

## BIRKENHEAD PRIORY.

*By Edward W. Cox.*

Read 1st November, 1894.

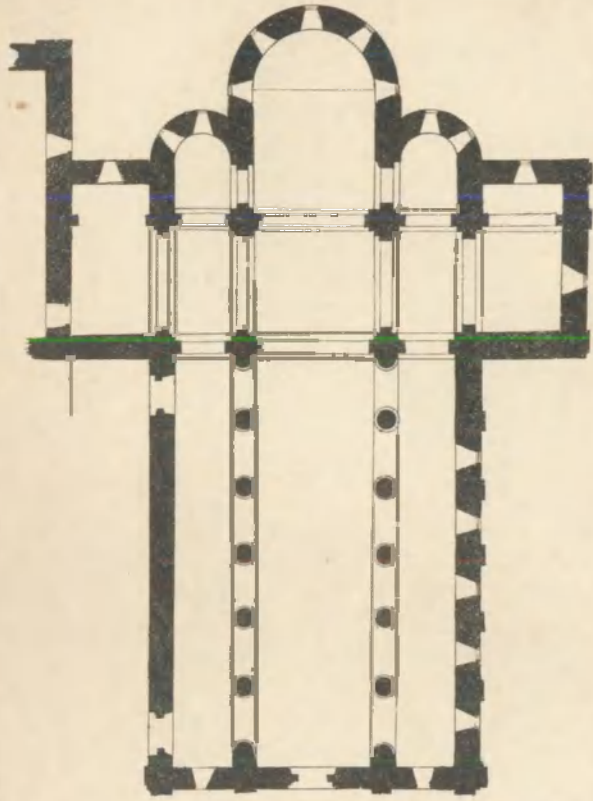
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SEVERAL attempts have been made to illustrate and recover the original features of the Benedictine Priory of Birkenhead, but its arrangements have hitherto proved a puzzle to architects and archæologists; partly from their peculiarities, also from the fact that they have been rather treated as pendants to its history, than an exhaustive analysis by careful measurement and assortment of its remaining fragments; also that sufficient attention has not been directed to the architectural changes in construction and demolition that it has undergone at various periods. The present paper aims at separating these questions from more general ones, and treats them from a point of view wholly archæological. If this form of study naturally involves much technical detail, it is hoped that the account of the many hitherto unconsidered features and relics may in any case prove useful as records and studies of this beautiful building, and that they may serve to assist in re-establishing some of the plans and details whose purposes hitherto have been misunderstood or supposed to have been lost beyond hope of recovery.

The plan of Birkenhead Priory Church as hitherto accepted has been that of a nave, 63 feet

long by 27 feet wide, transepts, and a short, square-ended chancel—the total interior length being 120 feet, by 52 feet wide, including the aisles. The plan I place before you from the data I have gathered, and the measurements and calculations I have based upon them, will show a church having a total length of 154 feet, an interior breadth of 42 feet, and a width, over the chapels of the chancel that succeeded the Norman transepts, of 77 feet. The analogy of the buildings of Chester Cathedral has been brought forward as giving a key to those at Birkenhead, and with this comparative test I cordially agree; but the details have been curiously misread, and the position of the corresponding buildings misplaced in the plans hitherto given in such a manner as to confuse and distort the whole scheme. In the plans now presented I have endeavoured to correct these errors. I trust they will be found to establish a complete harmony as regards the existing remains, and that, in addition, we have been enabled to recover, with considerable claim to accuracy, the lost details and proportions of the Priory Church.

The first idea for the readjustment of the existing buildings to their original uses is due to Dr. Jessop, whose well-grounded objection to accept the great hall on the west side of the conventual building as the refectory, and his allotment of this to the great hall of the Prior's house, compelled the location of the refectory and dormitory elsewhere. The refectory was clearly the large apartment on the north side, over the groined substructures; but Dr. Jessop was unable to fix any site for the dormitory or other buildings of the court. This paper will, I think, show that traces sufficient to ascertain not only the position but the exact size and character of the remaining buildings are still visible in these interesting ruins.

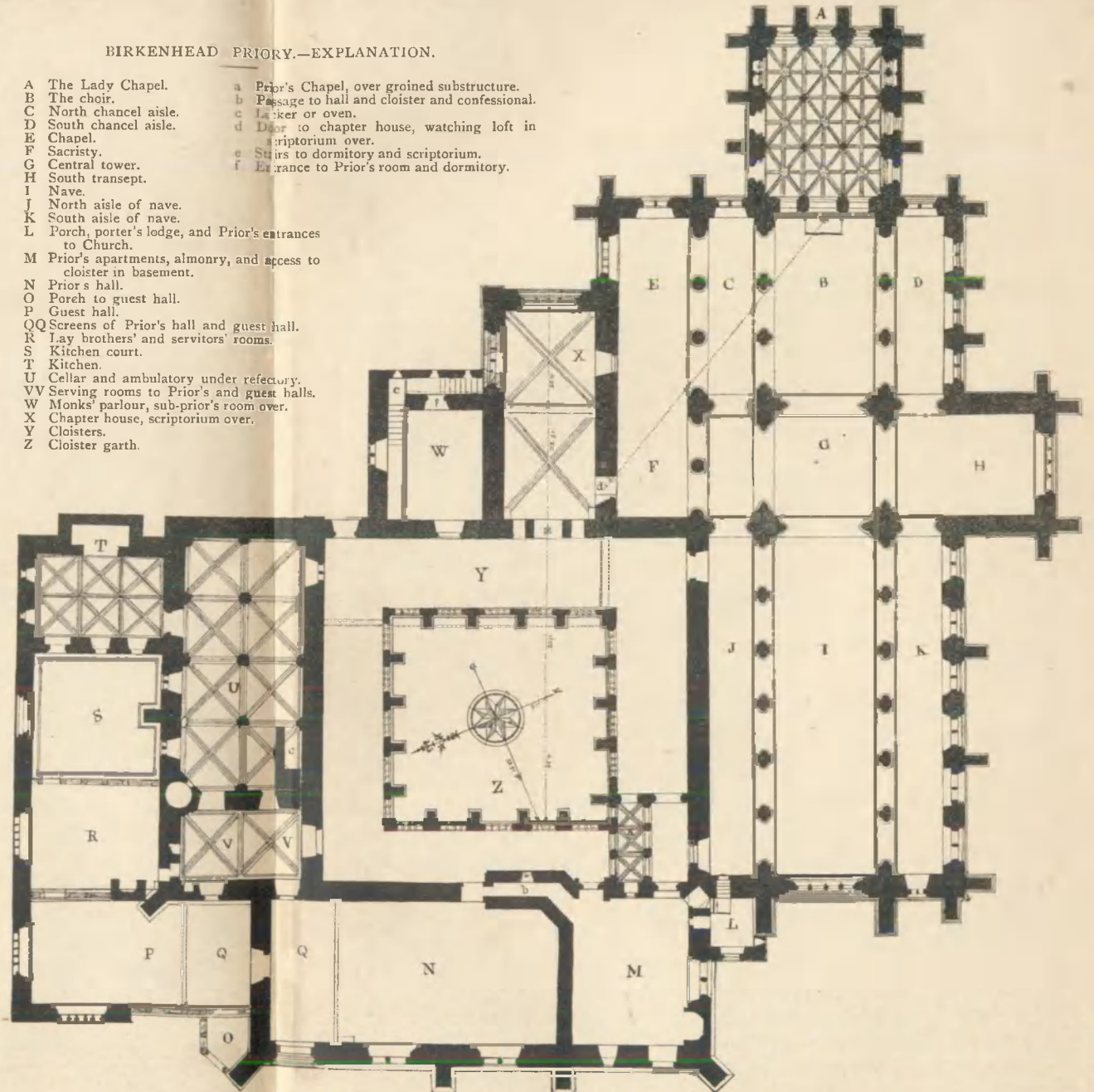


THE NORMAN CHURCH.

