Douglas Harding's Architectural Thesis 1930

Douglas Hardin'gs architectural thesis on The Flintwork of the Churches of East Anglia and North Essex. Douglas Harding took the train from London to the villages and took the photographs himself.

THE FLINTWORK OF THE CHURCHES OF EAST ANGLIA AND NORTH ESSEX

Thesis by

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I N D E X.

PART I.

FLINT AS A BUILDING MATERIAL .

PART II.

HISTORY OF USE OF FLINT IN BUILDING.

PREFACE.

The illustrations to the following Thesis are, in the main, photographs and measured drawings by the author. Several postcards have been used where these have proved adequate for this purpose. The camera has been largely used in order to give an impression of the character of the flint churches of East Anglia, which the measured drawings cannot convey. So that the continuity of the text should not be interupted, the illustrations have been collected at the end of the volume.

The subject, which has received little attention from architects and archeologists, is a large one, and the author has endeavoured to give a more thorough sketch of it than has hitherto, as far as he is aware, been attempted. It is scarcely necessary to state that 'flushwork' deserves a much more comprehensive treatment than it has been possible to give it within the present limits.

The fullest treatise, and the only paper dealing exclusively with the subject, in the author's knowledge, was read before the Royal Institute of British Architects by the late Mr Frank Bagally and published in the ~~Proceed-~~ Transactions ~~-ings~~ of 1885. There are short accounts of East Anglian flint work in Bond's works on Gothic Architecture in England and in the works of Dr Cox on East Anglian Churches, while Brandon's "Analysis" contains a number of illustrations which should certainly be referred to by those interested in the application of 'flushwork' motifs to church architecture. To all of these works the author is indebted.

The plan of this thesis has been to present first of all an account of the nature and uses of flint, followed by a history of the use in East Anglia. The body of the work is necessarily concerned with 'flushwork' decoration, of which the various patterns or elements are first analysed and then its more general aspects are described.

It is the rich variety of invention in design which renders the present study something more than mere archeology or fruitless research, for we shall discover much that is vital in the attempts, sometimes a little naïve, more often able and excellent, of the masons of East Anglia to express themselves.

I. FLINT AS A BUILDING MATERIAL.

Flint is a hard and brittle rock, composed chiefly of silica, which is supposed to have been deposited in concretionary nodules from solutions containing siliceous compounds. It occurs only in the form of comparatively small masses.

Location of flint

These flint stones are plentiful in the chalk deposits of England, and those of the smaller variety are extremely common in gravel deposits, on the sea shore, and on the surface of the land. In East Anglia the Middle and the Upper Chalk contain flints while the Chalky Boulder Clay, which extends over nearly the whole of Central Norfolk and Suffolk and which forms much of the surface soil also contains flints derived from the chalk by glacial action.

The chalk deposits of East Anglia yield flints which are either of a nodular or a tabular shape. The former, which are usually from the Upper Chalk, occur in horizontal layers and frequently possess rounded projections or 'horns'. The larger variety of these nodules, known as 'pear flints', may reach a height of from two to five feet. The tabular sheets of flint are found in the Middle Chalk. Land flints are in general smaller and of more regular shape than those derived from the chalk. Owing to the action of the waves flints picked from the shore, the land and gravel pits are smooth and rounded, and seldom reach a dimension of more than six inches.

Description of flint

A flint in the rough state is covered with a layer of whitish stone which is the product of a very slow oxidation. This coating is most conspicuous on the chalk flints, where it is about a quarter of an inch thick. It has the property of turning mortar a yellowish colour. The colour of the inside of the stones is subject to considerable variation. Those from the chalk are usually black though many shades of grey and even white are found. Brown and red flints are found when iron has been present, while the common land or shore flint is of a greyish colour. Some of the darker varieties of flint fade to grey and almost to white on exposure to the atmosphere for a considerable period. The fractured surface of a flint has a lustre which varies considerably in degree.

Owing to its great hardness it is practically impossible to chisel or to saw flint, consequently the only convenient method of dressing this most intractable building material is that of chipping or 'knapping' it with a special hammer.

Mining flint

At the present day flint is mined from the chalk at Brandon in North West Suffolk for the manufacture of gun flints, gauged and knapped flints for building purposes, and, we are told, 'Neolithic implements'. The method of mining these flints is interesting from its primitive character, for it would appear that it has undergone very little change during two thousand years. Shafts are sunk through the upper strata to a depth of about thirty feet. From the bottom of each shaft there radiate several galleries which are just sufficiently large to allow one man to excavate the chalk. This he does in almost the same way as did the neolithic men at Grime's Caves in the same district. From remote ages the flint mining and working industry has had an uninterrupted tradition, successively illustrated by axes, hammer heads, arrow-heads, saws and other implements, medieval church building flints, strike-a-lights, and the more recent gunflints.

There are four layers of flints in the chalk at Brandon. The top layer yields irregular shaped grey flints and a smaller

quantity of jet black flints which are very durable and do not fade. The flints from the Wall bed, which is next in order of depth, are always black but they are subject to flaws, grey rings and spots, and are liable to fly to pieces when struck. The Upper Crust is an inferior layer. The lowest bed, known as the Floor Stone, yields the best flints, which are, however, apt to fade upon exposure. It is from these last and from the best of those from the other beds, that gun flints and squared flints are derived.

Working Flint.

The chalk flint requires dressing or knapping before it is suitable for a facing material for walls. The skilled workman who does this is locally termed a 'knapper'. He chooses from his stock of raw material a large flint, from which he severs a piece of workable size (about 8"x 12"x 4") by means of a few sharp and slightly oblique knocks with his hammer. He is able to tell through experience exactly where and how to strike the flint in order to obtain an approximately even plane of cleavage. In a similar manner the white coating is removed from the flint. If the stone is to be random dressed, it is prepared, by chipping, with one approximately rectangular face from which the rest of the stone slopes away as an irregular truncated cone. If a gauged flint is required its outline is drawn with a template and the surplus material is removed with a flaking tool. Each of these types of building flint may have a smooth surface, or one that is 'back chipped' to an approximately flat surface. Many flints are spoiled before a smooth surface is found in the former case, while more labour is required to produce a flint in the latter case.

