intention. Each would be a mathematical impossibility.[1]

Consider the stars. Has anyone ever found three stars (not planets) in an apparently straight line? The approximation of the pointers to the Pole-star is perhaps as close as most, but it is not accurate. The planets and their satellites are, of course, occasionally and momentarily in line with two stars, but that does not affect my argument.

I repeat that if any three fixed points are in a straight line on plan they are so *by intention*, and that if any three fixed points are in the same horizontal line or gradient they are so *by intention*. How much the more, then, are three straight points on plan which also "bone" *intentionally so?*

The constructors of the lows evidently attached great importance to two outside points "boning" with the top of the low. At ARBOR LOW, Stanage Edge and the pointed top of Longstone Edge "bone" with the centre of the circle. At LADY LOW, near Blore, two hills on the line 30° west of north "bone" with the top of the low. LITTLE LADY LOW, close by the last, has the same peculiarity. The low on the OLD HILL, near Ashbourne, "bones" with Cat Low and an intervening ridge, and also with the ridge on which Harlow Greave stands and the foot of Weaver Hill. A low in the village of Mappleton "bones" with the plain on which Thorpe is built and the lowest point of the depression between Thorpe Cloud

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[1] In each case there is only one point at a given distance through which the straight line can pass, while there are an infinity of points through which it cannot pass ; the chances, therefore, are as 1 to infinity, and $\dfrac{1}{\text{infinity}} = 0$.

and Bunster. I could if necessary give several other examples, but perhaps these are sufficient. I am filled with amazement at the skill and patience shown in the selection of the sites of these lows. It is to me a marvel to find the repetition of this effect, even with the guidance of the constructed lows— but that, with nothing to help them, the builders of the lows should have been able to find such sites is almost beyond comprehension. This a mere trifle compared to what I have to say about

ASHBOURNE CHURCH AND THE LOWS.

The low on the Old Hill, Ashbourne, has the midsummer sunset nearly marked by a low on the summit of Wetton Low, seven miles away. (I can only say nearly in consequence of the weather.) The error, if any, is less than a degree. Ashbourne church spire is *in a straight line between these two lows*. That is either intentional or mathematical impossibility No. 1.

About o·62 mile a little west of south from Ashbourne church is a mound which I take to be a low. It has the bearing 30° west of north marked by the slope of Bunster and the slope opposed thereto. *Straight behind the church spire is Cat Low*, 5·3 miles away from the low. Again either intentional or mathematical impossibility No. 2. Standing upright on the highest point of the low the coping-stone of the church spire appears slightly below the ground line of Cat Low. By bringing the eye to the level of the top of the low (it is interesting to do this slowly), *that point and the coping-stone of the spire " bone " with the ground level of Cat Low.* Yet again either intentional or mathematical impossibility No. 3.

Partly in and partly out of the churchyard is a mound which looks like a low. Let us apply the angle 30° west of north to this and the church spire. The line passes through a low on the Callow Ridge, which is itself capable of proof by a sky-line depression on the continuation of the line. Several trees stand in the way; observations are only practicable in winter, and then with difficulty. The top of the low, the coping-stone of the spire, and the ground line across the Bentley and

Henmore valleys again "bone." According to the map there
are lows approximately where the line passes, which must be
also closely in "bone." I have not found it possible to prove
or disprove this; I only say that *the low on the Callow, the top
of the spire, and the ground line across the valleys " bone."* Is
this intentional or is it mathematical impossibility No. 4?

Ashbourne church is considerably out of line east and west.
The approximate general median line of the church, produced
westwards, passes through the summit of Gallowstree Hill,
Mayfield, 1·5 miles from the church. This *may* have been a
low, but trees and buildings are in the way, and I do not
assert it. The top of this hill, the top of the spire, and the
distant hills Atlow way *again " bone."* Is this by design or
mathematical impossibility No. 5?

A little to the northwards of this hill are two prominent
headlands. Trees are again in the way, but I am very much
disposed to consider them lows, and the fields in which they
stand are called "The Lows." From the top of *each* of these
the top of the spire " bones " with the distant hills Atlow way.
These are so either by intention or we are faced with impos-
sibilities Nos. 6 and 7.