NOTE.—The line of orientation passes through the centre of the plan, through door of chapter house and the Prior's seat in chapter house, and through Prior's place at the dais of his hall. The east front is planned to present seven gables towards the river; and the north front three gables, the west two gables, and the south two gables—seven in all in these three fronts. In the cloister court five gables. The deviation of the orientation is one point to the south—east-south-east. One of the diagonal groin ribs in the ambulatory has been inadvertently omitted.

## BIRKENHEAD PRIORY.—EXPLANATION.

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|--|---|
| A The Lady Chapel.   | a Prior's Chapel, over groined substructure.                |
| B The choir.   | b Passage to hall and cloister and confessional.            |
| C North chancel aisle.   | c Locker or oven.   |
| D South chancel aisle.   | d Door to chapter house, watching loft in scriptorium over. |
| E Chapel.  | e Stairs to dormitory and scriptorium.                      |
| F Sacristy.  | f Entrance to Prior's room and dormitory.                   |
| G Central tower.   |   |
| H South transept.  |   |
| I Nave.  |   |
| J North aisle of nave.   |   |
| K South aisle of nave.   |   |
| L Porch, porter's ledge, and Prior's entrances to Church.          |   |
| M Prior's apartments, almonry, and access to cloister in basement. |   |
| N Prior's hall.  |   |
| O Poreh to guest hall.   |   |
| P Guest hall.  |   |
| QQ Screens of Prior's hall and guest hall.                         |   |
| R Lay brothers' and servitors' rooms.                              |   |
| S Kitchen court.   |   |
| T Kitchen.   |   |
| U Cellar and ambulatory under refectory.                           |   |
| VV Serving rooms to Prior's and guest halls.                       |   |
| W Monks' parlour, sub-prior's room over.                           |   |
| X Chapter house, scriptorium over.                                 |   |
| Y Cloisters.   |   |
| Z Cloister garth.  |   |



BIRKENHEAD PRIORY.—RECOVERED PLAN.

## THE CHAPTER-HOUSE.

On the east side of the cloister garth stands the Norman chapter-house, and its position corresponds with that of St. Werburgh's, at Chester. Its western front was crossed by the eastern alley of the cloisters, a door and two plain windows opening into it; an arrangement identical with the later and much richer chapter-house at Chester. At the Dissolution this chapter-house appears to have been fitted up as a private chapel, the cloister and church being destroyed and the building isolated, all the attached walls of adjoining structures being roughly cut away, details effaced, and the scars patched with masonry. The door leading from the south side was changed to a window, to light the lower portion under a gallery then inserted, with a screen of which traces remain on the central Norman vaulting shafts. Two perpendicular windows were inserted on the east and north, and access, which was formerly had to the scriptorium over the chapter-house from the buildings joining the north side—probably the sub-prior's apartment being cut off by their destruction—was made by an external staircase and a late Tudor door.

## THE DORMITORY.

Rudely as this building has been handled, there is still to be seen on its western gable, below the scriptorium window, a course of hard grey sandstone, with six corbels below it of the same material, hewn level with the wall in such a way as to show that they once projected as the guttering and roof corbels of the lost dormitory, standing above the eastern alley of the cloister. In the south wall of the refectory is the socket for the beam that crossed to meet the north-east pier of the cloister, and it shows a width of fourteen feet.

There are no toothings for a stone wall in the south face of the refectory, nor any spring of an arch to carry a wall of masonry. This and the beam sockets lead to the inference that the dormitory was a timber superstructure above the cloister, of the width of 14 feet. This would be narrow, but a timber building could be projected over the line of the 14-foot cloister below it, so as to give an interior width of 15 feet at least. Thus, we should have a dormitory built of timber, 15 feet wide and 50 feet long, if carried to the south line of the chapter-house. The number of monks at Birkenhead was eighteen. This apartment would give eighteen cubicles of 6 feet 3 inches by 5 feet wide, with a longitudinal central passage of 2 feet 6 inches wide, and a traverse one from the door at the eastern side, thus exactly accommodating the monks on the foundation.

We may turn now to the analogy of Chester. The position of St. Werburgh's dormitory corresponds with that now allotted to the dormitory at Birkenhead. The structure above the cloister is entirely removed, but in the south refectory wall, at the end of the former dormitory, is an arcading in the wall extending beyond the line of the cloister wall, thus showing that the width of the dormitory was greater than that of the cloister below it, and that it could only have been an overhanging story of timber. The buttresses do not die into the wall with sett-offs, as on the other sides of the cloister, but are carried up square, to bear a bressemer beam for an overhanging timber story; and, as at Birkenhead, there are no toothings in the refectory wall for the junction of that of the dormitory. The strong presumption, therefore, is that Chester had also a timber-framed structure for its dormitory, and slight as are the traces at Birkenhead, they disclose the same design.

## THE MONKS' PARLOUR.

On the north-west side of the chapter-house is the rear arch of a ruined doorway, leading into what has been, most likely, the monks' parlour, with the sub-prior's chamber above it. On the north wall are the same marks of the obliteration of the junctions of buildings as are distinguishable on the west face of this building. They indicate that the apartment adjoining on the north was 24 feet long, and that it had a double wall, the inner one 2 feet 6 inches thick, the outer a thin wall. Between these is the original entrance to the scriptorium, apparently blocked up after the Reformation, and converted into a window, now built up. It seems fairly certain that the interval between these walls contained the original stone stairs to this door, and that a branch of the staircase to the right led into the dormitory. Access to the church by the second or north-east door of the nave, from the east walk of the cloister, was thus close and easy from the dormitory, and the difficulty of access to the church, arising from the location of the refectory in what has hitherto been called the dormitory, is entirely solved. Turning again to Chester, we find the arrangement practically identical with Birkenhead, and the church door similarly placed. One curious indication that the destruction of the monks' parlour was effected immediately after the Reformation is found in the fact that the late perpendicular window—possibly re-used from elsewhere—cuts through the thin outer wall of the staircase, and that the original door of the scriptorium had been rendered inaccessible when that window was inserted. May we not safely conclude, both from the traces left us and the analogy of St. Werburgh's, that the parlour and the sub-prior's chamber have thus been recovered?

## THE PRIOR'S ORATORY.

There remains against the east wall of the Prior's apartment, on the south side of the entrance from the cloister, the springings and line of groining, with plain chamfered ribs, of a sub-structure, which had over it another apartment stretching eastward, as evidenced by the indication of the junction of the side walls and the door leading from the first floor of the Prior's rooms. This groined substructure appears to have been open to the cloister, and to have formed a part of it on the south side. That all the rest of the cloister was timber-roofed, and not groined, is plain from the corbels to carry the roof. Exactly in a corresponding position at St. Werburgh's stands the abbot's chapel, set over a Norman groined substructure, leading into the cloister and the church by a north-west door. Traces of the splay of such a north-west door remain also at Birkenhead.

The chapel on the upper floor at Chester is partly groined, the chancel having a timber roof. If we give to the Birkenhead example two bays for its small nave and one for the chancel of the oratory, the third or sub-chancel bay would, if pierced by a doorway, exactly give an entrance into the cloister garth, and a walk of 14 feet in width. We have found the width of the east cloister walk to be 14 feet, and by including this groining in the south cloister and measuring to the still-discernible west wall of the church, the width of the south walk is also found to be 14 feet.