Brandon and its neighbourhood have been a centre of the flint mining and knapping industry of East Anglia from remote times. The contemporary knappers are believed to be directly descended from the men who made Neolithic implements, and their skill is attributed to the fact that the trade has been practised by their fathers since time immemorial. So far famed was the skill of the Brandon knappers that they were employed in medieval times upon the flintwork of churches so far apart as Cromer and St. Leonards.

East Anglian building mats.

Flints gathered from the surface of the land or dug from gravel pits were cheaper, and, in most cases, nearer to hand than those obtained from chalk. Thus it is of this humbler material that the rubble walling of the majority of the East Anglian Churches is built. Large quantities of flints of an uniform size and shape were available upon the sea shore and were extensively employed for building the churches near to the coast.

With the exception of flint, East Anglia has very little building stone. The cliffs of the south-east coast of Suffolk yield a soft stone of an argillaceous nature, known as Septarite, which weathers badly and is liable to cracking. This material has been used locally for church building in conjunction with flint and other materials. Iron Pudding Stone, also obtained from the shore, is used in the same district, but its poor appearance and the difficulty of placing any labour upon it confine its use to a few rubble walls in the neighbourhood. Chalk or Clunch, where available, was frequently used for the cores of church walls which were faced with flint, but it is neither hard nor durable enough to warrant its use as a facing material or in an important structural position. The best building stone in East Anglia is Carstone, which was quarried from the cliffs at Snettisham near Hunstanton and was used in

the construction of many cottages and some churches in that district. In the case of this material the scarcity of supply did not admit of its more general use. In addition to flint, many varieties of stone picked from the sea shore, were incorporated in the walling of churches near the coast. Wherstead church is built of flints, granite, gniess, greenstone, quartzite, sandstone, red chalk and other rocks. Thus the medieval builders who could not afford to import ashlar stone from Caen or from Barnack were, in all but a few cases, obliged to use the idigenous flint with all its disadvantages.

Flint as building material.

There are several objections which may be raised against the use of flint for building purposes. The nature of the material necessitates great care in its use. Owing to the smallness of size and irregularity of shape of the flints, walls are always lacking in both longitudinal and transverse bond unless a special bonding material is used. A facing of knapped or guaged flints has a tendency to become disconnected from the wall. A great deal of mortar is needed, and since this contracts upon setting a flint wall has to be built slowly and in sections. Neglect of such precautions as these may lead to the failure of a flint structure. In addition it is often alleged that flint structures are drab, uninteresting or cold in tone and rough in texture. This indictment applies in certain cases but we have many beautiful flint churches. The limitations of so hard and so small a material evidently preclude its use for mouldings, tracery, mullions, piers, voussoirs and rib-and-panel vaulting.

The outstanding merit of flint as a building stone is its great durability and hardness. It will defy the ravages of time and weather almost indefinitely. When it is treated in certain ways and when a coating of lichen mellows its metallic lustre it is an attractive material.

Owing to the small size of the stones it is necessary to build the external quoins of ashlar since the flints would otherwise fall away readily from the angle. In addition to strengthening the wall ashlar quoins provide a more accurate arris and a neater appearance than do flint quoins. In East Anglia the only examples of salient angles formed in flints known to the author occur at Pentlow (fig) and at Beeston Regis. The former church has three quoins of large flat flints surmounted by a few courses of wrought limestone. Window and door dressings are invariably executed in dressed limestone though internal angles are frequently formed in flint.

Wall Construction.

We can merely conjecture the methods of construction employed by the medieval builders of East Anglia, but we assume that their technique was somewhat similar to modern practice. The instructions for the modern flint builder are briefly these: Flint walls should not be less than two feet thick. The mortar is preferably made with a mixture of Portland Cement and lime, or with a good hydraulic lime, but on no account should a pure or fat lime be used. A stiff, strong mixture, rather than very wet mortar, larrying or grouting, is employed. If lime is used bricks or tiles are built into the wall to assist in the hardening of the mortar, since flint is a non-absorbent substance. In order to avoid vibration the flints should be passed into the mortar by hand and not struck with the trowel. The facing flints are first carefully bedded in mortar; the core is then inserted. The wall is built in stages of from six to nine inches in height. If the upper courses are laid before the lower courses are set the wall is very likely to bulge owing to the superincumbent

weight and to the lack of lateral bond. It is thus necessary to build flint walls very slowly. On account of the greater number of mortar joints in flint work than in ashlar, it is very difficult to prevent the wall from settling to a greater extent than its quoins and dressings. The bonding between the wall and the wrought stonework should be as thorough as possible. It is advisable to strengthen the walls laterally and longitudinally by means of lacing courses of brick or tile, 'through stones' extending throughout the thickness of the wall, hoop iron and similar expedients. All work upon flint walling should be suspended during rain and frost, from which the walls must be protected.

After the flint wall has been successfuly erected it will, except in unusual circumstances, prove permanently sound. A flint wall costs less than most types of stone wall to keep in good repair, but should it fail it becomes a total wreck. Flint walls, if carefully constructed, will remain safe for hundreds of years; as witness the many medieval flint churches of Eastern England. The fact that there are numerous ruined flint churches in Norfolk and a few in Suffolk does not necessarily imply faulty construction or an unsuitable material. Many of the Norfolk parishes had two or even three churches, all of which a comparatively small number of villagers could not afford to keep in repair. Thus several churches were allowed to fall into ruins owing to the penetration of rain and its subsequent freezing. Others were destroyed by fire, while at least one, proving too large for its congregation was pulled down for the sake of its material, a part of which was sold and a part served for a reconstruction on a humbler scale. In such instances failure is clearly not due to any weakness on the part of our material.

Flint building to-day.

