



On the Constructional Design of Church Timber Roofs in Cheshire, Denbighshire and Flintshire

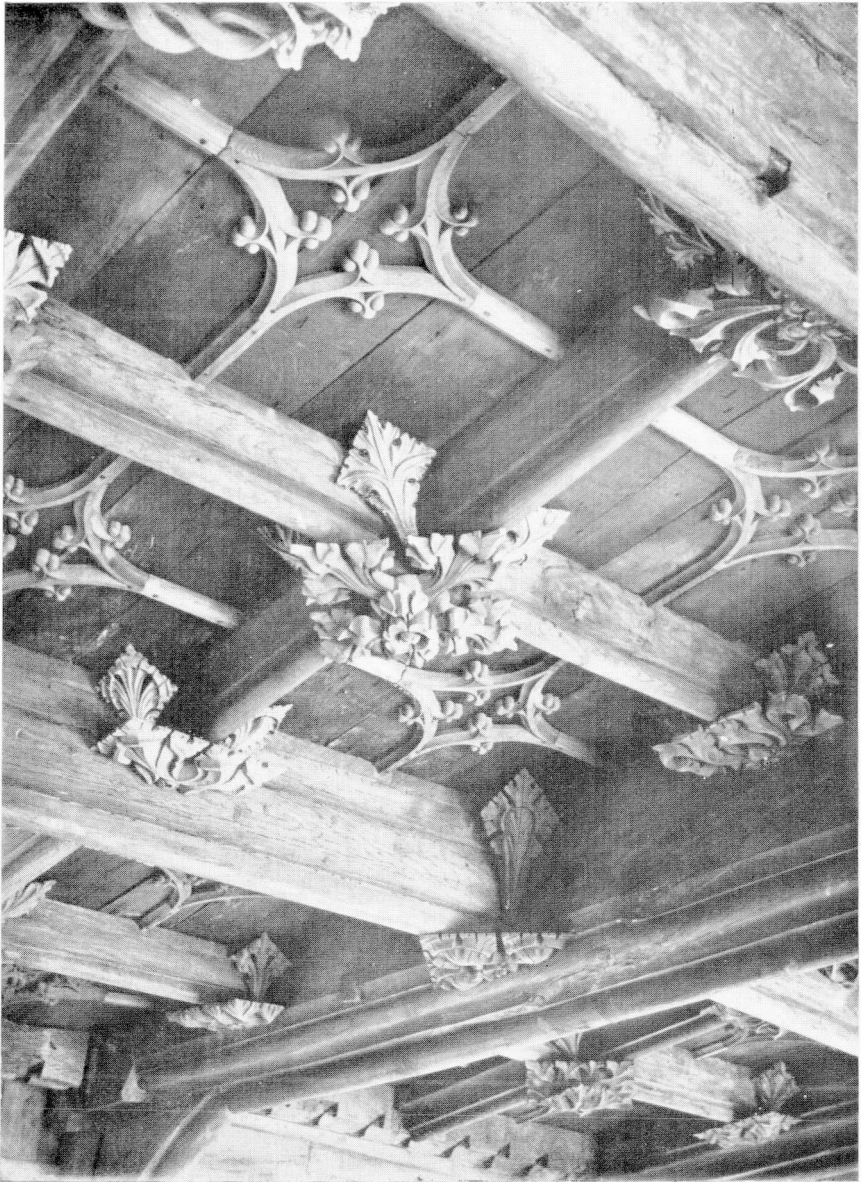
(Plates XXVI—XLIV).

