

Derbyshire Scratch Dials.

By F. N. FISHER.

A SCRATCH dial, as the name suggests, is a primitive type of sundial, usually consisting of two or more lines scratched, rather than deeply incised, on the surface of the stone and radiating in a downward direction from a central stylehole.

They are to be found on the south walls of medieval churches, usually at about 60 ins. from the ground, and are generally some 9 ins. in diameter.

Large variations from these measurements, however, often occur: in Derbyshire, at Kedleston, there is a dial as low as 36 ins., while that at Repton is no less than 85 ins. in height. Also, the small dial at Spondon measures only 5 ins. across, while at Clowne, each line is extended to 14 ins.

The ends of the lines are often joined to form part of a circle as at Langwith, to form a semi-circle as at North Wingfield, Kedleston and Repton, and, occasionally, to form a complete circle with lines radiating in all directions from the centre, like the spokes of a wheel, good examples of which may be seen at Bradbourne and Spondon (No. 1).

Another interesting type of dial is where there are no lines, a circumference being traced, either fully or in part around the stylehole by means of a series of small holes. It is assumed that in most cases these holes were fitted with pegs but, at Steetley, which affords a good example of this type of dial, the holes appear to be too small ever to have held pegs and it may have been that these dials were painted. (See below). A further

variant occurs, which may be seen at Spondon (No. 2) and in both the dials at Alsop-en-le-Dale, where the lines end in small holes. It may be that holes were used for the same purpose as lines, the shadow cast by the style falling upon them and so recording the passage of time.

Owing to restoration or rebuilding, dials may be found which have strayed far from their original position somewhere on the south side of the church and may be seen on the north wall or even in the interior. The writer recently observed at Bodenham in Herefordshire a scratch dial on the north porch. This porch was originally erected on the south side but was pulled down and re-erected in its present position during the last century.

The dial at Langwith is inside the south porch, which shows that it is of earlier date than the porch itself, the latter, erected early in the 14th century, having rendered it useless.

Even dials in their original positions are found in many differing spots, and, though the vicinity of the south and priest's doors is a common situation, our forefathers, who cut these dials, would certainly put them in a position most easily observed by anyone entering or approaching the church.

There are two lines which are present in nearly every dial. The perpendicular line, immediately below the stylehole, is called the noon line, since, if a pointer or style be inserted in the stylehole in a direction due south, the shadow falling on this line will always register noon, because the sun at its zenith will cast a shadow directly beneath the style.

Then there is the line to the left or west of the noon line at an angle of roughly 45 deg. This line is very noticeable in most dials because it is more deeply cut in the stone. It is usually termed the mass line, as the shadow, were a style in situ, would reach it at about

9 a.m., the usual time for celebrating Mass on Sundays and Holy Days in medieval times. From this we get the term 'mass clock.' The mass line may be seen to advantage on both the dials on the church at Alsop-en-le-Dale.

The other lines vary considerably on different dials, but in many cases it will be seen that the lines divide the dial into twelve equal divisions. The horizontal line immediately to the west of the stylehole represents 6 a.m., and the one exactly opposite, 6 p.m. This system of dividing the period between 6 a.m. and 6 p.m. into twelve hours was used in the church in medieval times, the hours being numbered from one to twelve. The important hours were the third, sixth and ninth, when certain offices were recited by the clergy. These offices took their names from the hours at which they were recited, viz., Terce, Sext and None. The mass line corresponds roughly with the third hour, since Mass was celebrated immediately after terce. Another line, bisecting the eastern half of the dial, marked the hour corresponding with three o'clock, when Nones was recited. These lines, then, besides marking the main canonical hours, also marked, together with other less significant ones, the ordinary hours of the day.

We have been examining the lines radiating in a downward direction only; how, then, can we explain the lines radiating upwards, as in a wheel dial?

These lines could only be of use where the style projected in an upward direction, so it may be that such styles were divided into two parts, one part tilted upwards and the other part downwards. Yet, to record time in the upper part of such a dial, the style must be bent upwards so considerably as to form a very small angle with the vertical, in order to cast a shadow even at midsummer.