Flint is not used now to any great extent in East Anglia for building purposes other than for the manufacture of Portland Cement concrete. Repairs and additions to the older churches follow the lines of the medieval work though it is usually possible to distinguish each kind. New churches are occasionally erected of brick with flint facing, but when, as is often the case, the joints are pointed with dark mortar instead of being 'galletted' or merely 'raked back', their appearance is unsatisfactory.

II. AN HISTORICAL ACCOUNT OF THE USE OF FLINT IN BUILDING IN EAST ANGLIA.

Pre-Roman. Our history of the craft of flint working commences in the Palaeolithic age, and it was in this and in the Neolithic period which followed that the skill of the craftsmen attained its climax. The flint implements of the earlier period were characterised by their chipped working edges, while those of the latter period were often ground and polished to a perfect cutting edge. Saws, arrowheads, fabricators and spearheads as well as the larger hammer stones, axe-hammers and chisels are found, many of which are exquisitely made, spite of the difficulty of working the material. The manufacture of flint implements at Brandon is believed to have continued until the Roman occupation of Britain.

Roman. While the Ancient Britons are known to have built walls of dry stone, it is probable that the Romans were the first to build walls of flint and mortar in England. At Caister near Norwich and at Burgh they employed flint in the building of their castrae, or 'castles' as they are now styled. The massive walls at Burgh are constructed of a rubble core, faced inside and outside with split flints in level rows. The exterior face (fig.2) which is more carefully finished than the interior, is bonded together with horizontal lacing courses of tiles, occurring at intervals of about two feet. The tile courses extend two tile widths into the wall and are two tiles deep. The interior face has similar, but fewer and less regular, bonding courses. Circular bases of bastions occur at the angles of this ruin which obviated the necessity for ashlar quoins, buttressed the structure and possibly provided turrets for defensive purposes. The mortar employed is of a pink colour and was made from powdered tiles and lime. From the character of the work it would appear that only the face of the wall was laid by hand while the core of the wall was deposited in shallow layers as mass concrete. The Romans were masters of concrete construction and found in the local material a suitable aggregate for its manufacture. It is particularly interesting that split flints should be used in a building of this nature and at so early a period.

Saxon Of the Romano-British and early Saxon periods there remain no authenticated ruins in East Anglia. The earliest churches are probably not prior to the ninth century.

There is a considerable number of churches, however, having features indicating that they were built in the ninth, tenth, eleventh and in the first half of the twelfth century.

The towers of all these churches, as well as those of the Norman period, were all circular in plan. These remarkable towers are more numerous near to the sea-board, either on account of Scandinavian influence or in order to afford protection for the parishioners from the incursions of the Norsemen. Norfolk has one hundred and thirty, Suffolk forty and Essex eight round towers. From all these Dr. Cox selects thirty which bear evidences of belonging to the Saxon period. Several theories have been advanced to account for their shape, the most probable of which is that the lack of local building stone suitable for quoins led to the adoption of a plan which had no salient angles and hence did not require the use of any other material than the local flints. While this influence of the limitation of material no doubt contributed to the persistence of the form, its original adoption may have been due to the influence of the round towers of Norway, for Norse influence was particularly strong in East Anglia and near to the coast.

With the exception of the tower of East Dereham church, which is built of carstone, the round towers are of whole shore flints or of whole land flints, while in some of the less carefully built towers broken rubble is also incorporated. In most cases the flints are arranged more or less approximately in courses. Those towers that are built of shore flints are usually very regularly coursed (fig.4), and the stones are similar in size and shape. Frequently the flints are arranged in herring-bone fashion, in which each stone in a course is inclined in an oblique direction and at right-angles to the slope of the flints beneath. This herring-bone pattern is typical of Saxon work, but the form persisted in the Norman round towers, of which Haddiscoe is perhaps the finest example. A similar mode of construction was used as late as the fifteenth century in Walberswick church. Pieces of sandstone, and of various other kinds of stone, are frequently introduced into the facing of the round towers either at random or in course. The tower of Holy Trinity, Bungay, has some courses of sandstone laid in the herring-bone manner, while Herringfleet has two well marked bands of very large flints. Roman bricks, as at Rushmere, occasionally enter into the construction of early towers.

The appearance of the round tower is best when horizontal courses give breadth and stability to the composition. Most possess scarcely a vestige of ornament of any kind, and are uninterrupted in their height by set-backs or string courses. The example at Haddiscoe, which is divided into stages by limestone string courses, and has level stone-rows, belongs to the early Norman period and is no doubt the work of Saxon craftsmen. A number of round towers, and especially those built of random rubble, bear traces of plaster. This, like most of the early plaster over flintwork, is sufficiently thin to leave exposed the flints which project furthest from the wall.

The diameters of East Anglian round towers vary between ten and twenty feet, and their walls sometimes attain a thickness of five feet. From an examination of their material it would appear that they were built in sections of from ten to twelve feet in height.

The best practice in the formation of stone dressings in flintwork is to tooth the ashlar regularly into the wall. In most early work straight joints and rudimentary toothing are more usual as the window dressings in the chancel at Fritton and the tower at Haddiscoe.

The foundations of flint churches are difficult to examine. It would seem that they were built roughly of flint-and-lime concrete, which was often scarcely thicker than the wall above.

Apart from the round towers little Saxon work remains in Norfolk and Suffolk which can be distinguished from later work, but we may infer its character from that of the towers.

One of the most entire and interesting of Saxon relics is the Old Minster of S. Elmham. It was built of large flints gathered from the surface of the neighbouring land, laid in regular courses. The external quoins were built in dressed stone and the internal quoins were neatly formed in flints. Both the external and internal faces of the walls bear traces of plaster of the same quality as the mortar. A few put-log holes, of a triangular shape, may still be detected in the walls. The put-logs were probably made in this way in order to obtain as large a bearing as possible upon the freshly built walls. By this ingenious device two put-logs could be sawn from a balk, each of which had

a greater bearing area than that of the original timber.