## THE CLOISTERS.

The east and south cloister alleys (being designed for access to the church both from the dormitory, the Prior's house, and the exterior) were wider than the other two; the north alley, which was used for service from the kitchen, being 11 feet, and the



BIRKENHEAD PRIORY.—VIEW OF RESTORED CLOISTER, DORMITORY, NORTH SIDE OF CHURCH,  
AND ANGLE OF PRIOR'S CHAPEL.

west alley, least used of all, only 9 feet. The result of this arrangement gives a symmetrical cloister garth of 33 feet by 34 feet within the buttresses, or 39 feet by 40 feet to the walls. It recovers, by means of the mysterious and hitherto unexplained bit of groining, the Prior's chapel, and brings this and the cloister into conformity with Chester. The widening of the south and east cloister alleys at Chester is effected by adding a narrow aisle next to the cloister garth. The entrance to the cloister from the west has in both buildings been made by a passage under the south end of the Abbot's and Prior's apartments, and all the positions of the other doors into the cloister correspond most closely with each other. These details and comparisons give us, therefore, with some fair assumption of accuracy, the plan of the lost cloisters of Birkenhead.

#### CELLAR AND KITCHEN.

The cellar and kitchens by this re-adjustment now fall into their right places. The latter is ascertained to have been a groined apartment, projecting northward from the east end of the refectory block of building. The mark of the lines of vault are to be traced on the north refectory wall, and there is a reconstructed pillar in the refectory, probably taken thence. That it had a storey over it is shown by the door on the first floor opening from the refectory. The Prior's hall had a separate serving door, opening behind the screens at the north end from the kitchen court. The north wall of the refectory, between the kitchen and the Prior's hall, has been much altered and almost entirely rebuilt in post-Reformation times.

#### PORTER'S LODGE.

There is a singular imitation of the Chester arrangements at the re-entering angle between the

south end of the Prior's apartments and the west end of the church, where was placed a square tower, which appears to have risen only a little over the height of the north aisle and the wall of the Prior's rooms. Only the toothings remain to mark its place. It has contained, most likely, the Prior's external entrance, the porter's lodge, and a most ingenious concentration of doorways leading to the church, the cloister, the Prior's rooms, and the exterior of the building, all of which could be commanded by a single janitor. This tower reproduces the Norman western tower of Chester Cathedral, which likewise commanded the stairs to the abbot's rooms, the church, and the north domestic entrance. The Chester tower was either never finished, or was taken down to a height a little above the north aisle. The purpose of this small but important feature at Birkenhead does not seem to have been previously recognised.

One more detail of the Prior's hall has been discovered, namely, the foundation of the screens at the north end, which stood 12 feet from the wall.

#### THE CHURCH.

Having thus rearranged the domestic buildings, and by this means brought them into complete harmony with those of Chester, and also, by the same means, recovered the character and dimensions of lost details, we may turn to the church, where emendations are equally needful, not only to reconcile the existing remains with reasonable construction, but to show that the analogies of the other buildings are continued in the church. The remnants of the church remaining are: the north jamb of the west window, a fragment of the west wall of the north nave aisle, and traces of the north aisle wall, with two doors to the cloister, the lower part of the west wall of the north

transept, with the spring of an arch that crossed the north aisle, and the traces of the transept on the south side of the chapter-house; also the north-western respond of the nave arcade. It will be seen from this that only the length of the nave and breadth of its north aisle can be measured from remains.

The marks of a cross wall on the south wall of the chapter-house have been supposed to give the width of the transept; but, for reasons to be stated, I think this trace is wrongly interpreted, and I offer a new explanation of it in the proposed scheme of the Norman church. By taking this measure for that of the transept, the entire calculations of the proportions of the church have been thrown out of form.

It is better here to show the evolution of the new set of measures for the thirteenth century church, and then to develop the way in which the other features seem to fall naturally into harmony. We may now proceed to explain the process by which the dimensions of the church are to be ascertained. No trace is now visible of any foundation that will give us its breadth. They must, therefore, be reasoned out by the analysis of other remnants. Among these are three fragments of the tracery of a large window, of second-pointed date, forming portions of the heads of trefoiled lights having four centred depressed arches. This form is more usual in late perpendicular than in decorated work, but here it has been adopted with a purpose. Professor Freeman has said that Gothic must be abandoned as a perfect style, since there was no conceivable way in which a circular tracery could be carried on pointed lights. With this piece of tracery Professor Freeman's crux could be solved. The measure of it indicates that it formed a light of two feet in the opening.

Decorated windows of this class were very commonly of four lights ; and four such lights, with heads of the depressed character, would carry a circular tracery of six feet with perfect symmetry at the bearings and junctions. If we add such a circle to the lights, and enclose them in an equilateral arch, the almost universal form for large early decorated windows, it will be found to contain them exactly. Moreover, another fragment gives us a cusped trefoil, which, when drawn out and re-constructed, is found to fit with equal exactness into the conventional tracery pattern within the circle. Thus we are able to restore the west window.

A further proof that these pieces really belong to the west window, is found in the fact that a portion of the original jamb is *in situ*, on the ruins of the west end, and that the tracery corresponds with the splay of this jamb. A still more interesting evidence is given by the fact that the jamb has been fitted to carry the glass in a wooden frame, and that the curve of the head of the light shows the notch into which the wood frame was rebated and fixed. All the conclusions, therefore, seem to show that the west window is correctly reconstructed.

Let us now see what measures are given by this window. Four lights of 2 feet give 8 feet ; three mullions, of 8 inches each, 2 feet additional ; two half-mullions, 8 inches ; making a window of 10 feet 8 inches across the breadth, including mullions. The wall of the west end still standing measures 4 feet 2 inches on the north side from the respond to the jamb. If we take a similar piece on the south side of the window, we obtain a total interior width of 19 feet ; or, measuring to the centre of the columns or responds of the arcade, as was commonly done by the ancient masons, the width



BIRKENHEAD PRIORY.  
WESTERN ELEVATION OF CHURCH.

of the nave was 21 feet, not 25 feet or 27 feet, as formerly estimated.

I have dwelt on the process of evolving this measure in some detail, because as we proceed it will be shown, by the accumulation of proofs, how the correction of these dimensions helps to a solution of previous difficulties, and sets the whole scheme of the building into complete harmony and consistency; how this also enables us to measure and recover the lost features, and at the same time to emphasise and increase the analogies with the sister building of St. Werburgh's, at Chester.

From the fragments of the west end of the north nave aisle we are able to measure the breadth of the nave aisles as 7 feet interior and 11 feet exterior width. Taking the south aisle as of equal width, we have a nave of the total breadth of 50 feet to the outer walls. It is extremely likely that the dimensions of the nave of thirteenth century work are identical with the original Norman nave of 1150, which may be shown by a separate analysis of the Norman fragments.

Very various estimates have been made as to the number of arches in the nave arcade, mostly deduced from the curious drawing in King's *Vale Royal*, 1656, in which they are represented as five round-headed ones; and it has been generally assumed that they were three in number, and of semi-circular form. The fact that they are so represented in the *Vale Royal* plate is not only not conclusive—because every arch, including existing ones which are pointed, is similarly shown—but a careful examination of the plate will, I think, disclose the intention of the artist who drew it as to what he meant to convey. The bird's-eye views of buildings of this period often partake as much of the nature of a plan as of a view; and in this plate it would not be possible to see the arcade

as represented, yet it was intended to suggest both its then existing and its former condition. One wide arch and two columns are given fully shaded, with a half-arch on the right and on the left in outline, and three narrower arches without columns are indicated.