The most probable explanation of these wheel dials

is that the designer who constructed them did so merely from convenience of draughtsmanship, the upper lines, of course, being useless for time recording.

Further, we must not overlook the probability that these dials have been interfered with by persons mistakenly trying to confer symmetry on the design; in this connection, it is interesting to note that the lines on the upper half of the dial at Bradbourne are the more distinct

THE STYLEHOLE.

Although no style has as yet been found in situ an examination of the stylehole occasionally reveals a small portion of metal as at Horsley No. 2 and Nuthall, Notts., presumably a portion of the original style.

There is a style at Mugginton, however, but this dial is of later date than the ordinary scratch dial and is of a transitional type. The stylehole is found either in the stone itself or in a joint of the masonry, which may have been cemented up.

On an average it measures $\frac{3}{4}$ in. across and $\frac{3}{4}$ in. in depth.

VARIOUS THEORIES.

Style at right angles. Mr. Ethelbert Horne,¹ to whose exhaustive research so much of our knowledge of this subject is due, emphasizes the simplicity of the scratch dial, both in conception and purpose, and favours the theory of the style projecting at right angles to the face of the wall. That, on such dials, the hour lines would register inaccurately because of the varying elevation of the sun at different seasons of the year, may have been obviated by the use of more than one dial on the same church, for example, the three dials at Spondon. Moreover, accuracy in time measurement as we know it was neither understood nor desired in those days.

¹ Horne, Ethelbert, *Scratch Dials*, 1929.

Bent style theory. We have to admit the inaccuracy of a dial with its style at right angles, but we are not forced to accept it in that position. Dr. A. R. Green¹ has carried out much work with experimental dials to prove that, on a dial facing due south, if the style is bent downwards to form an angle with the horizontal equal to the latitude of the dial, this arrangement will register fairly accurately. Also, if the church is incorrectly orientated, a lateral deflection of the style towards the south will suffice.

Painted dial theory. In the middle ages the exteriors of our churches were limewashed and this has suggested to Mr. T. W. Cole² that scratch dials were painted, the lines or holes serving as a permanent guide when repainting was necessary owing to relimewashing. The holes on the Steetley dials seem to support this theory, as they appear too small ever to have held pegs, and the only markings on Horsley (No. 2), four short lines at a distance from the stylehole, would appear to have served the same purpose.

SUNDIALS.

Prior to the Norman Conquest, the passage of time was recorded in England by sundials, some of which are still in existence. These dials, which are known as Saxon Sundials, can be distinguished from scratch dials by their superior workmanship. Moreover they incorporate the octaval system of recording time, in which the day-night is divided into eight equal parts.

Although it is not known exactly, it is thought that scratch dials persisted in use at least until the 15th cent. The introduction of mechanical clocks would have had very little effect on small country churches, owing to the extreme slowness and the expense attendant upon the dissemination of new ideas at that time, but, with the

¹ Green, A. R. Sundials, 1926.

² Cole, J. W. Origin and use of church scratch-dials, 1935.

greater mathematical knowledge available, the primitive scratch dial was gradually improved upon, and this improvement, continuing through the 16th and 17th cents., reached its zenith in such elaborately constructed sundials as the one at Eyam.

Towards the end of the 14th cent. Canonical Hours gave place to the newer Clock Hours, as used today, and the dial at Clowne, with its Roman numerals marking the hours and its equally spaced lines, shows that it is an early elaboration of the primitive scratch dial.

The dial at Mackworth, besides having Roman numerals at the ends of some of the lines, also shows them unequally spaced, as found in the sundial of later date. We are fortunate in this dial in-so-much-as it is a dated example, and has, underneath it on the south-east part, an inscription which runs " Ut Hora Sic Fugit Vita Hominis 162-."

The scientific sundial was almost always incised on a single piece of stone and let into the face of the wall. An early sundial which is incised on the wall direct can be seen at Foremark and another good example is at Pinxton.