Norman

Of the one hundred and seventy eight round towers of East Anglia and Essex, the majority are of Norman construction, and not more than twelve belong to a later period. The remains of Norman parish churches however are fragmentary.

The walls of the apse of Fritton Church, which is in this style, are constructed of shore flints laid in level rows in herring-bone manner with the internal face battered and plastered. The two buttresses, which occur on this apse, are in dressed stonework, and are of slight projection.

The Normans continued to use flint after the manner of their Saxon predecessors, and it was not until the following period that flints were split or chipped for facing purposes. In addition to flints, other local material was utilized where it was available. An example of heterogenous construction is the late Norman church of Wantesden which is built of septaria, flint, and pebbles of various kinds.

The Norman builders imported great quantities of limestone from Caen in Normandy. This stone, owing to the comparative ease of water transport in such times, continued to remain a favourite material in East Anglia for centuries after, and was used for quoins, dressings and for facing flint walls. The excellent limestone from Barnack near Peterborough was also used, especially where it was possible to convey it by river to the site.

While the Norman parish churches of the district were built of, and faced with, flint, and required ashlar only for their quoins and dressings, monastic and quasi-military buildings were faced partly or wholly with dressed stone. This fact may be assigned to a desire for monumental effect, additional strength and facility of moulding and carving. The rubble core of Norman walls and piers was bonded in a most imperfect way with the stone facing. The Cathedral and the Castle at Norwich are of rubble faced with Caen and Barnack stone respectively.

The walls of Castle Acre Priory (of the Norman period) are built throughout of flint rubble with the exception of the facing of the west front, and the pier mouldings, shafts and quoins of the remainder of the building, which are constructed of limestone.

An exception to the usual method is seen at the Priory Church of St.Botolph, Colchester, (middle twelfth century) the nave piers of which are built of septaria and a few flints, mixed with Roman bricks laid approximately in bands. This construction was due to the great cost of ashlar, and was rendered possible by the use of piers of large diameter and constructed of good mortar. The dressings are partly of limestone and partly of Roman brick. The builders of this Church were careful to provide put-log holes in the interior face of the rubble work, each of which was spanned by a small stone lintol, filled loosely and plastered. This practice of building permanent put-log holes for subsequent repairs was applied to many flint buildings of the later period.

Thirteenth and fourteenth centuries.

In the thirteenth and fourteenth centuries a comparatively small amount of church building was done in East Anglia, for the district was unfertile and the people were poor. The Black Death which occurred with terrible severity between the years 1348 and 1369, is said to have halved the population.

It was during the thirteenth century that split flints were adopted for facing parish churches (fig.7), though their use never entirely superseded that of whole flints. It is doubtful whether the labour involved in knapping the flints was justified by an improvement in their appearance. The dull grey coating of

a shore flint or a regular land flint is preferable to the metallic appearance of a split flint, but the rougher and more irregular kinds from the chalk and the land required splitting in order to provide an approximately even face to a wall. The practice of splitting flints may have commenced on these large rough varieties and extended to the regular type of flints. Rubble, broken and whole, coursed and uncoursed, plastered and bare, continued to be used throughout the medieval period after the introduction of the system of facing walls with knapped flints.

The use of round split flints necessitated that a considerable area of mortar should be exposed between the stones. The practice of 'galletting' the joints of knapped flintwork or of gauged flintwork consisted of pushing small flint flakes into these mortar joints, either in order to protect the mortar, or, what is perhaps more likely, to improve the appearance of the work. The flint flakes are variously, thin and thick, closely or loosely packed, or appearing at intervals in an apparently careless and arbitrary fashion.

Fifteenth Century Gauged flints.

The next important step in the development of flintwork was the squaring or gauging of flints. Though a more costly method than the preceding one, it removed the white coating which is conspicuous in the knapped flint, dispensed with the need of galletting, and lent itself more readily to a neat junction with the stone dressings.

Intermediate between the squared and the knapped flint is a variety which has had the outer layer removed but has not been accurately gauged. Such a flint is more or less polygonal in shape.

The date of the introduction of gauged flints is variously given by authorities. It seems that their use was exceptional before 1400 and was not general until the middle of the fifteenth century. Squared flints were used in the panels of the late Decorated Chapel of Houghton-le-Dale.

Every conceivable degree of labour was placed upon these gauged flints. In some cases it was sufficient to strike off the white coat of oxide from the edges of the flint while other examples exhibit an extraordinary amount of care and precision.

Such is the Old Bridewell at Norwich, which is in some ways the most interesting flint building in East Anglia (figs.8,9). It is ascribed to either the latter part of the fourteenth or the beginning of the fifteenth century. The front wall of this building is of flint, faced with gauged flints, without buttresses, and relieved by a few small windows. The flints are approximately squared. Instead of very accurately squaring each flint the builders preferred to shape each flint to fit into the slight irregularities of its neighbours. The joints are very narrow, but where possible they are galletted with very thin flint flakes. It is impossible to insert a knife into the joints and no mortar is visible. The skilled craftesmen who were responsible for this work were no doubt from Brandon, the centre of the industry.

This sudden evolution of gauged flintwork seems less remarkable when we consider that it was contemporary with the new gun-flint industry which gave the Brandon knappers so much practice in the manipulation of their material.

The prosperity of East Anglia during the fifteenth century is witnessed by the great number of noble churches of that period. The woollen trade, introduced by the Flemish weavers, which turned many a small village into a flourishing country town, had by this time added very largely to the wealth of the people. It reached its zenith in the latter part of the fifteenth and began to decline in the sixteenth century.

Flushwork

It was during the latter half of the fifteenth century, and at the period of greatest prosperity, that 'flushwork', or flint-and-stone-work, was invented, developed, and used everywhere in Norfolk and Suffolk. The influx of wealth made it possible to import a great deal of limestone, which, though flint continued to be the principal structural material was used liberally in the elaboration of the external wall surfaces forming decorative patterns and ornament of all kinds.

Since the ashlar was the costly portion of the structure, the builders took pains to use it to best advantage. Thus it was seldom used in the interiors of walls but was essentially a facing material.