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THOROUGH study of Cheshire types of church architecture and the reasons for the same have not yet been published, but we are gradually accumulating data for a study of its woodwork, of which roofs form an important section; in no other class of work is the skill and ingenuity of the mediæval craftsman seen to better advantage. Though utilitarian in character the roof was turned into a thing of beauty by the 15th century carpenter, and was a magnificent complement to the spacious and lovely buildings erected during the last phase of mediæval art. In Cheshire, the sturdy and often lofty churches with their light clerestories, were completed with panelled beam roofs which offered little thrust to the walls, and enabled the builder to utilize the wall space for spacious windows; just as in the Denbighshire two-aisled churches, a thrusting single hammer-beam roof, which the low thick walls could withstand, by its construction and absence of tie-beams gave greater height. Again in East Anglia, where large timbering was never plentiful, the double-hammer-beam was perfected, constructed of timbers of short scantling. Indeed, it will be found that whatever type of roof was prevalent in a district, there was an all-sufficient reason for its use. Many constructional methods were employed during the mediæval period in the



GRESFORD CHANCEL ROOF.
(Detail)

planning of timber roofs, and it may be as well to give a short general introduction to the subject before discussing the roofs of Cheshire and Denbighshire.

Mediæval roof design can be roughly divided into three classes, namely beam roofs, trussed roofs and thrusting roofs. All three were employed throughout the mediæval period. A roof constructed of single pairs of rafters independent of each other and suitable only for small spans is called a single-framed roof. If the church was of any width it was necessary to place horizontal timbers beneath the rafters to support the weight of the roofing material. These timbers, known as purlins, rested upon strong frames or principals placed at intervals bridging across the width of the church. If the church was not wide, a ridge purlin and one half-way down the slope of the roof was sufficient, but if wide two or three purlins were placed at equal intervals. The purlins and wall-plates conveyed the strain from the common rafters to the principals, which were placed between the windows or above the apex of the arches where the wall was best able to bear the strain. When roofs are constructed in this way they are termed double-framed.

BEAM ROOFS. The beam roof is a flat roof constructed by placing beams at regular intervals across the width of the church. The beams are either naturally cambered or cut to this shape to prevent sagging, or they are fired by means of tapering pieces placed above them. The beams act as a dead weight upon the walls and do not exert any outward thrust. In addition to resting upon the wall the beams are generally strengthened by wall-posts resting upon stone corbels and tied by arch-braces springing from the wall-posts, and curved towards the centres of the beams. This arrangement serves the double purpose of carrying the weight down the wall where it is stronger, and secures the beam from falling when the ends resting upon the wall have become decayed. Different methods are employed to produce the necessary slope to the roof; either the ridge-purlin lies on the beam and the side-purlins are morticed

into it, or they lie on the beam and the ridge-purlin is raised upon a short post. The decoration of beam roofs is largely confined to moulding and enriching the beams and decorating the wall-plates. Sometimes the rafters (placed flatways and not on edge as in modern roofs) are left exposed, or the surface is divided up into square panels with carved bosses at the intersections producing a very rich effect.

THE TIE-BEAM OR TRUSSED ROOF belongs to the double framed type, and if properly designed exerts no outward thrust upon the walls. It is not possible to truss a wooden roof without the aid of a tie-beam or a pair of scissor beams, and the latter are rare. The constructional varieties of the tie-beam roof can be sub-divided into three, namely, the couple-close, the queen-post and the king-post; the queen-post being a development of the couple-close roof, and the king-post of the beam roof. When a roof consists of a pair of rafters pitched against each other with their feet framed into the tie-beam it is called a couple-close roof. If the rafters are supported by two posts placed underneath the side-purlins it becomes a queen-post roof. If the rafters are supported by a central post rising from the beam to the apex of the rafters it is called a king-post roof. The tie-beam is supported as in the beam roof by wall-posts with arch-braces springing from them.

THRUSTING ROOFS may be roughly sub-divided into couple roofs, arch-braced, collar and trussed-rafter, and hammer-beam roofs. The thrusting roof placed all its weight against the walls pushing them outwards, and all mediæval experiments had for their object the neutralizing of this tendency. The thrusting roof in its simple form consists of two rafters pitched against each other with their feet resting upon the walls; this is called a couple roof, and only the power of the walls to resist the pressure prevents collapse. An improvement of this simple form is the placing of braces beneath the rafters to prevent them sagging, the braces gradually becoming arch-shaped. This did nothing to prevent the outward thrust until they were lengthened at

their lower ends and slotted into stone corbels, placing the thrust lower down where the wall was stronger, and clipping the wall at the same time. The addition of the arch-brace necessitated a development at the apex of the rafters, and a hanging-post was inserted between the ends of the rafters into which both they and the arch-braces could be secured. This type is called an arch-braced roof.