It has been already shown that the dormitory and cloisters appear to have been obliterated after the Reformation, and the space turned into an open courtyard for the house into which the Worsleys converted it. With the nave arcade standing, the arches would be too narrow to admit a loaded cart. Probably, therefore, they were removed at that time, with the exception of two, which, by the removal of the intermediate column, were thrown into one wide opening, and the springings connected by a rebuilt wide arch, shown in the plate, which would serve as a gateway. The half-arches on each side would be built up to serve as counterfoils of the wide arch. This is the arrangement shown in the shaded parts in the etching, and the sketchy outlined narrower arches are added to show the artist's idea of what formerly existed. Thus we should have for the original arcade six, not three, four, or five arches, as formerly surmised.

How far will the existing remains bear out this theory? Upon the capital of the north-western respond are four voussours or arch stones. Of these, the upper one of the two in the inner order is a piece from some other arch of different curve and having only one chamfer, plainly placed there in some recent repair. The upper stone of the outer order has become displaced, and has also been roughly repaired; but the ashlar courses that abutted on its extrados remain to show its original line. The lower stones of the inner and outer orders are both *in situ*. By very carefully taking

the curves given by these stones, the span of the arches they have formed part of can be ascertained. It is true that a semi-circular arch of 20 feet span to its outer line could be given, but we should obtain thus the anomaly of greater span than those of the central crossing; and if we accept the measure of the transept, as indicated by what is alleged to be its eastern wall, we have the further anomaly of a central tower of oblong form with its longer axis east and west, a form for which I know of no precedent, although such towers having their longer axis north and south are not unusual. The lengthways arrangement would give the arches of the crossing more width and greater importance than those opening into the nave and chancel. Further, if the arcade consisted of three round arches, and the main roof principals were arranged, as they usually were, over the springings and the centres of the arches, there could be only two main principals in the length of the nave of 63 feet, which would be a very poor and weak piece of construction.

That the roof was carried by principals, and was not a waggon-headed roof of closely set timbers, appears to be indicated by a strong corbel for framed principals which existed twenty-five years ago in the north aisle. With an arcade of six arches we obtain equilateral pointed arches consistent with the period of their erection, a proper proportion between those of the nave and crossing, vertical lines of support through the piers for five principals for the nave roof, also the very significant fact that the vertex of such arches corresponds with the indications we have of the height of the aisle walls, whereas three round arches would carry the apex much too high.

It is stated that in excavating the ground, the bases of columns were found for three arches. I

was fortunate enough to see part of this excavation, when the present railings were set up, and the base then dug up appeared to be a fragment, not *in situ*. It is to be seen in the prior's apartments, while the similar piece, now forming a threshold for the gate, I saw lifted into that place, and it is, I believe, a capital. Probably other proofs will eventually be found that the nave arcade consisted of six arches.

From the foregoing argument it will follow that the square of the central crossing to the centres of the piers was 21 feet; also that the transepts were similarly 21 feet wide, not 25, 27, or 30 feet; and that the indications of the supposed eastern transept wall must be otherwise accounted for. This will be done when we consider the original Norman church, that on which we are commenting being the church as it stood at the Reformation.

Among the stones piled in the Prior's hall are three portions of piers of larger dimensions than the nave piers, and differing in form, inasmuch as the largest shaft is keel-shaped, not semi-circular. There are also several pieces of keel-shaped detached shafts, 7 inches by 6 inches, and a capital, that may have belonged to this shaft. These members combine into a strong pier, such as would be used to carry a central tower; and their measurements are so harmonious when so set together, that it may be very safely assumed that this was their location. They indicate that the arches opening into the chancel transepts had a span of 14 feet clear, a measure harmonising with the assumption of six arches of the nave, of which the clear opening was seven feet, or half that of the crossing.

The elongation of the large central members of these piers to a keel shape, and the addition of detached shafts in the mode indicated on the section

given, also illustrate the constructive needs which dictated the adoption of these forms—which are drawn inward, narrowing the tower arches to a span of 14 feet—for the crossing; by which the thrust of the tower arches was partly met, so as to reduce the strain on the buttresses; and at the point where the north chapel had superseded the Norman transept, it was possible to dispense with a buttress at the north-east angle of the tower.

#### THE NORMAN CHURCH.

It is convenient at this point to endeavour, by a digression, to determine, as far as possible, what may have been the plan of the Norman church of 1150 A.D.; because, so far as the plan of the thirteenth century church has been commented on, it is most likely that it followed the Norman ground plan very closely, both as regards its area and the arrangement of its aisles and arcades; but from the transepts eastward the later church, according to the few traces left, was considerably altered and extended. Taking, then, a nave of six bays, with north and south aisles, the width of each Norman transept should be 21 feet; but the east wall of the north transept, which is cut away close to the junction of the chapter-house, marks about 30 feet; and as the Norman string-course for the exterior of the chapter-house is stopped by this wall, there is little doubt that this wall is a portion of the Norman work.

We may again turn to St. Werburgh's for a clue to this design. The Norman north transept there remains, and an arch, now walled up, once communicated with an apsidal chapel on its eastern face, replaced at a later date by the existing sacristy. If we take a somewhat similar plan for Birkenhead, the width of the Norman aisle-less transepts will be 21 feet, and the trace of the wall

will represent that of an eastern chapel, opening, probably, by an arch eastwards, as at Chester. When side apses are thus projected eastwards, an apse to the central part of the church would almost certainly be designed. Square-ended aisles are to be found with a central apse, but projecting apses from the aisles or transepts would scarcely ever be used with a square-ended chancel. It may be assumed, therefore, that the Norman church had three apses to the east, and that the chancel was short, as was usual in similar churches. Such a design would again bring us into very close conformity with the Norman cathedral of Chester.

THIRTEENTH CENTURY EXTENSION OF THE  
NORMAN CHURCH.

We may now go on to show how this Norman church was transformed in its eastern members, in the thirteenth century. The apsidal chancel was removed, and one of three bays, with side aisles, extended from the eastern side of the crossing. Three bays would form the complement to a nave of six bays, according to the rule commonly followed in the northern counties of England. The eastern wall of the north transept was taken away and cut level with the chapter-house, as we now find it, and the space extended eastward as a second north chancel aisle, or probably as a chapel. The traces of this eastward extension are quite plain, in the irregular junction of its wall with the south-east angle of the chapter-house. The Norman window of the chapter-house, now external, would look into this chapel. Not only have we the indications above spoken of, but the plate in *King's Vale Royal* gives this wall as then standing, and containing a large pointed window to the east of the small Norman one still extant.

From the traces of the external masonry of the scriptorium, which formed part of the northern limit of this chapel, it is plain that it had a span roof running from west to east; consequently this alteration practically obliterated the Norman north transept. Further than this, such a roof was a necessity, as a western window was essential for lighting. The chapel, wedged in between the church and the chapter-house, could only be lighted from the east and west, and from the north so far as it projected beyond the chapter-house. The north window is shown in King's *Vale Royal* plate. Moreover, the plate shows a window of considerable height, and the plan makes a high building needful, that the western window might clear the roof of the cloister exactly at the open space left by the termination of the dormitory short of the full length of the eastern side of the cloister. In the same manner, and for the same reasons, the north chancel aisle must of necessity have been carried up above the level of the nave aisle with a gabled roof, in order to secure light. Without such an arrangement, both chapel and aisle would have been almost in darkness. The view of the cloister garth gives this suggested restoration.

How the south transept was treated we have no evidence to show. Probably, as at Chester, it was retained, and for constructional reasons it was necessary to keep it, whether rebuilt or not, in order to provide a counterpart for the arches of the crossing.