Taking the top road from Ashbourne towards Wirksworth,
known as Windmill Lane, at about a mile from Ashbourne the
grass verge gradually widens to the left (forming part of Ash-
bourne Green), until the fence returns suddenly to the edge
of the road. In the corner thus formed is a mound, which I
take to be a low. It has a sky-line depression 30° west of north,
and probably also at the same angle two outside points which
" bone " to the top of the mound. There is a fence in the
way, but making allowance for this, I think I am justified in
saying that the natural surfaces do "bone." This low also,
very nearly, has the midsummer sunset behind the pointed top
of Thorpe Cloud. I think it possible that once upon a time
there may have been the phenomenon of a double sunset, at
midsummer, thence. It is not possible to see Ashbourne
church from the low, as the road hedge, with numerous trees,
is in the way, but from a point a little nearer Ashbourne it is

practicable to see both ways. The top of the low, the top of the church spire, and the ground line Snelston way must very nearly, if not exactly, "bone." I do not express this as a certainty, but I have the strongest opinion that it is so. This makes No. 8 of the alternatives.

Here we have six cases where the coping-stone of Ashbourne church spire is in a true "bone" with lows in different directions, and two cases where the spire is straight between lows. I can only say that these facts are wonderful.

To my mind there is something still more wonderful. How could the architect of the church know that these seven or eight lines of different directions and varying inclinations would all coincide at one undefined point some 200 feet up in the air? Granting him this knowledge, how did he design his steeple? Let it be remembered that a spire sloping all ways has its height irrevocably fixed when once it is started, and it is beyond my comprehension how he knew how much this undefined point came above his base.

Making enquiries from friends in the neighbourhood, I heard that the spire had been considerably reduced in height during the recent restoration, also that it had been somewhat raised. Then I consulted the Rev. F. C. R. Jourdain, whose father was Vicar of Ashbourne during the restoration. He informed me that the top of the spire was found to have been damaged at some previous time, and that the late Mr. Jourdain and his architect had restored it to what they considered *its original appearance.*

Is it necessary to meet the possible suggestion that the whole thing is a mere coincidence? Anyone forming such an opinion has to face the chances 1 : 6 × infinity × 2 × infinity, which is a ridiculous mathematical statement, but not more ridiculous than the assumption of its possibility.

I do not presume to offer any explanation, I only vouch for the facts.

In conclusion, What can be the connection between the lows of 3,000 to 4,000 years ago and the church of 700 to 800?

ARBOR LOW AS A THEODOLITE.

The natural divisions of the circle I take to be six. Probably the first man who described a circle and applied the radius six times to the circumference finding this brought him exactly to his starting point would be as positive as I am about this. "Not so," say many, probably the majority. "The natural divisions of the circle, more especially as applied to the horizon, are four—north, south, east, and west."

Possibly this question was debated some four thousand years ago.

A combination of the two systems would give the circle divided into four large equal divisions and four small, also equal divisions.
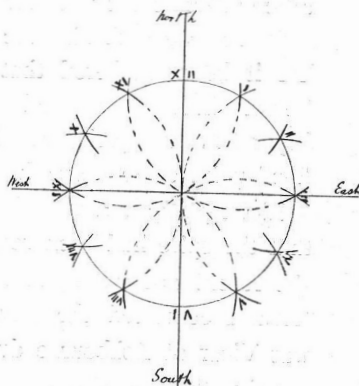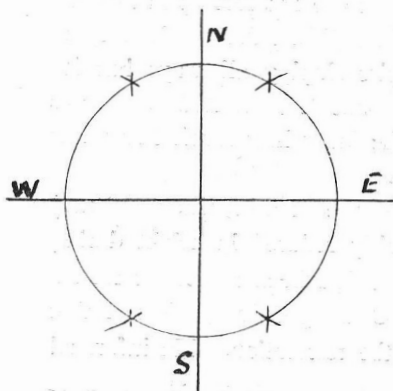
It would soon be found that the larger divisions were exactly double the smaller ones, and that by bisecting the larger ones the circle would be divided into twelve equal parts, the immemorial Zodiac.

Each of these divisions = 30°, and for convenience may be numbered like the face of a clock.

Let us apply this to Arbor Low. Standing in the centre of the circle, at *XII*. (*North*), I have so far found nothing. The line crosses High Low, where a further examination is necessary.