Another method is to place a cross-bar, or collar, two-thirds of the way up between the rafters to strut them apart. Two other pieces of timber called struts are placed from the collar to the centre of the lower span of the rafters, thus supporting the rafter at two points and forming a rough kind of arch. This was developed in the south-west of England by turning the struts into perfect arches resting on the wall-plates. The wall-plates were gradually improved by placing horizontal timbers on either edge of the wall, tenoned together by cross pieces called sole-plates, the rafter pitching on the outer edge with a short post or ashlar piece flush with the inner wall, wedged between the rafter and the inner wall-plate, thus forming a broad foot for the roof. This was further improved by placing the inner wall timber at a lower level than the outer and allowing the sole-piece to be tenoned directly into the ashlar piece, thus preventing the roof from slipping off. Both these varieties of roof are called collar and trussed rafter roofs.

THE HAMMER-BEAM ROOF is a development of the wall-plate noted above. The sole-piece is projected beyond the inner surface of the wall and is supported by a wall-post and arch-brace, thus becoming a hammer-beam. On the end of the projecting beam a queen-post is erected with an arch-brace supporting the rafters, thus lessening the span of the roof. This construction prevents the roof from slipping off and reduces the thrust, placing the strain lower down, where the weight of masonry above helps to keep it steady. In a wide roof this system of bracketing is further developed by supporting the rafters at additional points and producing the double hammer-beam which is still one of the glories of 15th century design and carpentering.

LOCAL TYPES OF BEAM ROOF.

During the second half of the 15th century and up to the time of the suppression, extensive rebuilding of church fabrics in the county of Cheshire took place. The 14th century church, generally of a low dark type, was discarded, giving place to large, light and spacious buildings, whose arcades were surmounted by lofty clerestories containing windows in almost continuous sequence. With advanced skill in construction, the walls were built with an economy of materials undreamt of in earlier times, which, in conjunction with the space required for the windows, made the walls unfitted for a roof exercising any constant outward thrust. This was especially so in the case of churches erected with materials from the local quarry centres, red-sandstone of varied quality, which in the best districts was of a loose non-fibrous nature lacking in silica, and in the worst little better than half congealed red clay. This prohibited the use of exposed flying buttresses, owing to the friable and porous nature of the stone. The beam roof therefore supplied what the circumstances required, offering no outward thrust against the walls, and in consequence of the low gable, no resistance to the wind. It had the further advantage of allowing of an unhampered setting out, as it was unnecessary to place the principals over the strongest parts of the wall.¹ The Cheshire carpenters used this advantage to panel their roofs in squares, the width of the fabric ruling the spacing, with the consequence that the principals are placed in any position, even directly over a window. This has occasionally given rise to a local tradition of a roof being re-constructed from a destroyed conventual church, whereas it was designed for the church it covers².

No recognised principle seems to have been in use as to the number of panels to be set out across the church or between the principals, or as to the arrangement of the

¹ The ordinary raftered roof is an exception in the county, an instance being at Gawsworth, over the nave.

² As at Witton, which is supposed to have come from Norton Priory, and St. Mary, Chester, from Basingwerk Abbey.

purlins and cross timbers. In some roofs they are of equal size, in others there are semi-principals and purlins, with timbers of lesser scantling between them arranged in sets of four panels. The principals are supported on short wall-posts resting on corbels, and have arch braces springing from them towards the centre of the beam.³

The moulding of the timbers and the decoration of the principals are of the same character throughout the county, and the treatment of the running ornament in the hollows of the purlins, and the carving of the bosses are homogeneous. The mouldings are deeply cut in hollows and rounds of late 15th century type, and many of the principals are decorated on camber or firred face with blind tracery often with a circle containing a shield. There are exceptions, as at Mobberley, where the centre of the beam has a niched figure. The flowing ogee enrichment in the hollows of the purlins is also used in the mouldings of the screens, as at Mobberley and Northenden, generally cut in the solid.