#### THE LADY CHAPEL.

Of this portion of the Priory church no single stone is now to be seen *in situ*. The tower of St. Mary's Church occupies part of its site, and whatever indications we have of it are only to be found by the very careful analysis of some few fragments, and by the slender record of the plate

in King's *Vale Royal*. The examination and allocation of these fragments has to be made by the elimination of the sites for them which are found to be impracticable, by the evidence of existing remains, and their fitness for only one purpose and site in the building. Yet, if it be granted that they once belonged to such a building, its details can be recovered with a fair amount of certainty. Also, conversely, if the development of these detached elements can fairly be brought into a complete plan, such a plan will be admitted as having no suitable site in the Priory buildings except as an eastern Lady Chapel.

We may take first the evidence of King's *Vale Royal*. Premising that its rudeness and inartistic drawing have been held previously to be so extreme as to make it valueless as any authority at all, we will take its indications for what they are worth. On the right of the plate is shown a wall, crossing the eastern end of the ruins of the church. It is somewhat low, and is pierced by three ruinous openings eastward. On the northern one is indicated a pier, as though the opening had originally been an arch. Now, if this shows the eastern wall of the chancel, the elevation needed to be such that if a building like a Lady Chapel were set beyond it, there should be room over its roof for the east window of the chancel; consequently the building must have been low, and no lofty, single, eastern arch could be constructed as its entrance. An arcade of three low arches would give room for the window, and these would not rise above the low roof of the chapel. Exeter Cathedral presents such a plan, and it would meet exactly the requirements of Birkenhead.

We will now turn to the existing fragments. They consist of the springers of a groining, with transverse and diagonal ribs of two orders, and

the crown of a groining, with a floriated boss, from which radiate eight ribs. The set of the springing shows side arches slightly segmental; and if the curves taken, together with those of the junction of the ribs, shown by the crown of the arch in the existing boss, be estimated, they give a vaulting cell of 10 feet by 7 feet; the longer axis being that upon the lateral wall. The two horizontal ribs of this boss will show that they lay transversely to the axis of the church, on the crown of the vaulting cell; the two that incline upwards being the longitudinal mid-rib, which, as in the chapter-house at Chester, is not horizontal, but slightly arched between the bosses. The remaining four ribs are those on the angles of the groins, and the springing indicates that the sections or bays of the vaulting were divided by an equilaterally arched rib, forming the arch of a seven-foot span. Thus the groining may be shortly described as quadripartite, with mid-ribs in the crowns of the vaults. The ribs at the springing radiate to right and left, proving that not less than two bays existed.

We have now to endeavour to locate this groining. The nave aisles, we know, were roofed with wood, and within about twenty years a corbel existed in the north aisle wall for carrying the principals. It is not possible to construct a groined central alley with timber-roofed aisles and without flying buttresses, but narrow groined aisles are practicable. It is decisive, therefore, that neither nave nor aisles were groined. The conversion of the north transept into a chapel, or additional aisle, also proves that the chancel was roofed with wood. There is no trace of the cross arches, groining, or counterparts of any sort on the south wall of the chapter-house, that would have been essential to support such a groined roof, borne on walls, supported by arcades. The cloister garth remains, with many corbels for

carrying a timber roof, but no trace of groining. Of the domestic buildings, all remain or are traceable; the groined undercroft of the refectory is perfect, and none of the details of its vaulting agree with the fragments we are considering. The only other possible position for groining would be a porch, and this, if any such existed, would have to be fixed on the south side, as we have evidence of northern and western doors. The proportions of the vault of which we have relics would, with its two bays, form a porch 20 feet long by 7 feet wide; dimensions quite inconsistent with any such structure. We are, therefore, constrained to find for this groining a place in some vanished building.

Let us now return to the indications in the *Vale Royal* plate, and try how they will agree with this vaulting. We have the three ruinous openings leading eastward. If we take three cells of vaulting, each of 7 feet span, arranging them as we know they must have been, with their 7 feet measure transversely to the church, we obtain a width of 21 feet, the same as that of the nave and chancel. Three 10 feet spans, placed longitudinally, give a length of 30 feet for a Lady Chapel, having three alleys of vaulting, each of three bays. To carry these groins four shafts would be necessary, dividing the chapel into centre and aisles. Thus the remains agree with the plate; and we obtain a Lady Chapel of three bays, chancel of three bays, and nave of six bays, giving a harmony of construction. For this groining there is no other place suitable. Formerly the cap of a small vaulting shaft and part of the shaft were visible in the ruins. These are, unfortunately, now lost. They may have belonged to this building. The fact that the vault, as adapted to the east end of the church, must have been carried on columns, indicates a desire to keep the roof low. A single

span of vaulting would have required a much greater elevation. The building would thus allow the eastern window to clear it. The low eastern wall, taken down to the sill of such window, is shown in the engraving.

We turn again to the comparison of the Chester Lady Chapel. We find it to be of three bays to the east of the chancel. The vault is in one span, as there is height enough in the chancel to permit its window to clear the roof, and the chapel is entered by a single lofty arch. Each building has some features in common, but each is adapted to its site. Let us assume that this analysis is correct for the Birkenhead chapel, and that these fragments have disclosed to us the character and dimensions of a feature of the Priory that has ceased to exist. It is worth while to investigate how far such a building bears relation to the general measurements of the church and its surroundings. We have already seen that the breadth is in agreement with that of the church, but much more is shown than this, for it completes the symmetrical measures of the church in a very remarkable way, giving exactly 77 feet for the measure of the nave to the centre of the crossing, and 77 feet from this centre to the end of the Lady Chapel. The diagonal lines from the centre of the eastern pier of the crossing to the extreme points of the buttress necessary to bear the thrust of the vault is the same measure; also from the central east window of the chapel to the north-east angle of the chapter-house, the interior length of the chancel, and that of the chapter from the altar of the choir to the east window of the chapel exactly divide the measure of 77 feet. All the other minor measures of this structure also fall accurately into those of the general scheme of measurements of the whole building.

The thickness of the walls of this building has been laid down on the plan as being the same as that found in the rest of the buildings, and the estimate so taken causes the structure to respond to all tests of proportion correctly; such response and completion of the plans by this conjectural rehabilitation of the chapel, as fitted together from the fragments, being strong presumptive confirmation of the accuracy of the deductions derived from the analysis. If we take the scheme of groining as following that of the chapter-house at Chester, the number of the bosses at the intersections of the diagonal ribs would be nine; the transverse ribs, forming the span of the alleys, would be without bosses. We have one boss remaining, which belongs to the centre of a vaulting cell.

#### THE GUEST HOUSE.

It will have been remarked that all the parts of the Priory hitherto treated of have been those strictly belonging to its conventual requirements. None of these are appropriate to the accommodation of the travellers who used the ferry, worked by the monks. We have seen that the dormitory was just sufficient for the use of the eighteen monks, nor was there in the rest of this part of the structure any other suitable housing; yet we know that up to the reign of Edward III, when the Prior petitioned to be permitted to build a separate house, in order to avoid the disturbance caused by the travellers to whom hospitality was afforded, they were lodged in the Priory.

A very careful examination, recently made, of the north side of the structure, seems to show that, upon the ground now occupied by the vicarage, a separate courtyard and buildings existed for a guest house, and were part of the original plan, as extended in the thirteenth century.