Where the church is incorrectly orientated, the sundial is often set out at an angle from the wall to make it face due south; or, in some cases, this difficulty is overcome by deflecting the style towards the east or west.

DESCRIPTION OF DIALS.

Alsop-en-le-Dale. (See illustration).

There are two scratch dials on this church which can be seen on the east side of the round headed window to the east of the south Norman doorway of the nave.

1. Is 88 ins. to the stylehole and has a noon line of $3\frac{1}{2}$ ins., with two lines to the west, and one and part of another to the east. The noon and western lines terminate in small holes.

2. The stylehole is 58 ins. high, the noon line is 4 ins. and there are six lines westwards and five to the east, some being very faint. Several of the lines end in small holes.

Bradbourne.

This dial, which is situated on the west side of the south porch (date 1450-90), consists of a very faint circle 12 ins. in diameter with fainter radiating lines, none of which is easily discernible. The stylehole, which is 52 ins. from the ground, measures $1\frac{1}{2}$ ins. across and $2\frac{3}{4}$ ins. deep.

Clowne.

This dial is to be seen on a corner stone at the south-west corner of the nave. Height to cemented-up stylehole 67 ins. The noon line measures 14 ins., and is distinct. There are eight lines to the west, four of them quite clear, and one, very faint, on the east side. There are Roman numerals at the end of several of the lines, which indicate it to be of a transitional type.

Croxall, Staffordshire. (Transferred from Derbyshire to Staffordshire in 1894, but still in the Rural Deanery of Repton, and the Diocese of Derby).

On the diagonal buttress at the south-east corner of the nave are two dials, one facing south-east and the other south-west.

1. The one facing south-west is 77 ins. to stylehole; has a noon line of $3\frac{1}{2}$ ins. and five others of 3 ins. to the west. Faint parts of a semi-circle can be seen with a radius of $3\frac{1}{2}$ ins.

2. Facing south-east, a complete but very faint circle can be seen, diameter 10 ins. and 72 ins. to central stylehole. The noon line is 5 ins. and continues upwards to the circumference. There are three lines to the west, and one in the upper half of the circle.

Horsley.

1. This dial is on the first buttress east of the south porch. The stylehole was originally in a masonry joint and 78 ins. high. The noon line is 7 ins. and there are five lines on the west side and three on the east.

2. The dial on the west buttress of the south aisle has

a stylehole 55 ins. high, in which can be seen the remnants of the metal style. The dial consists of four scratches about 1 in. long and $5\frac{1}{2}$ ins. from the stylehole. Vide supra—Painted dials.

Kedleston.

Under the south window of the south transept and below the string course is a dial which has a combination of lines and holes—almost dots. The dial is in the form of a double semi-circle, the outer radius being $5\frac{1}{4}$ ins. and the inner $4\frac{1}{4}$ ins. The noon line is clear and there are four lines to the east and three to the west, one being very faint. The small holes or dots appear where the lines cut the circumferences of the half circles and, also, there are two rings of them between the lines, one being between the circumferences and the other nearer the blocked up stylehole.

Upper Langwith or Langwith Bassett.

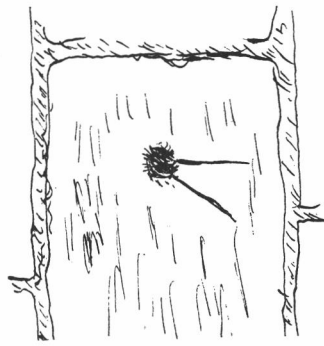
On the east side of the south door—inside the porch—a mutilated dial of four lines is seen at a height of seven feet. The noon line measures five inches, there are two lines to the east and one to the west, joined by part of a circle.

Mackworth. (See illustration).