The wall-plate is often enriched with carving, as at Barthomley and Astbury, whilst at Malpas angels with outspread wings are placed under the lesser principals. At Astbury in the main aisle the spandrels over the windows are filled in with ornamental woodwork, and in the Gresford aisles the corbels support arch-braces to the wall-plates as well as to the principals. In many cases where the bosses have been destroyed, the mouldings are found to have been stopped before reaching the joints, thereby strengthening the construction. The bosses are fairly large, but shallow, and are circular in shape, or if square have circles in the centre decorated with blind tracery, letters, or monograms. A rich effect is obtained by the planting of separate leaves called crows feet round the boss, which nestle in the corners of the purlin joints. The panels are either left plain, or have diagonal ribs, as at Witton, or are decorated with tracery as in the aisle roofs at Malpas.

³ Many of these supports have been renewed in later times, sometimes neatly as at Barthomley, or crudely as at Great Budworth and Audlem. Repairs have been done at Cheadle, Great Budworth, Audlem, Barthomley, and Ruthin. The repairs at Witton are dated 1641, Astbury 1616, Sandbach 1661. These dates have misled antiquaries into believing that they denoted the erection of the roof.

Even at the present time many of the bosses are painted white, but originally the roofs must have been rich in polychromatic colours. Earwaker, in his *East Cheshire*, vol. 2, page 576, states "Gawsworth church was formerly very remarkable for the elaborate decoration of its interior, not only the walls, but the roof being highly coloured; on the ribs were figures of angels picked out in gold and colours and the effect must have been very handsome." This is commented upon as late as 1849 by a writer quoted in the *Cheshire Sheaf*, old ser., vol. 1, page 334: "The roof of the nave is formed with arched ribs or rafters, with principals at intervals and boarded; and the whole covered with the most brilliant colours, with the bosses at the intersections and some of the mouldings gilt; the whole can be quite distinctly made out. The chancel roof is flat, and formed into square panels by moulded oak ribs, having a kind of Arabesque painted on them." Needless to say at the present day not a vestige of this remains.

Instances occur of special treatment over certain parts of the roof, especially where there is a continuous roof over both nave and chancel. At Gresford the roof over the quire has enriched panels divided by ribs into compartments, with carved bosses at the intersections. At Holt the bay over the sanctuary has traceried panels. At Mobberley the panels of the bay over the rood have diagonal ribs and bosses, with extra large bosses at the intersections of the purlins. At Astbury there is an elaborate crocketed pendant bracket over the rood for the figure of the Almighty, and no doubt had a pendant support to steady the rood below. In addition there is a niched pendant boss over the altar for the reserved sacrament to be suspended therefrom.

The roofs of the side aisles are of similar construction to the main aisle, with one or two exceptions. There is a fairly early lean-to roof of the beam type over the north aisle at Astbury with good moulded timbers and bosses. The width is divided into four squares and the principals are stronger than the purlins. The squares are not panelled, but divided by slender rafters four to each square with

boarding running the same way as the rafters. The north aisle at Audlem has also a good lean-to roof, divided as at Astbury, the timbering here being the same scantling throughout, the squares divided by two rafters with boarding running parallel. This roof has lost its bosses. There are also a few good porch roofs, the finest being over the south porch at Astbury, divided into four panels with circular tracery, the spandrels filled with foliage and sacred monograms.

The lofty clerestoried unbroken church was occasionally built over the Welsh border, and in Denbighshire we have two fine examples at Gresford and Holt. Wrexham was the same until the east window was cut through to make a short chancel. At Mold, in Flintshire, is another fine church whose rebuilding was cut short by the suppression before the clerestory was added, as was Bebbington in Wirral. At a recent restoration of the first named church Sir Gilbert Scott, the elder, placed a beam roof over the nave, constructed in the local manner. This type of church was also built in Lancashire—Standish, near Wigan, was erected as late as 1587—but many of them have suffered much remodelling during the 19th century.