Although, in a sense, separate from the monastic buildings, they were connected with these by a remarkably clever piece of planning. One of the leading proofs of their existence is the extremely skilful adaptation of the northern portions of the monastic buildings for the addition of a guest house, the plan of which has not hitherto been made out. In this scheme the priory kitchen was common for the service of both monks and travelling guests, yet having contrivances to prevent confusion in its use. This structure projected northward from the eastern end of the north side of the undercroft of the refectory, and faced inwards to a small court, 22 feet square, of which the plinths and their return angles still exist. The kitchen was groined in the same fashion as the existing undercroft, but with a smaller span of the vaulting cells.

The marks of one bay of vaulting remain in the wall, and the picture by Calvely, 1780, shows two bays in depth, having a span of 6 feet 8 inches each, which, with the added thickness of a pillar, to carry the second bay, gives a clear width to the kitchen of 14 feet 10 inches. If we take the length as three bays, their measure will exactly fit and correspond with the east side of the square courtyard, of which the plinth gives us the length of the south side. The thickness of the pillars and walls is estimated at the same measures as the others belonging to the domestic buildings. The stones of such a pillar are set up in a ruined modern summer-house in the refectory.

A fire-place set on the east of the centre bay will bring the outer line of the kitchen exactly level with that of the undercroft. A well-moulded large doorway opens to the undercroft, and the kitchen, doubtless, had two windows and a door to the courtyard. There was a room above the kitchen, opening from the refectory by a small pointed

doorway, still existing; and from the undercroft two original windows opened into the courtyard. The kitchen was massively built of stone. On the west side of the court the plinth shows the junction with the existing south side, but is there broken off. It is, however, plain from the masonry that no thick stone wall existed on the western side, and there is no trace of any stone wall above the height of the plinth. It is plain, therefore, both from this fact and from sockets at proper intervals for timber to be set in the walls, that the building fronting this side of the court was of wood, so far as its front was concerned.

If this piece of building were carried westward as far as the end of the refectory, where sockets near the angle buttress show some timber work to have been attached, we should have a room 22 feet square, with one above it opening from the refectory and occupying an exactly corresponding space to the kitchen and the square court. Slight traces of a doorway, now blocked, formerly entering the upper room, are still discernible in the refectory wall; the lower room, however, must almost certainly have been entered from the courtyard. The structure being of wood, would need a stone chimney and fireplace, and this might remain after the decay and destruction of the timber. In Calvely's drawing (*Transactions*, vol. xlii), a fragment of ruin is shown, just north of the north-west angle of the refectory, which is exactly the place where the hearth and chimney should be set for these rooms. I would suggest that these apartments were those of the lay brethren and attendants. As I hope to show presently, this would be the most suitable, perhaps the only, place the plan affords for the retinue of the Prior.

Immediately to the west of this building, reaching up to the northern end of the Prior's hall

and crossing the west end of the dormitory, are traces of another timber building, stretching northward. Its east wall would run in the same line as that of the prior's hall, but the sockets for its beams adjoining the north door of that apartment show that the width was 20 feet, being thus 7 feet narrower than the Prior's hall. If this structure ran northward to the extent of the northern side of the courtyard, we have an apartment of 20 feet by 44 feet; and the northern side of the whole of these rooms, kitchen, courtyard, room of the lay brethren, and this last building, which I venture to identify as the *gwesten hall* of the Priory, would be bounded by one straight line of wall, while each feature would occupy a proportionate and equally measured space, the *gwesten hall* occupying two such spaces. Upon this line of wall the limit of the modern vicarage grounds is fixed; probably the foundations were found convenient for the purpose.

The screens of this *gwesten hall* must have adjoined those of the Prior's hall, separated by the wall of that building; and its passage reached from the undercroft to an external timber porch, to give separate external access to travellers. Next to the Prior's main doorway, marks for its beams remain on the angle buttress. There was a door of communication between the two halls, and this is almost in itself a proof of the existence of the second, or *gwesten hall*, for its splays are turned outwards, proving them to be internal and not external features. The partly existing north gable window of the Prior's hall, and the western one of the dormitory, shown in Calvely's drawing, 1780, open at some height above that of the side walls of the *gwesten hall*, but a high-pitched roof, set in the angle between the dormitory and the Prior's hall, would have somewhat obscured both these

lights. We therefore find in the wall, above the door of communication, sockets for the frame of a flat roof, over the screens, divided into five compartments, each of which has been subdivided by a lesser bearing timber. Probably this roof was leaded. It seems almost certain that the flat roof only extended so far as to clear these windows, and ended over the screens; the rest, extending to the north wall, having a high-pitched roof and gable. It is equally likely that though the flanks of these buildings were timber, their northern gables and the north wall of the courtyard, in which was the gate, as well as those of the lay brothers' rooms and the room above the kitchen, were of stone.

We may return here to the evidences of the print in King's *Vale Royal*. In addition to the gables of still-existing buildings there indicated quite correctly, another is shown towards the north, narrower than the others, and standing exactly in the right position for this guesten hall. Its narrower span throws it a little to the right of the north gable of the Prior's hall, thus exactly agreeing with the traces of the timbered flanks still visible. The gable is clearly of stone, and contains a two-light window. This gable has been supposed to represent the kitchen, but for that apartment it is incorrectly placed. Thus the accuracy of this previously discredited print is proved, by the stones which remain, to be a conscientious representation of the Priory buildings as they stood in 1656, for its testimony is borne out by existing remains; and in spite of its rude and conventional drawing, in perspective and detail, it has furnished the most valuable clues to the interpretation of the existing fragments.

Having so far laid down the main lines for the recovery of these buildings, it may now be shown

how admirably the arrangements for their service fall in with this plan. The western end of the undercroft of the refectory abuts on the ends of the screen passages of both prior's and guests' halls. It is divided off into two smaller apartments at this end, and although the wall separating these is modern, it most likely replaces a wooden partition. In each room are two doors, the one entering from the larger part of the undercroft, the others severally pass into the screen passages of each hall. Thus these two small rooms form serving rooms, and probably also butteries, by which from the kitchen, by way of the undercroft, the two halls could be supplied separately with viands. The Prior's meals passed through the room to the left, those for the guests to the right. From the guests' serving room, on the right hand, there is a square opening that has been closed by a door, through which the food for the lay brethren could be separately handed to them; while just to the right of the entrance was the newel stair, leading up to the monks' refectory. Thus the work of serving the meals to large numbers was at once concentrated, economised, and yet completely separated at the north side; much in the same way as the concentration of access to the church and monastic buildings was adapted to their complete supervision by the Prior on the south side. The arrangement of these features shows not only that they are all consistent parts of the original plan, but their meaning and purpose is disclosed; they are meaningless, unless the existence of the buildings of the north court be granted.

It may be well to point out that the free use of oak in mediæval construction, in combination with stone, for exterior work, is by no means so rare as is apt to be supposed; and not only have we the

analogy of Chester, but we may refer to the still existing wooden dormitory of Basingwerk Abbey, to a portion of the conventual buildings at St. Mary's Abbey, York, and to the dormitory and other buildings at the great and wealthy Abbey of Selby, which were beautiful and elaborate work of the thirteenth century, closely corresponding with Birkenhead in being set on a groined undercroft, with an upper stage of timber. These stood nearly perfect till the year 1812. There is little doubt that the Birkenhead refectory was also timber at the sides, with stone gables. The side walls of stone, with their square windows, as seen at present in the upper floor above the groining, are of very recent origin, probably as late as the eighteenth century. They are very rude and inferior work, but of old material, and they were, doubtless, built under the ancient framed roof shown in the print of 1656, as the wooden sides decayed.