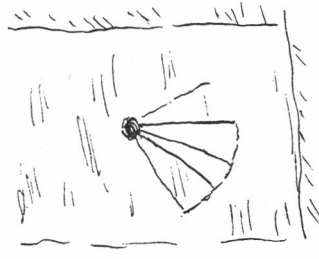
1. Situated on a buttress east of the south porch. Height to cemented-up stylehole 60 ins. The noon line is 7 ins. and is inclined a little to the west. There are two lines to the west and four to the east.

2. A faint dial can be seen a little to the east of No. 1. No noon line can be seen, but there are four lines to the east and two to the west, about 4 ins. long. Very small stylehole.

3. On the diagonal buttresses of the south porch are two excellent late examples of transitional dials. They face south-east and south-west respectively, and were made to be used in conjunction with one another. The one facing south-east consists of a semi-circle $8\frac{1}{2}$ ins. in



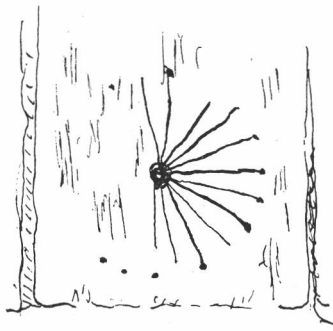
PENTRICH.



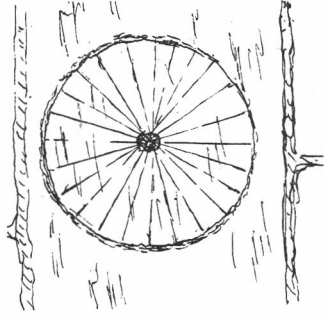
WHITWELL.



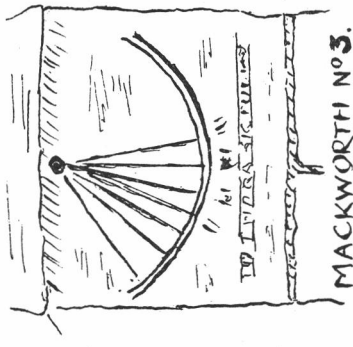
STEETLEY N^o1.



ALSOP-EN-LE-DALE N^o2.



SPONDON N^o1.



MACKWORTH N^o3.

radius at a height to stylehole of 95 ins. There is no perpendicular noonline, and there are five lines on the western half and two on the eastern half of the dial. Roman numerals II and III can be seen plainly on the two eastern lines and also fainter ones on some of the other lines.

Under the dial and somewhat weathered is an inscription:—

“UT HORA SIC FUGIT VITA HOMINIS 162-.”

4. The dial on the south-west buttress is of similar size and also has seven lines. No Roman numerals are, however, to be seen.

Marston Montgomery.

On the tympanum of the south doorway within the porch is a clearly marked dial. It consists of a complete circle 9 ins. in diameter, which is divided by a horizontal line running through the central stylehole, with lines in a downward direction only. Two lines divide the left side into three equal parts whilst the right side is divided into three unequal parts by two lines. An unusual feature of this dial, is that the lines project beyond the circle and end in small crosses.

Mugginton.

This transitional dial is in two parts, one facing south-east and the other south-west, and is situated at a height of 110 ins. on the diagonal buttress at the south-east corner of the south nave aisle. The part facing south-west is particularly interesting, as a metal style is present, which is bent downwards at an angle of roughly 55 deg. to the horizontal and also deflected to the right. At the ends of the lines are the Roman numerals XI, XII, I, II, III, whilst just underneath are a corresponding number of dots—: : : : : etc. The style on the south-east face is lacking, but the Roman numerals IX, X, XI, XII, I, are present, as are the dots corresponding to these hours.

Pentrich. (See illustration).

The example at Pentrich is to the east of the priest's door, in the south wall of the chancel. The stylehole is $1\frac{1}{2}$ ins. across and at a height of 51 ins.; from it, run two lines only. The noon line is $4\frac{1}{2}$ ins., and the other is 30 deg. to the west, which, according to a standard dial, would register 10 a.m.

Repton.