Unfortunately we have little data to go upon as to the craftsmen who erected these fine beam roofs. We know that the Rector of Wilmslow, Henry Trafford, built and roofed the chancel of his church in 1522, but it has lately been restored out of existence. Lysons states that the Barthomley roof was put up in 1589, but this is too late a date for this fine example, and must refer to some repairs. Many fine roofs have been destroyed from neglect, restoration and disaster, including Wybunbury in 1595, Middlewich 1809, Northenden 1873, Stockport 1812, Bowden, Tilston and Weaverham. Acton was destroyed by the fall of the tower in 1757. Brereton has recently been quite renewed, and Middlewich has had some excellent new roofs built in the local style.

A few individual roofs deserve special mention :—

BARTHOMLEY. Both the nave and north aisle are finely proportioned, and the difference in the varying depths of

timbering yield an excellent variety of line. The ornament is restrained and the bosses are not obtrusive. The tracery design on the beams is fitting and the manner in which the crows feet surmount one another gives an added richness to the bosses. There is a deeply carved wall-plate. Repairs to the ends of the beams have been done by the estate workmen from time to time.

WITTON, NORTHWICH, has an excellent roof with deeply moulded timbering, richness being produced by the diagonal ribs crossing the panels. The variety in the size of the bosses helps the general effect. This roof has been badly repaired on several occasions. An inscription on a beam now in the vestry reads, A.D. 1641. Will Leftwich, Gent. Geo. Bromfield, Rob. Ward, Tho. Welford, Wardens. Tho. Colsonsocke, Carp. Another date on the roof is 1686.

MALPAS. The design here varies a little from the general type and is closely akin to Gresford. The beams are plain except for brattishing continued along the top of the wall-plate which has an added decoration of patera. The angels are original and are well proportioned to the roof. The bosses are a little too large, many are missing, others repaired in deal and even in cardboard. The intermediate moulded rafter has a pleasing effect. The aisle roofs are very flat and fit awkwardly to the walls, but the tracery in the panels is very good.

ASTBURY. This magnificent church retains more of its ancient fittings than any church in the county. In addition to the roofs over the three aisles and south porch, there are three old doors, the rood screen, and a wooden eagle lectern. The roofs are exceptionally good being both well designed and carved. The purlins have a running ogee enrichment and the bosses have monograms and sacred symbols. The roofs underwent extensive repair about 1616-7, as several inscriptions on the wall-plates show. On the south side William Brereton, William Moreton 1617. John Davenport, Philip Oldfield, John Yerwood, Rd. Brownsworth, Church Wardens, A.D. 1616. Rd. Lownes, Carpenter. On the

north side, Rondolph Rode, Edward Bellot, mayor of Congleton 1617, William Liversedge. In the north aisle John Shaw, Joseph Brown, Church Wardens, 1701.

CHEADLE has a good roof disfigured by unsightly braces put in the 19th century to support the decayed beams.

GRESFORD, DENBIGH, with its store of mediæval screen-work and glass also retains its roofs over all the aisles. Those of the side aisles are simple and plain, that over the main aisle is similar to Malpas with the extra rafter across the panels. Over the quire the panels have carved tracery superimposed upon them. The principals are plain and have arch-braces to the wall-posts, finishing with well carved angels; there are flying angels also under the intermediate purlins and the general effect is rich and substantial.

WREXHAM, DENBIGH. The main roof differs from those already considered in having long wall-posts alternating with short ones over the windows. The arch brace to the main principals springs from the corbel and almost reaches to the centre of the beam forming an arch which is made into a trefoil by large cusps, from which are fastened flying angels. The general effect is good if a little thin, the wall-plate and purlins wanting apparent strength for so massive a roof.

RUTHIN, DENBIGH, retains in its north aisle one of the finest roofs in Wales. It is the usual fired beam type but is elaborately decorated. The panels are carved with innumerable tracery designs, badges of the landed gentry connected with the church, and inscriptions. The roof has undergone a good deal of restoration and repair, displacing the order of the badges and inscriptions. The carved panels are cut out of long boards resting on the purlins. The beams are supported upon late ungainly wall-posts.