The devices in flint and stone are generally known as 'flushwork' on account of the fact that the faces of the flint and limestone are in the same vertical plane. By this contrivance a panelled surface was obtained, not by relief, but by contrast of tone, where the stone formed a light background for the inlays of darker flint. Thus considerations of economy led to the adoption of this highly interesting substitute for the sunk stone panel which was the characteristic motif of the period.

The sudden development of flush panelling appears to have occurred during the middle of the fifteenth century. Of the examples which can with any degree of certainty be dated, the majority were built between 1450 and 1500. Stratford S. Mary bears the date 1430; S.Peter Mancroft, Norwich, was finished in 1455; Walberswick was built between 1472 and 1493; the flintwork of Lavenham is dated 1473; the south aisle and porch at Wetherden, the restoration of S. Mary at Quay, Ipswich, and some of the flushwork at Saxmundham, - all belong to the year 1483. The Lady Chapel at Long Melford was built early in the sixteenth century.

Flushwork is an indigenous product of East Anglia and North Essex, and, with very few exceptions is not found elsewhere in England - a circumstance that we must attribute rather to the relatively great wealth of East Anglia during the period than to any lack of communication between the builders. In some parts of the south-eastern counties square chequer work and chequer designs on buttresses are found but flushwork similar to that of East Anglia was not built.

Square Panel.

A favourite type of pattern in flushwork is what we will term the 'square panel'. It is approximately a square with a side varying between nine and eighteen inches. A margin of from one inch to four inches remains as a frame or border to the panel which is sunk to receive the flint inlay. Square flush-panels, and particularly those occurring in plinths, are frequently alternated or mixed with similar panels in stone, in which latter a sunk pattern is worked. This method is found at Wrentham, while at Lavenham, and frequently elsewhere, a whole series of square panels is in limestone, sunk and moulded.

The variety of designs, in the case of the square panel and indeed in the case of all panels, renders it impossible to do more than distinguish the more well defined types.

The 'geometrical', of which figs. are examples, is frequently found in plinths and buttresses. Within the frame of the square panel diaper patterns are formed of lozenge shapes or squares which are alternately of flint and stone, or one finds discs of stone with the intervening spaces, and sometimes the centres of the discs, inlaid with flint. The tower plinths at Elswell and Framlingham and the buttresses at Elmswell and Stratford S. Mary provide instances of the use of these motifs (figs.10,11).

The second type of square panel contains one or more letters formed in the limestone, with flint for background. This is commonly the initial of the saint to whom the church was dedicated, or the initial of S.Mary. In either case the letter is frequently surmounted by a crown, which may be elaborate or rudimentary or may be replaced by a small triangle. One of the most beautiful panels of this type is seen in the tower base of Dedham, where Ms are delicately drawn, surmounted with elaborate crowns, and surrounded by large foliations. (fig.12). S. Michael Cressingham, S. Mary Erpingham, S. James South Repps, S. Edmund Southwold and many others have Ms, with and without crown; S. George, Saxlum Toney has a G and M, and SS.Peter and Paul, Fakenham, has crowned Ps (figs.13,14). The sacred monogram is found in the tower base at Elmswell and in the clerestories of Woolpit and Coddenham (figs.15,16.

A third type of square panel contains a shield of stone thrown into relief by a background of flint. This simple pattern is often embellished by confining the flint inlay to eight triangular shapes which surround, in star fashion, the shield (fig.17). A variant of this form, which appears on the front elevation of Ufford porch,on the porch at Parham, and on the angle buttresses at Needham Market, has the two lateral and central triangles divided into a lozenge and two triangles of flint (fig.18). An example at Elmswell has twelve triangles, and many fantastic shapes of shield and background are frequently found.

The 'foliated shield' within a square panel is perhaps as common as the previous kind. The shield is surrounded with foliations of flint which may be simple or elaborate in character. The porches of Blythborough and Blythford and the towers of Earl Stonham and Framlingham afford instances of the use of this ornament. The cusps may take the place of the triangles of the previous type or may be arranged round the shield in a circle. Those at Dedham are graceful examples. Combinations of this and of the star pattern are found in the porch of Parham and the base of Lavenham tower (figs.94,103).

A fourth class of pattern that occurs in square panels is a simple flint quatrefoil. It was largely employed for plinths, strings and parapets. Its cusps are either round or somewhat pointed and the spandrels are sometimes pierced for flint inlay. The quatrefoil is used in the porches of Ufford, Kersey, Halesworth, Blythford, Gt Bromeley and Ardleigh; as a plinth at Sudbury S. Peter and S. Osyths Priory gate; in the towers at the Stonhams and Woodbridge, and in the clerestory at S. Clement,Ipswich (figs.96,104).

The Catherine wheel seems to form the basis of a kind of square panel which encloses a circular band of stone. The spandrels formed by this ring are occupied by a trefoiled ornament in many cases, while the inside of the circle contains a flint quatrefoil, a monogram, a wheel or an intricate tracery pattern (figs.19,20).

There remains a large number of other patterns occupying a square panel. To these no general name can be given, but the motifs which are common in their design are confined to the shield, the monogram, the 'twisted cord', the trefoil, quatrefoil, multifoil and a small foliated shape with one pointed and one circular cusp. In addition to these are found crosses, keys, swords, crowned lions, angles, gridirons, pots of lilies, sacred plate, and the 'wafer enrayed'.

Rectangular Panel

The most characteristic and common pattern of the flushwork series is the rectangular panel. It was adopted in the latter part of the Decorated period, to which style belong the buttress at Debenham and the Chapel at Houghton-le-Dale (figs.25,72). The proportions of the rectangular panel vary to an almost unlimited extent

though there seems to have been a preference for panels of between four and nine times as high as their width. The width of the flint panel varies, according to circumstances of design and scale, from eighteen to three inches. The width of the limestone styles or uprights between the flint panels does not vary considerably and is not often less than two and a half or more than five inches. The rectangular, though diversely treated, has not the profuse variety of the square panel.