On the south-west buttress of the south transept, at a height of 85 ins., may be seen a scratch dial which has a noon line of 5 ins., with six lines to the west and five to the east.

The stylehole cut directly in the stone is $1\frac{3}{4}$ ins. deep and $1\frac{1}{2}$ ins. across.

Spondon. (See illustration).

1. This dial, which is situated under the westernmost window of the south aisle, is in the form of a complete circle. The 24 lines, which are very faint except for the noon line, are equally spaced and the stylehole is cemented up.

2. This dial is to the west of the east buttress of the south aisle and is 40 ins. from the ground. There is a noon line, one to the east and three to the west, which terminate in holes and appear to have been re-cut recently. Their length is $2\frac{1}{2}$ ins., and the dial is the smallest so far noted in Derbyshire.

3. Situated east of the east buttress of the south aisle. The stylehole in this example is in a joint of the masonry. The noon line is very distinct and measures $8\frac{1}{2}$ ins. There are three lines to the west.

Stanton-by-Dale.

On the tympanum over the south entrance is carved a cross patée, on the central boss-like part of which is a dial. This appears to be of the Saxon sundial type.

This central boss is $5\frac{1}{2}$ ins. in diameter, and is divided into two equal parts by a horizontal line running through

the small central stylehole. The noon line is vertical, and is continued upwards to the upper edge of the dial. The lower half of the dial is thus divided into two equal parts, which parts are again equally divided by lines at 45 deg. The division of the dial into four equal parts is in accordance with the octaval system, whereby the day-night was divided into eight periods.

It was some time after the Conquest before the octaval system finally gave way to the present duo-decimal system, so that it is probable that many Saxon dials were made after the coming of William. As the dial is faint and rather small for a Saxon dial, the explanation may be that the cross was cut and the stone re-dressed at some later date.

Steetley Chapel. (See illustration).

1. This dial is seen at the south-east corner of the choir and is contained on a single stone. It consists of a central stylehole $\frac{3}{4}$ in. across and $1\frac{1}{4}$ ins. deep, at a height of 54 ins. from the ground, around which, at a radius of $3\frac{1}{4}$ ins. is a circle of small holes, 24 in number. The holes are very small and it would appear that they were not meant to hold pegs. This dial I consider as confirmation of Mr. Cole's painted-dial theory.

2. Seen on the south-east corner of the nave and extending over three stones. The stylehole is blocked up and was in a joint of the masonry at a height of 66 ins. The circle of small holes is $9\frac{1}{2}$ ins. across, and there is a faint noon line to be seen.

Taddington.

This dial is on the centre buttress of the south aisle. It is much weathered, and all that remains is the cemented up stylehole and portions of four lines to the right or east. It is 57 ins. high and 4 ins. from stylehole to end of lines.

The stone on which this dial is cut is flaking vertically, and it is possible that the dial will disappear altogether in a comparatively short time.

Whitwell. (See illustration).

This dial is seen to the west of the doorway of the south porch. It is 56 ins. to the stylehole and has a noon line of 5 ins., also three lines to the west and a faint one on the east side. Part of a faint circle connects the lines on the west side.

North Wingfield.

An interesting dial is to be observed on the easternmost buttress of the south side of the chancel, at a height 63 ins., and consists of a double-semi-circle of 6 ins. diameter, between the circumferences of which there may have been Roman numerals. The lines seen are mostly to the east, the west side being badly weathered.

Although over 150 of our country churches showing medieval work were inspected, only 17 of them have scratch dials. To these must be added Croxall, as, although now in Staffordshire, it is still in the diocese of Derby.

It has been assumed that all our churches had them at one time, but "restoration" and weathering have destroyed many, whilst others may still be hidden under ivy and creepers which unfortunately are present on many of our churches. Some of these dials are quite faint and very small, so it is quite possible that others may have been missed even though each church visited was given a close scrutiny.

As regards their preservation, it is unfortunate that little can be done, beyond putting a weather moulding above them, but in any case they should be kept free from dirt and mould which has a deleterious effect on the stone.