In the site of the guest house there is, however, a certain disadvantage of position that enables us to understand why the new hostel was eventually erected for travellers, separately from the Priory. The guests' hall having the prior's hall at its screen end and the lay brothers' apartments at its side, the former divided only by a door, the noise and revelling of the travellers disturbed the Prior on one hand and his servants on the other; and we can well imagine, when the hall was occupied, during the visit of Edward I, in 1277, and during the Welsh and Irish wars, by soldiery in transit, that the monastic seclusion would be somewhat rudely broken. We know that at Birkenhead were kept the king's waggons, and that the Prior had charge of them; therefore he had much to do with land as well as ferry traffic.

Thus I have tried to set out the complete plan of our ancient and beautiful Priory. No portion of this has been based wholly on conjecture, but for every part attempted to be recovered there is some material trace or some authority existing, which has served for the interpretation and reasoning out of the original details. Fortunately most of the detached fragments are extremely characteristic, and they lend themselves easily to their logical allotment to their proper places in the design. It remains only to notice certain detached fragments that supply us with many of the details of the buildings, though some of these cannot be placed with absolute certainty:—

1. The first is half the trefoiled head of a small arcade, boldly moulded, which may belong to such a feature flanking each side of the western door, but it is almost equally suitable for the niche of a piscina, though its weathered condition seems to mark it as external work.

2. Two pieces of window tracery, giving the springings of at least three acutely pointed lights, though probably the window had four lights. The main tracery is intersecting, with a sub-order of trefoiled lights and a trefoil in the head—a very beautiful composition. This is very possibly, from its high finish and moulded main order of tracery, a portion of the east window of the chancel.

3. Two shafts, with hollowed faces and moulded caps of small projection, with an attachment in the rear, that have formed part of a wall panelling, similar to that in the chapel of Beaumaris Castle. This is internal work. It might form panelling at the west end of the nave, or be part of the lower part of the sedilia.

4. Three fragments of very rich tracery, not portions of windows or adapted for glazing. They

are foliated and sub-foliated, and may have formed open-work canopies for the sedilia. Their character would be consistent with the preceding fragments, and they could both have formed part of the same work.

5. Five half single lights, with remains of cusped tracery, not prepared for glazing; which may be allotted to the cloister lights. All these have been beaten in at the vertex of the arch by violence, and this seems to show that they filled square-headed openings in the cloister; the ashlar having been first thrown off the lights, the tracery and mullions were beaten out by breaking the junction of the pointed lights.

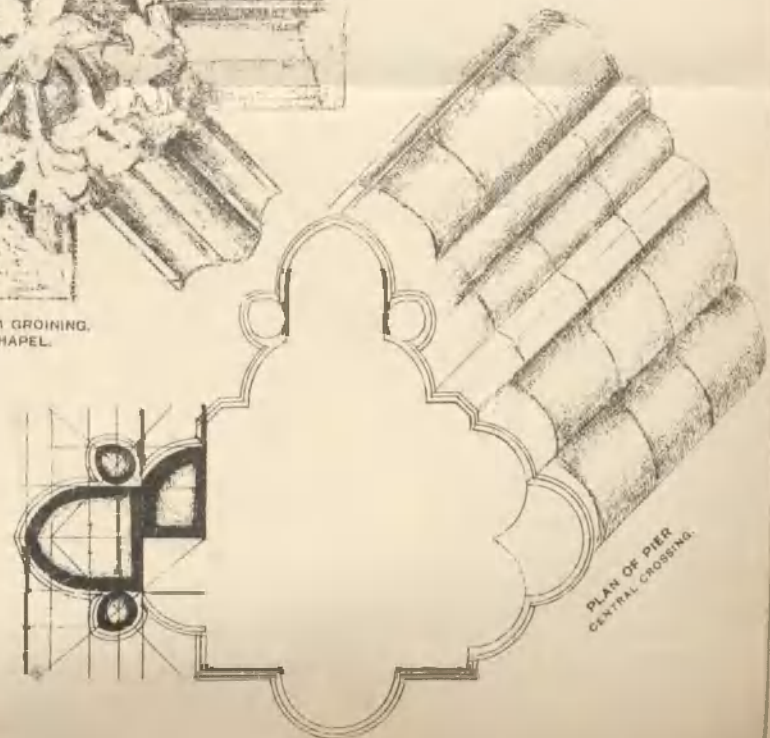
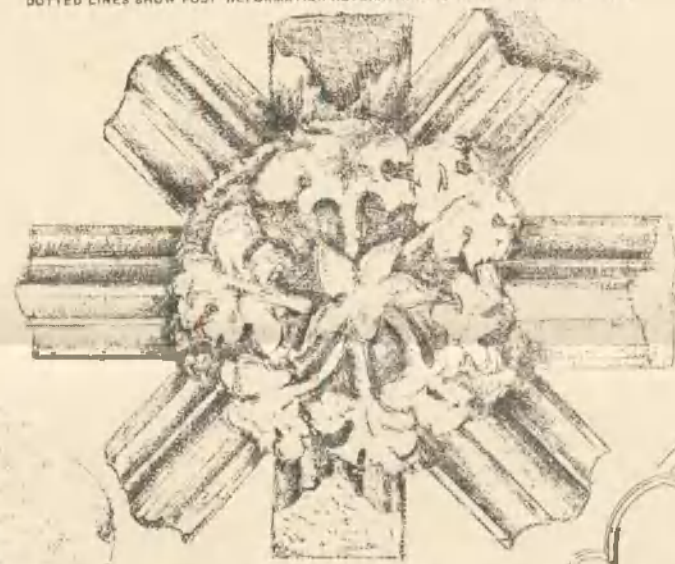
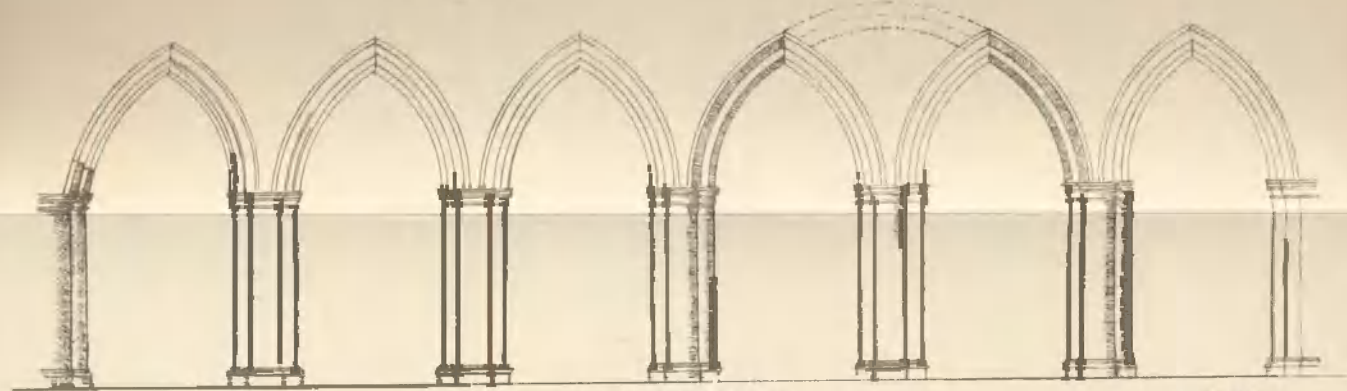
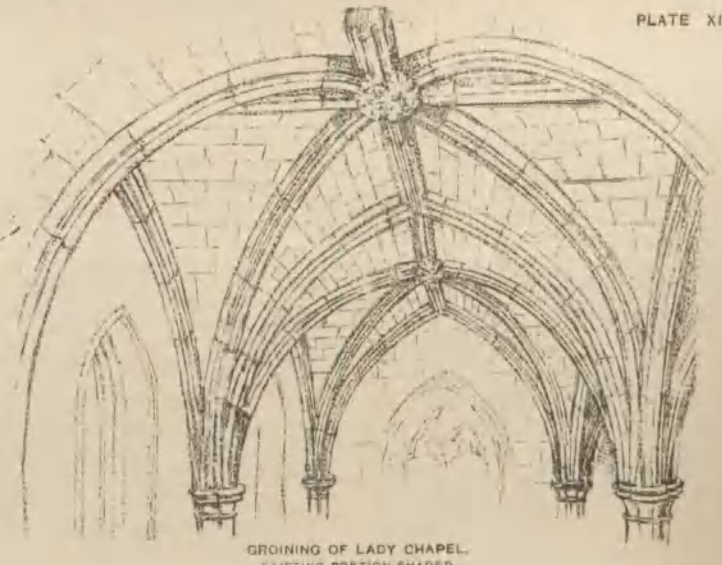
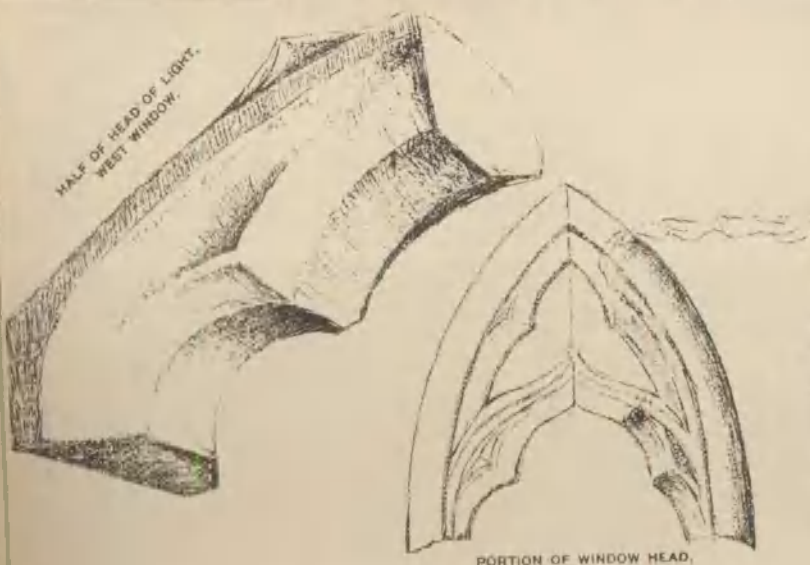
6. Two fragments of mullions of west window, having roll mould filleted on the exterior, and splayed within. A similar mullion, of smaller dimensions, differing from section of No. 2, but still part of a large window; possibly to be allotted to the south transept. Piece of a mullion of a large window, with shallow hollow on the chamfers on the interior and exterior. This is like late work, and may be part of some post-Reformation alteration. Also, built up in the refectory, two or three pieces of the post-Reformation window of the Prior's hall; two pieces of a late perpendicular hood mould; two unidentified jambs.