The most elementary type of the former panel consists of a plain rectangle of flint, with styles, head and base of limestone. Its simplicity is not an indication of early date for it is employed in the sixteenth century. Examples of its use are found in the plinths at East Bergholt and Corton, in the clerestory at Walsham-le-Willows and in the buttresses at Wilby and East Bergholt (figs.26,7). In the last instance the head of the panel is inlaid with a rondel of flint. This however, is possibly a restoration.

The 'plain-arched' panel, without foliations, is not often used (fig.27), and examples of panel heads divided into two cusps, which are seen in the porches of Kersey, Hitcham, Lowestoft and Bildeston, are curious examples of a type that is mainly confined to the decoration of porches.

The trefoil headed panel is the commonest motif in all flushwork, and is capable in itself of much variation. The foil is, in some districts, as wide as the panel itself, and between this and the very narrow type of a cusp at Kessingland, every shape is found. The projecting piece of stone between the cusps of the trefoil head may terminate in a lobe of varying shape; either pointed, and resembling the 'Tudor flower', or rounded, (figs.28,29), or, what is more usual, it may terminate abruptly without a lobular projection.

The spandrels which remain on the slab in which the trefoiled head has been pierced usually remain plain; they are, however, frequently occupied by a small triangle of flint (figs.32,58). In other cases the stone spandrels are removed in lieu of being pierced, as in Ufford porch, or a very narrow band of stone remains as a base to the panel above, as in Parham porch (figs.46,103). In examples of a more delicate description, such as those in the clerestory at Woolpit, in addition to the removal or piercing of the larger spandrel, the smaller, between the cusps, is also pierced and inlaid. The larger spandrels of flint may be elaborated in several ways, and may have two, three or more foliations.

A familiar motif that is used in conjunction with the trefoil head is the 'crocketted head'. When each head is crocketted singly it may be surmounted by a horizontal bar of stone (fig.36) or an arched stone which is pointed, semi-circular or three-centred (figs.34,118).

The 'round cusped' trefoil head is not an uncommon flushwork pattern. It occurs in conjunction with the pointed cusp in panelling, and its shape varies from the depressed example at Bildeston to the commoner semicircular kind at Bramford and Bungay (figs.101,43). The motif is sometimes elaborated by piercing the spandrels or by further cusping, but it generally remains simple in treatment.

In work where wide panels are employed, and in the case of large surfaces, cinquefoil-headed panels are found. The central cusp may or may not be pointed, but the lateral cusps are invariably round.

The cusped head with seven foliations usually takes the form of a trefoil with a second order of foliations, such as the example from Worstead (fig.30).

A panel head is sometimes elongated into a stone upright which is furnished with projections, more or less similar to the familiar crockets of masonry and woodwork. The crocketted head, in con-

junction with the rectangular panel, is used in three ways. It may crown a single panel, unite and crown two or more panels, or terminate the style which divides the panels. A common description, especially in the south of East Anglia, is seen at S.Osyths where two cinquefoiled panels are combined under a crocketted ogee arch which alternates with a crocketted upright of stout proportion.

The most rudimentary form of the crocketted head occurs on the side of the porch at Ufford. It consists of a trefoiled head, the upper part of which is shaped after the manner of the Tudor flower. On the front of this porch a similar head is embellished with three crockets, while above this occurs panels with five crockets. In the more elaborate examples the panel head is greatly elongated and furnished with five, seven, or nine crockets.

The design of these crockets is usually adapted to the nature of the flints and is consequently bold and not finely detailed. A type of crocket which approximated more nearly to those which were common in other types of work, is used at Coddenham and Laxfield, where it represents the profile of the conventional vine leaf of the curved variety. Other crockets are adapted from the lozenge-shaped Tudor flower or square vine leaf, and are seen at Corton and Wetherden. (figs.26,31). A peculiar type used at Saxmundham and Kersey (fig.33) is elongated laterally into a flame-like form. In a series of panels on the side of the south porch at Chelmsford the upright styles of the panels are continued above the panel heads and crocketted, but the heads are without crockets.

The spaces left vacant between the crockets are occupied by shields of stone, crocketted uprights, pots of lilies and other devices, or remain vacant.

Similar to the crocket in character and function is the subdivision of the head of a rectangular panel into two small panels, a procedure which is well illustrated in the tower of Laxfield (fig.41). A combination of this and of the preceding method is used in the tower of Southwold.

Not infrequently the head of a panel combines with the base of the panel above it to form a more or less elaborate pattern of which the tower of Bungay and the buttresses at Stratford furnish examples (figs.42,43). In such cases the base of the uppermost panel takes the form of an inverted head and the space between this and the head of the panel beneath is inlaid with a foliated pattern.

Two or more panels are sometimes united under 'arches' after the manner of window tracery (figs.49,50).

The lower portion of the flushwork panel is in most cases a plain rectangle. Adopting the outline suggested by the small castellations which are so frequently found projecting from the transomes of fifteenth century windows, the designers of flushwork often left small projecting rectangles of stone at the bases of their panels. The lozenge, or Tudor flower shape, is used with effect in this position (fig.107). Occasionally the base of a panel has a plain 'arch', or more often is cusped as an inverted head.

When a series of rectangular panels occurs, it is not uncommon to find that alternate panel heads are placed immediately above the others or 'staggered'. Such an arrangement made jointing easy and interrupted the horizontal line where the latter was undesirable (figs.45,46).

Cross shaped Panels

Similar in character to the rectangular panel is the symbolical cross-shaped panel which is found at Long Melford, Needham

and Kersey. It is only occasionally met with. At Cockfield the porch buttresses have flintwork crosses, the largest of which have lozenge shaped chequers of limestone arranged in the flintwork (fig.44).

