

FROM OLD TO NEW – A RESTORATION PROJECT

The Nazeing Church Sundial

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The church of All Saints, Nazeing is located to the south-west of Harlow, standing high on an exposed and windy ridge on the east side of the Lea Valley in Essex. As well as having a mass dial on the nave of the church, complete with an old iron gnomon, the tower of the church also has a large carved wooden sundial. This vertical dial is of some interest, but had become very badly worn over time, so restoration was suggested. It is mounted high up on the south face of the staircase to the bell chamber at the south-east corner of the tower, as shown in Fig. 1. Over the years, the surface of the dial had become worn and also the gnomon mounting holes had allowed the gnomon to become loose and to be blown sideways by the prevailing wind in this exposed location.

A benefactor had made funds available to restore a number of sundials, with this being on the list that he would like to have restored. Early in 2008, approaches were made to the local vicar and the church authorities, with the offer of restoration of the dial, and this was readily accepted towards the end of the year. With the acceptance of the restoration offer agreed, Barrie Winter, a chair-maker and wood-carver friend of the author, was contacted and agreed to make a new dial, if restoration of the original was not practical.

Before any work could commence, the old dial would need to be removed from the tower to inspect its condition and also for analysis of its unusual furniture. As the ground at the base of the tower slopes badly, the simple use of a ladder or even of a ‘cherry-picker’ type of hoist to reach the dial was thought unsuitable, but that scaffolding would be required to remove the dial in safety. In August 2009, scaffolding was erected and the dial was removed by Bryn Pateman, a friend of the benefactor (Fig. 3).



Fig. 3. Removing the old dial from the tower.



Figs 1 & 2. The unrestored dial on the tower of Nazeing Church.

Fig. 4. The construction of the back of the old dial.



On inspection, the dial was found to have been constructed of three pine boards, approximately 1" thick and carved in relief. Upon later inspection by experts, it was considered that the wood, as indicated by the date of 1765 shown on the dial, was almost certainly that of the original, but had undergone a number of repairs in the past. The carved woodwork of the dial had been mounted onto a support backing of tongue-and-groove boards, possibly typical of stock material used for railway carriage woodwork of the late 1800s or early 1900s period. The gnomon was in generally sound condition, but only just resting in the dial woodwork and also without its retaining pins to the rear of the body of the dial, thus allowing it to move loosely on the face of the dial.

On closer inspection and due to the overall poor condition of the dial, it was felt that a completely new dial would be the most appropriate choice in the restoration process.

Analysis of Dial Markings

The true latitude of Nazeing is $51^{\circ} 45'$ whereas that shown on the original dial is $51^{\circ} 32'$, that being the value for London. When the dial was originally made it was likely that



Fig. 5. Glancing illumination to highlight the carving.

the latitude of only major locations would have been accurately known, but not for smaller towns, so the nearest major location values would have been used to delineate this dial.

Although some features of the markings on the dial could be identified with some certainty, it was not possible to fully identify them all. Side-lighting of the dial by means of an 'anglepoise' lamp proved to be particularly successful, especially so in a darkened room, as shown in Fig. 5.

Close inspection of the furniture fully confirmed the motto as "*Meridies Solarium*", the latitude details, declination lines for the equinoxes and solstices and the date of 1765.

A series of vertical lines, with adjacent lettering carved across the lower area of the dial, previously unidentified, proved to be solar azimuth lines with eight directions noted, from SE through South to SW being indicated.

A sheet of clear plastic ('Melinex', an ICI product) was fitted over the dial and the original furniture markings traced out with a marker pen to produce a better picture and gain a greater impression of the original markings on the dial plate (Fig. 6).

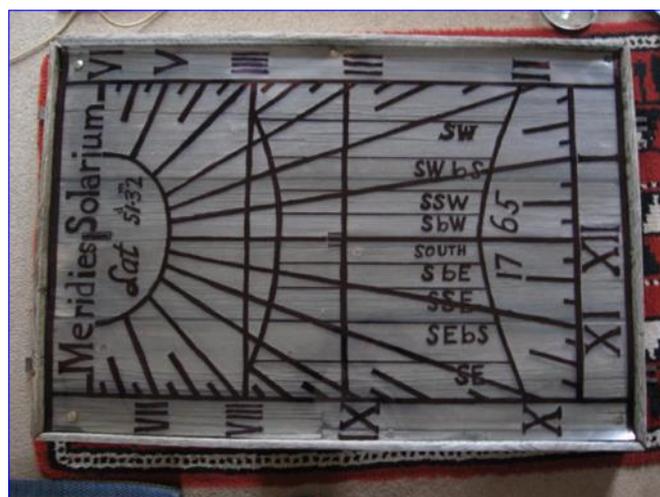


Fig. 6. The carving transferred onto a Melinex sheet.