I. (30° *East*) is marked by the summit of Longstone Edge, a pointed hill at a distance of 5·6 miles, and Stanage Edge, about 14·0 miles, "boning" accurately to the centre of the circle in a very nearly horizontal line (a natural mark).

II. (60° *East*) is marked by a tumulus 1·13 miles (an artificial mark).

III. (90° *due East*) is marked by a tumulus 1·73 miles, and farther on by "The King's Stone," about 5·5 miles, and by a stone circle on Stanton Moor about 5·8 miles (all artificial).

IV. (120° *East*) is probably marked by a tumulus about 2·2 miles. This is not very clearly shown on the Ordnance Map (artificial).

V. (150° *East*) is marked by Blackstones Low, 5·96 miles (natural).

VI. (*due South*) is marked by the base of a stone in the southern gateway or entrance to Arbor Low (artificial), by Cross Low, 5·06 miles (natural), by the tumulus near Okeover, locally called Arbor Low, at a distance of 9·3 miles (artificial), and at a distance of two degrees of latitude by Stonehenge (artificial).

VII. (150° *West*) passes between two tumuli close together, 1·4 miles (artificial), and through Steep Low, 5·23 miles (natural, with probably an artificial low).

VIII. (120° *West*) may be marked by a tumulous, 0·20 mile, but this is doubtful. Farther on the line passes through the summit of Foxhill, 5·65 miles (natural).

IX. (90° due *West*) is marked by a tumulus 1·38 miles (artificial). I think this line is very nearly horizontal, and possibly also "bones" with the centre of Arbor Low, the top of the tumulus, and the distant sky-line. I cannot speak definitely, as a wall is in the way.

X. (60° *West*), Gib Hill, 0·45 mile (artificial), may mark this, but it is doubtful. The summit of Axe Edge, 9·03 miles, is exactly on the line (natural).

XI. (30° *West*) is marked by the centre of the hollow between Chelmorton Low to the right and Brown Edge to the left (natural), by Cow Low, 11·16 miles (artificial), and by Chinley Churn, 14·7 miles (natural), the line so far being almost exactly horizontal. A further production of this line is referred to a little later.

From the foregoing it will be seen that ten out of the twelve directions are marked, one is doubtful, and one (due north) merely possible.

Arbor Low, when constructed, must have been a very accurate astronomical instrument for marking horizontal angles, and if trees and walls did not in many cases block the view, it would be still available.

Let us try another low. I have selected one on the Old Hill, Ashbourne, for my own convenience, although it is considerably blocked by trees and buildings.

This low has at

XII. (*North*), a low 0·41 mile (artificial).

II. (60° *East*), a low 0·47 mile (artificial).

VI. (*South*), two lows near Tinker's Inn, 0·72 mile and 1·02 miles (both artificial). These are straight on plan, and so nearly due south that I consider them correctly so, but as the view is blocked by trees, I give it with reserve. These lows, with the Old Hill low and the one to the north, make four in a straight line north and south.

VIII. (120° *West*), probably the big low at Clifton (artificial); but again I speak with reserve, the view being blocked.

IX. (90° *West*), Harlow Greave (artificial), on the ridge of hill between Mayfield and Dydon, must be near this, but trees prevent any accurate observation from either end.

XI. (30° *West*), the lowest point of the hollow on the sky-line between Sharplow and Thorpe Cloud.

In this case half the directions are marked.

I found the remains of a small stone circle near Ambleside, which has ten of the twelve directions marked. This is on the production of the line XI. from Arbor Low, and a further production cuts the great stone circle of Castle Rigg near Keswick.

The repetition of the division of the horizon into twelve equal parts is worth further observation.

I might mention here that in the old editions of the Ordnance Map our great Derbyshire stone circle is called "Arbelows," and by some people in the district it is spoken of as "Arbelows Ring." I commend this form for the sake of euphony.

The sound "Ar" or "Har" is very often repeated in connection with lows.[1] For instance, *Ar*bor Low, the low near Okeover, also called *Ar*bor Low, *Har*low Greave, near Mayfield, *Har*boro' Rocks, *Har*es Hill near Clifton, *Ar*rat Low near Peak Forest, *Av*ebury (I believe the pronunciation is *A*bury). This similarity, I suggest, points to a common origin.

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[1] See page 39.