Various Panels

Interspersed among the flushwork panels there often occur isolated stone units of different kinds. Such is the shield - a favourite device which is usually plain. It was employed to fill small irregular spaces, as the spandrels of the clerestory windows at Melford, the heads of the buttress panels at Stratford and the spaces between the panel heads at Ardleigh and Melford (figs.35&45). It is used on the east wall of the late Lady Chapel of Long Melford extensively, where the design is of an entirely different character from the usual type.

Running Patterns

Used in conjunction with square and rectangular panels are horizontal bands of ornament which we may term 'running patterns'. These serve to unify flushwork compositions.

One of the commonest of these patterns is the quatrefoil repeat, with the two spandrels between each quatrefoil inlaid, or remaining plain. Of similar description is the alternating trefoiled pattern used in the tower of Woodbridge S. Mary. The flowing flushwork tracery of the porches of Blythburgh and Ufford and of the clerestory of Coddenham represents on a plane surface the patterns that were normally executed in relief, either in wood or stone (figs.46&44). Rows of chequered flint and limestone, square panels and various motifs such as initial letters, frequently go to form these running patterns.

Spandrel fillings

The employment of horizontal and vertical stonework leaves unoccupied the spandrels over doors and windows. These spaces are filled in various ways. Those over the clerestory at Earl Stonham have a kind of horizontal panel and a quatrefoil and those at S. Michael Coslaney Norwich and Coddenham are somewhat similar (figs.42&44). At Lavenham, Long Melford, and in several other instances, the windows have the appearance of being cut into a panelled wall after its construction, small fragments of crocketted heads appearing above the dripstone in a curious manner. Amongst other designs, a shield, plain or in a cusped frame, often occupies the spandrel.

Window-like patterns

In addition to the general use of flushwork designs resembling window tracery, definite representations of windows are sometimes made, such as occur alternately with windows in the tower of Mutford, in the eastern-most bay of the clerestory at Stratford and in the towers of Kersey and Woodbridge.

Akin to these imitations of pointed windows, designs which suggest the circular or 'wheel windows' of the earlier period are occasionally used. Examples occur at Butley Priory and the Erpingham Gate at Norwich - a 'faithful restoration' (fig.48).

There are two kinds of flushwork panels. The first, of which a a good example is Laxfield tower, is one in which panels of flint are formed in a background of ashlar. The second type of flushwork consists of patterns of limestone upon a flint background of which the east end of Long Melford, the Cathedral Gate and S. Michael Coslaney at Norwich (figs.48&49) are examples. It is not so common and very often not so satisfactory a treatment as the first, and frequently bears little relation to the general design. There is no distinct division between the two varieties of flushwork.

Sunk panels

In the flint and stone tracery which has been described, the framework and the filling of the panels has in all cases been approximately 'flush' or in one plane. Another type of decoration, which is designed in a similar way to flushwork, but is far less common, is the 'sunk panel'. Examples of this enrichment occur

on the buttresses at Lowestoft and Cromer, the porches at Southwold and Gt. Bromeley and the clerestory at Wymondham. The beauty of this panelling, in which the flint is recessed and the stone framework is moulded, is best seen in the delicately moulded and carved example at Lowestoft. At Cromer the ashlar is deeply undercut, while at Gt. Bromeley the mouldings are of a less pleasing character (figs.50,51).

Sunk flint panels are emphasised both by relief and by contrast of tone. We cannot but regret that they were not generally used for buttresses, porches and the like, if not for larger wall surfaces, since their decorative quality is remarkable. A considerable increase in labour and in the quantity of stone required, perhaps rendered this system a less popular one than flushwork.

Sunk panels in stone are frequently introduced into flushwork to afford a pleasant variation in its surface. Such are the quatrefoils that are often used in rows, as at Long Melford or arranged among flushwork panels, as at Gt. Bromeley (figs.52,53).

Brick panels

The last and least common variety of flint panel is one in which a frame of brickwork is filled with flint. Brick as the principal, or facing material, is rarely used in East Anglian churches. Examples of brick and flint panelling are found in the plinth of the porches at Gt. Bealings, where the work is 'flush', and at Gt. Ashford where the brickwork is moulded and raised above the surface of the flints. Flint panels are occasionally found containing bricks, which may generally be attributed to 'restorations'.

Chequer work

A different application of flint-and-stone work which, unlike flushwork panelling, is not confined to East Anglia, is known as the 'chequer pattern'. Alternating squares of flint and limestone, approximately five, six and seven inches square, are characteristic and are found upon almost all buildings in which flushwork is employed. In general, four more or less squared flints comprise the dark chequer and an independent limestone block, the light chequer. In certain examples, as in the east end of Cavendish, the pattern is elongated vertically, while at Lowestoft it is elongated in a lateral direction (figs.55,56). The square chequer is applied to large wall surfaces, strings, plinths, the sides of buttresses and miscellaneous positions.

The diamond or lozenge chequer pattern is less common than the preceding, and is applied in a similar way to the square chequer.

A triangular flint and limestone chequer pattern was used occasionally in the later period. The facade of the Guildhall at Norwich furnishes an example of this treatment.

Allied to the more regular patterns are what we may term 'pseudo-chequer' designs. Roughly squared ashlar blocks are built into the south wall of the tower at Bungay at fairly regular intervals, and the west side of the same tower is partly ornamented by circular pieces of stone similarly spaced. These are possibly small cylindrical portions of columns which were thus utilised in rebuilding. The west wall of Rattlesden porch is faced with flat-shaped rectangular pieces of limestone which alternate with roughly squared flints. These, and many other examples, which have freestone introduced with some degree of regularity, are contemporary with flush panels and are not the preliminary stages in the evolution of chequer work, which appears to have been suddenly adopted in the earlier half of the fifteenth century.

Lettering

In the embellishment of the church facades of East Anglia, lettering plays an important part. It is always interesting and

takes several forms. There are four principal uses of exterior lettering:- the initial letter (referred to under 'square panel'), the composite monogram, invocations of saints and legends relating to the foundation, building or dedication of the structure.