Design and Construction of the New Dial

Full-size plans were produced with the aid of a PC-Sundial design program showing a possible new layout, but only including the four major azimuth lines and lettering to reduce overcrowding, but also to maintain elements of the original dial features incorporated into the new design. With all the other features to be retained from the original dial, a final design layout was decided upon.

The maker selected chestnut wood for the construction of the new dial as this is a very stable, long-lasting wood having excellent weathering characteristics which would suit the location of the dial in the exposed location on the church tower at Nazeing. Three pieces of the wood were used, being tongue-jointed and glued vertically, similar to the construction of the leaves of a dining-room table. A copy of the plan was pasted to the dial plate to allow the maker to work on the design on the wood with a routing

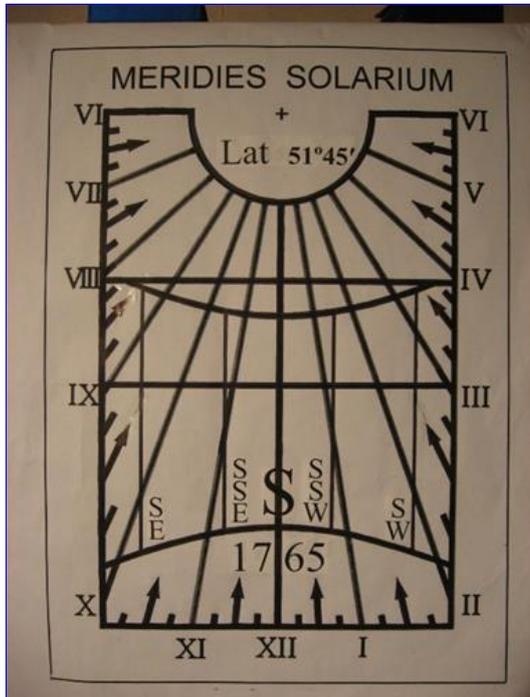


Fig. 7. Drawing for the new dial.

machine and also carve the more intricate details to plan. The restoration date of 2010 was also included on the new dial, with the maker also being persuaded to sign his work, "BW Fecit"

Figs 8 and 9 show the work in progress, and the maker Barrie Winter with the old and new dials.



Fig. 8. The new dial with some areas still to be removed by the router.



Fig. 9. Barrie Winter with his newly-completed dial and the original.

Following construction, a number of coats of linseed oil were applied to the dial to assist with its preservation. The linseed oil would allow the wood to 'breathe' but not seal the surface to trap in moisture and hasten any rotting, which a covering of paint or varnish might have caused.

There had been an earlier delay in the construction, due to illness, but by July 2010 all work on making the dial had been completed and the new dial was collected from Yorkshire.



Fig. 10. Close-up of the new dial, with linseed oil applied and showing the gnomon fixing and the brass nodus.



Figs 11 & 12.
Back and
front of the
finished dial.



Preparing the New Dial for Installation

Due to the difficulty in working on the dial *in situ* at the church site having the uneven ground at the base of the tower, which had required the use of scaffolding, it was decided that for future maintenance purposes, the gnomon assembly should be directly accessible from the front of the dial plate and not fixed through to the rear of the plate. This would enable it to be removed without having to remove the whole dial from the tower of the church. To this end, a small upper fixing plate was welded to the gnomon at the correct angle and side-support brackets were also fitted to the gnomon's support strut, thus allowing the assembly to be simply attached directly to the front of the dial using brass woodscrews. This arrangement would allow the gnomon to be more easily removed for any necessary minor work, without needing to remove the whole dial plate from the brickwork of the tower.

A nodus for the gnomon was also provided to enable the dial furniture to be fully utilized. This nodus, constructed in the form of a crossbar, was formed from the 'earth pins' of two redundant '3 pin, 5 amp' electric mains plugs. Both pins were tapped to enable a short length of threaded stud-
ding to join the two together through a newly-drilled hole at the correct position on the style edge of the gnomon.

The two original fixing straps were fixed to the rear of the dial with brass woodscrews, and additional galvanised metal strips were fitted horizontally to provide further reinforcing for the woodwork of the dial.

Erection of the New Dial

In August 2010 scaffolding was re-provided to enable the new dial to be installed on the church tower. Installation of the new sundial by Bryn Pateman went fully to plan, with it subsequently being blessed by the church vicar, the Rev. Catherine Pennington. The whole operation was also overseen to the satisfaction of the benefactor.

A further visit was made to Nazeing Church to photograph the replacement dial following the removal of the scaffolding and, as past experience would suggest, on arrival the sun was hidden behind the clouds! However, after about an hour's wait, the clouds parted for a few moments, with the sun briefly emerging through hazy skies. The shadows produced on its newly-carved surface indicated that the restored dial really was working. The sun then vanished behind the clouds again!

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Fig. 13. The newly-installed dial.