7. A small boss, apparently the terminal of a hood mould of a gabled buttress, possibly from the west end of the church. Also a stone that seems to have been part of such a gabling, and a plain piece of coping with a sloping weathering.

8. Two pieces of the font bowl, Norman.

9. Numerous ledger stones, with incised crosses.

10. Two voussoirs of very finely moulded arches, of different section; one of early English character, probably from the doorways of the church.



11. Jambs of windows of similar section; splayed, but differing in size; possibly from side windows of the church. Two of these seem to show that the glass (as in the west window) was fitted in wooden frames.

12. A capital and several pieces of small round shafts, from jambs of church doors.

13. Half a capital of nave pier, set as a threshold in the gate to cloisters.

14. The bases of two of the shafts of the clustered columns of the nave.

15. Piece of moulded cornice of Prior's room, with ball flower ornament; and head of post-Reformation door of upper floor, that fell about six years ago.

In addition to these, several carved heads, made when St. Mary's Church was built, and also the top of the spire, removed during repairs made a few years ago, are mingled with the ancient stones, and it is desirable that these should not be confused with them. From the sorting of these various ancient fragments, it has been possible to re-construct the lost portions of the Priory with fair accuracy of detail.

#### THE TEST OF DOMINANT MEASURES.

So far we have dealt chiefly with the remaining building and its loose fragments, giving their apparent purposes and fitting them together like the pieces of a dissected map; and we may call in now another test of the accuracy of our conclusions. Were we able to know with absolute completeness the principles and codes by which the mediæval masons worked, they would form a complete key to most ancient designs. Investigations in this direction have recently been undertaken, to which it has been my privilege to contribute in a small

north-east angle of cloister; Prior's door to north-west corner of refectory; outer side of cloister court, west side to traces of wall of parlour; centre of chapter-house to passage to Prior's hall, exterior; north side of cloister to western respond in north aisle of church. All these are ascertainable measures.

Now, we will take an intermediate set of measures into the lost parts, from known ones. Prior's chapel, north, to southern buttress of west front of church, 70 feet; from same buttress to angle of passage, Prior's hall, 77 feet; from door of Prior's hall to centre of south-west respond of nave, 77 feet; from Prior's house door to south aisle outer wall, 70 feet; centre of cloister garth to centre of south nave arcade 70 feet; north wall (centre) of chapter-house to south wall (centre) of crossing, 70 feet; north-east door of nave to east buttress sacristy aisle, 70 feet; east inner jamb of north-east nave door to centre of Lady Chapel, 77 feet; from west transept wall to third bay of Lady Chapel, where would be the altar steps, 77 feet; north inner wall of north transept to centre of wall of south transept, 77 feet; centre of great piers of crossing to centre of north chapter-house wall, 70 feet. These are all measures from known and existing points to points in the recovered plan.

Lastly, we will take the measures that apply to the plan we have built up from fragments, having no place in existing work. Centre of west front to centre of church, 77 feet; centre of church to altar of Lady Chapel, 77 feet; diagonal line of chancel, north-west to south-east and north-east to south-west, 77 feet (over aisles); diagonals from centre of eastern piers of crossing to eastern buttresses of Lady Chapel, 77 feet; opening of transept arches to east end of Lady Chapel, 70 feet; length of chancel aisles, 35 feet (half 70); openings of nave

and chancel arches, 7 feet ; width of aisles, 7 feet ; width of nave centre to centre of arcades, 21 feet (three times 7) ; width of aisles, with walls, 10 feet 6 inches (together 21 feet) ; width of cloister walks, east and south, 14 feet ; breadth of Lady Chapel, 21 feet (three bays, 7 feet span).

Thus all the measures agree in system. Even the recovered tower piers show that the measures go into detail, though I have only given, so far, greater measures. They are planned on a square of 28 inches, set on one of 42 inches—four times seven and six times seven respectively. The projecting member of the column is 18 inches, the cross-pieces 14 inches by 10 inches, 28 inches together and 28 inches wide. The detached shafts are 7 inches to the keel ; they stand on a diagonal line, 14 inches from the centre.

So, having first attempted to read the broken and imperfect score, we at length strike the known key-note of seven, the ruling measure of the whole design, and then, out of the now silent and unknown, vibrate the responsive harmonies of "the lost chord."

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#### POSTSCRIPT.

Since the above paper was written, the restoration of the west front, as shown in the plate, has been subjected to the further test of its harmonic measurements, and these are based upon the number three. Also, it has been set upon its tracing board, consisting of quadrilateral compartments, with their diagonals, in accordance with the principles of planning used, it is believed, by the ancient masons. The result has been to confirm by these means, its measures, proportions, and design in every particular, as coinciding with the developments derived from its few remains.