MOLD, FLINT. In the north aisle is a finely moulded beam roof, the panels subdivided into four, having varied tracery carvings upon them, the principals are also richly cut. The mouldings of the purlins are carried to the joints and suggest that bosses were never intended.

LLANRWST, DENBIGH. THE GWYDIR CHAPEL has a beam roof erected between 1633-4. The whole chapel is an

interesting example of classic masons attempting the mediæval style. The bosses are poor but the general effect is good.

TYPES OF BEAM ROOFS IN CHESHIRE, DENBIGH-SHIRE, AND FLINTSHIRE.

UNPANELLED ROOFS.

Siddington chancel, without purlins.

Gawsworth nave, with side purlins.

Chester Cathedral north transept, in six bays, two between beams.

PANELLED ROOFS, six across and two between beams.

Gawsworth chancel, equal purlins, without bosses.

Cheadle nave, equal purlins, with bosses.

Witton, Northwich, all, equal purlins, diagonal ribs and bosses.

PANELLED ROOFS, six across and three between beams.

Astbury, south aisle, six across and three between bosses, and trails.

Sandbach nave, six across and three between bosses.

Wilmslow all, six across and three between bosses.

Wrexham nave, four across and three between diagonals and bosses.

PANELLED ROOFS, eight across, equal purlins.

Mobberley nave, four between beams, with bosses.

Holt all, four between beams, with bosses.

Chester St. Mary nave, five between beams, bosses.

Malpas aisles, six between beams, tracery panels.

SUB-DIVIDED PANEL ROOFS, unequal purlins, eight across.

Gresford chancel, four between beams, tracery panels and bosses.

Gresford nave, four between beams, extra rib in panels, bosses.

Malpas nave, four between beams, extra rib in panels, bosses.

Astbury nave, four between beams, bosses and trails.

Barthomley nave, four between beams, bosses and trails.

Audlem nave, four between beams, extra rib, lost bosses.
 Weaverham north aisle, four between beams, lost bosses.
 Gresford aisles, four between beams, no bosses.
 Baddiley nave, four between beams, lost bosses.
 Audlem porch, four between beams, lost bosses.
 Cholmondeley, three between beams, four across, hammer-beam.

SUB-DIVIDED PANEL ROOFS, unequal purlins, twelve across.
 Great Budworth nave, six between beams, lost bosses.
 Mold north aisle, ten between beams, no bosses, tracery panels.
 Ruthin north aisle, eight between beams, tracery panels and bosses.
 Bunbury chancel, six between beams, no bosses.
 Llanrwst chapel, Post-Ref., six between and sixteen across.

LEAN-TO ROOFS, four panels deep.

Astbury north aisle, four rafters to panel bosses.
 Audlem north aisle, two rafters to panels, no bosses.

PORCH, Astbury south, four panels, decorated.

ARCH-BRACED AND HAMMER-BEAM ROOFS.

The Welsh counties bordering upon Cheshire, with few exceptions, retained their earlier building traditions in the 15th and 16th centuries. Their churches, especially in the Vale of Clwyd, were based upon Celtic precedent, as were those of Devon and Cornwall. This consisted of an undivided nave and chancel of low proportions, and, when enlargements took place an additional or second aisle was built almost as wide as the first. Consequently their churches became two-aisled, divided by a single arcade, with the chancel at the east-end of one aisle and a chantry chapel at the east-end of the second aisle. This type of construction had a strong influence on the woodwork of the building, both in roofs and screens. The latter were broad, of thick scantling making a fitting division between nave and chancel, often with a plastered tympanum reaching to the roof. The

walls owing to a plentiful supply of rough materials were strong and thick, as well as fairly low, and could withstand any thrust a roof was likely to exert over their narrow naves. The type of roof was an early arch-brace and hammer-beam or arch-braced and collar roof, the latter seldom descending below the wall-plate. Over the sanctuary a different roof was used, a trussed rafter of barrel-shape boarded over and enriched to distinguish its more sacred character. The adoption of the hammer-beam and arch-brace helped the apparent height of the low building, which was to it as necessary as in the Cheshire type inexpedient. There was a certain exchange of ideas across the borders as we have already seen in the development of Cheshire principles at Gresford, Holt, Wrexham and Mold; this was reciprocated in Cheshire by a few churches taking the Vale of Clwyd form, as at Plemonstall, Shotwick, and Thornton-le-Moors. These churches also followed the Vale of Clwyd roof, Plemonstall and Thornton having a primitive hammer-beam and Shotwick an arch-brace. It has already been stated that this class of roof exerted considerable thrust on the walls, and where the walls although thick, were built of rubble, they show a tendency to bulge, as for example the north wall of the chancel at Plemonstall. The Vale of Clwyd type is developed at Llanynys, a well proportioned piece of work, with alternate hammer-beams and arch-brace principals. The timbering is strong and carefully moulded, the delicate curve produced by the collar being particularly effective. It terminates at the hammer-beam with an inward twist, which is helped by the curve of the wall-post brace. St. Marcella, Whitchurch, Denbigh, has the same type of roof, but is not so successful, owing to the peculiarity of the ashlar pieces sloping inwards towards the centre of the roof from the wall-plate to an extra purlin, thereby weakening the construction and giving the roof a rather sprawling effect.

Two hammer-beams and arch-braced roofs call for particular attention, namely the south roof at Cilcain in Flintshire, and one at Llangollen. In each case there is much to be said for the tradition that the roof of Cilcain

came from Basingwerk Abbey and that at Llangollen from Valle Crucis Abbey.⁴ Both roofs are too massive in timbering and elaborate in construction for an ordinary small parish church, and both show signs of hasty re-erection and careless fitting. The Cilcain roof is a magnificent example, but by being placed too low its heavy timbering has a tendency to overpower and crush down the simple nave it covers. It has a span of 22 feet 6 inches. From the large hammer-beams, the ends of which are decorated with immense angels holding shields with emblems of the passion, rise queen-posts with lesser posts behind, the top of each opening being filled with perforated tracery. These posts on either side support the principal rafters, which are braced apart by a heavy collar placed well down, the corners filled by curved carved braces. Above the collar are further posts supporting the apex of the rafters. The alternate trussed rafter arches finish at the wall-plate with elaborately carved brackets. The wall-plate is filled in with panelling having carved tracery-heads. The whole of the purlins and rafters are of heavy scantling and are deeply moulded. The apex of the collars are ornamented by figure subjects or foliage cut in the solid. No small church could have produced a roof fit for a mediæval London hall such as Crosby, and yet that is what is to be seen in this lonely little church.

The roof over the present enlarged church of Llangollen is also of the hammer-beam and trussed rafter type. Like Cilcain it shown signs of having been taken to pieces and roughly built together again, the mouldings are set square without mitres. The five easterly bays are panelled over and richly carved. The hammer-beams are decorated with angels playing musical instruments. There is a distinct feeling of the post-reformation about some of the carvings especially the wall-post braces, which makes it difficult to decide as to the date of its first erection, or how far they are the outcome of the re-erection.

⁴ The candelabra at Llanarmon and Llandegla are reported to have come from Valle Crucis, they are certainly mediæval, and we know that the arcade at Llanidloes was bodily removed from Abbey Cwm Hir.

Other churches with simple hammer-beam roofs are Abergele, Llanrhaidr, and Llangynhafal. The majority of the Denbighshire churches have well proportioned arch-braced roofs, such as those at Derwen, Llanrwst, Chirk, Clocaenog, Llanefydd, Llanychan, Llanvair, Llanrhydd, Llansilin, Llandrillo, Llanelian, and Llanarmon. The roof over the sanctuaries of some of the churches is a variety of trussed rafter of barrel shape, boarded over and enriched, similar to the type met with in the churches of the south-west. These are found at Bangor, Llantisilio, Llanrhaidr-yn-Mochnant, Llaneliden and Llanrhaidr D.C. The last is in two bays and is a particularly beautiful specimen. The purlins are broad and flat, having carved trails of the vine or patera upon them, the wall-plate being treated in the same way, and the panelling is ornamented with carved tracery-heads with an additional row between the purlins finished with brattishing. The carving is of the same free type met with on screenwork of Welsh character and is rarely repeated. The two bays contain as many as ninety-six tracery heads. As already stated the churches of Thornton-le-Moors and Plemonstall in Cheshire have primitive roofs constructed in the Vale of Clwyd manner, but at Thornton full advantage has not been taken of the hammer-beam, for the post is set close to the wall. The roof is furnished with wind-braces from the principals to the purlins to strengthen the roof against wind-pressure. At Plemonstall the posts are taken as they should be to the edge of the hammer-beam, and the braces are hefty timbering forming collars as well as braces above them to hold up the rafters.

Several Cheshire churches have had roofs erected over them in the 17th century, nearly all of Hammer-beam type. The chancel roof at Middlewich was erected by Sir William Brereton in 1621, Waverton nave roof in 1635, Tarvin nave roof in 1650, Handley nave roof in 1661. The chancel roof at Barrow was erected by Bishop Bridgman in 1671, and there is a sister roof over the chancel at Ince. Fortunately these roofs still exist and are of good construction and

ornamental in character. The roof at Handley is a simple hammer-beam with collars having straight braces above the collars, and arched braces below them. The raftering is weak compared with the sturdy mediæval variety and placed vertically instead of broad-side on as was the old method. The Tarvin roof is the same type, the wall post braces composed of ornamental Jacobean decoration with a turned drop. On the beam dividing the nave from the chancel is the following inscription:—This rove was made annu domini 1650. Ralphe Wright. John Bruen. church wardens. Charles Booth. Will Venables. carpenters. In the same church the south aisle has a 14th century roof, the only one in the county. At Higher Peover over the north chapel built by Ellen Mainwaring in 1648 as a mortuary chapel to her husband and herself is an ornamental wooden ceiling, designed with a large central oval panel within which are the arms of Sir Philip Mainwaring and his wife Ellen Minshull, the frame ornamented with turned drops.

The years 1929 and 1930 have seen the repair of several roofs in the district, namely: Astbury, Gresford, Tarvin, south aisle, and Thornton chancel. The 20th century has treated these masterpieces of the mediæval craftsmen with the respect due to them. During the 19th century many roofs were either destroyed or ruined through too drastic measures, but it is to be hoped we are emerging from the dark ages of restoration. We have in a great measure to thank the chemist and the engineer for making it possible to save practically the whole of the mediæval carpentry of a decayed roof. The causes of decay have only recently been studied, and it is to Prof. Lefroy, who laid the foundations of our knowledge, and lost his life through experiments, that we owe this benefit. The nave roof at Astbury came first, it was known to be suffering from beetle, and when examined it was found that the upper roof of timber and lead had left its anchorage and was resting upon the ceiling beneath. The great principals had sagged about nine inches and the tenons of the massive framing

were in many places withdrawn to danger point. The roof has been drawn back to its original position by steel girders placed above it and is now secure.

The south aisle at Tarvin was ceiled in plaster, this was removed and revealed a 14th century roof similar to the piece seen over the Bruen chapel; it has been conservatively repaired.

Gresford has been taken down bay by bay, repaired, cleaned and replaced. About a third of the carving was found to be in plaster, lead or cast-iron put up during repairs early in the 19th century. Many of the iron bosses weighing forty pounds were fastened by a single nail into decayed timber. These have been replaced in oak. The whole roof was infected by the beetle, the ends of some of the principals being completely eaten away.

Over fifty churches have been rebuilt in Cheshire during the last two hundred years with the total loss of their mediæval roofs.

The illustrations to this paper are from photographs by the Author, to whom the Society is indebted for a number of blocks. Thanks are also due to Messrs. B. T. Batsford, Ltd., for the loan of the blocks of Plates XXXI, XXXIV-XXXVI, XLI-XLII.

EDITOR.