The initial letter is nearly always placed in a square panel. The letter itself is of stone, the background is of flint, and a narrow margin is drawn round the panel. Free letters occasionally occur in a band of ornament (fig. 57). The crown is sometimes placed, not only over a saint's initial letter, but also over each letter of a word or sentence. Such is the case in the remarkable example at Southwold where each letter of the inscription

"SAT EDMUND ORA P NOBIS"

is crowned and the margins of the panels are extremely narrow. Here the inscription is in an almost unique position - over the western tower window, following the shape of the arch (fig.58). The church of S.Mary, Bungay (fig.131) has a series of crowned Ms in square panels which also form voussoirs to the western window of the tower. Of similar design are the crowned initials at Blythburgh under the east window.

In rare instances the procedure is reversed and we find a letter of flint inlaid into a piece of limestone. Thus on either side of the north door at Bottesdale a series of capital letters in flint is worked on to a large slab of limestone.

The crowns which are used in conjunction with flint and stone lettering are diversely treated. Those at Coddenham and Blythburgh are shallow, those at Dedham deep and ornate while the crowns in fig.57 are carefully drawn in perspective.

The small script or 'text' of the period is also represented in flushwork. It appears in the plinth of Stratford S. Mary and the clerestory of Long Melford, where the letters are in stone on a flint background. In the former example a series of letters is framed into one panel which has lateral as well as horizontal stone margins. In the latter case the obstruction of the lateral margin is dispensed with. At Stratford some of the longer letters intrude upon the stone border where their outline is defined by an incised margin.

The design of flint and stone lettering is affected, less or more, by the nature of the flint. Subtleties of outlines are not easy to achieve with flint as a medium; thus we find that the majority of flint letters are boldly conceived and detail is suppressed. In other cases the material is pushed beyond its limit and designs of great intricacy are produced with the result that the inlaid flint has nearly always partly or wholly fallen away.

Our fifteenth century masons found, however, a substitute for flint lettering which allowed of intricate detailing and required a minimum of labour. The use of black mortar is confined to small letters and patterns and to the filling of small spaces in flint inlays where it was impossible or difficult to place flint. The inscriptions on the tower buttresses at Bradfield S. George (figs 59,60) are good instances of small 'black letters'. The curious letters, symbols and monograms at Stratford, also on the buttresses, are similar in execution and material. The process is reversed in the case of a monogram signifying M A R I A, in which the letters are in stone and the background is filled with black cement (fig.63). The refined detail of such work is suited to its material and contrasts with the coarse flint letters.

Quoins

The design of salient and re-entrant, or as we shall term them, internal and external quoins, external relieving arches and buttresses of the fifteenth century played a definite part in the

elaboration of church facades.

Until the introduction of flushwork, limestone quoins, internal and external, were irregular in height and bonding. Then, in order that they should align with flushwork panelling, and be in accordance with the character of the elevation, these were commonly, though not invariably, uniformly shaped and regularly disposed. The limestone quoin was superficial, never extended more than a few inches into the wall and was used for appearance only, in the case of the internal angle.

Of the types of external angle the irregular quoin, of random depth and bonding, persisted from Norman to Tudor times (figs.87,118).

In a more elaborate class of work the quoin stones are made regular in height and bonding and may take the form of a kind of 'long and short' work, as in Southwold tower, or the courses may be equal in height, as in Lavenham tower or of any intermediate proportion. In other instances, and more particularly those in which the quoin is between flush panels, the angle takes the form of a long strip of limestone with a straight joint on either side.

The use of limestone for internal quoins is by no means a necessity for many towers have these formed in flintwork. The irregular quoin-stone of varying width and height is sometimes terminated at the junction of the walls and at other times the angle is cut upon one stone which forms a course. Either of these arrangements may have an alternate and regular bonding with the flint wall or otherwise. The internal angles of Dennington tower are formed of quoins each of which projects equally on either side of the junction where there is a continuous vertical joint. Coursing is, however, frequently neglected where a joint exists at the angle. The angle formed at the junctions of tower walls and buttresses is commonly decorated with regular and rectangular pieces of stone which alternate on either side of the angle (fig.65).

Arches

In the fifteenth century arches over windows and doorways in flint walls were constructed of flint, brick and limestone. These appeared above the dripstone, and though resembling relieving arches, were often a mere external decoration. In numerous cases no such arches were constructed and the flintwork wall extended to the label.

In spite of its apparent unsuitability for the purpose, rough relieving arches were often built in flint. Shelley, Kersey, Pentlow, Cavendish, and S. John de Sepulchre, Norwich, - all have windows or doors over which rough flints, generally of the large variety, are laid approximately as voussoirs. An arch of accurately guaged flints is rarely employed, but an interesting example of its use is seen at Blundeston where a two ring arch is turned over the priests door to the chancel.

The use of stone voussoirs for 'relieving arches' was very general during the period. These voussoirs are usually rectangular, and only occasionally wedge-shaped. They alternate with squared or knapped flints in the formation of the arch. Many churches have a western door with a relieving arch above, in which case it is usual for the voussoirs of the latter to radiate from a centre lower than that of the arch mould (figs.66). The purpose of this mode of construction may have been to divert the thrust from the door jamb to a larger portion of the surrounding wall. Brick and flint arches are occasionally so constructed.

Arches built of alternating bricks and flints were also used over dripstones, following upon the revival of brick-making in East Anglia. The typical brick is long, narrow and almost vitrified, and varies from a purple to a dark red or yellowish colour. The brick and flint arches are one, one and a half, or two bricks deep, and the flints are of all descriptions. Miscellaneous arrangements and com-

binations are found. Thus at Ufford brick and stone voussoirs alternate with flints over a window in the chancel and at Chilton a window is surmounted by an arch of squared flints alternating with double tiles, and the whole is bordered by a ring of tiles following the shape of the arch. Brick arches were occasionally used without flints. Such is that over the west door at Elmswell where a four-ring arch of black and dark red bricks is built with very wide joints which are galletted with flint chips.

Buttresses

In some churches, where limestone was used with freedom, the buttresses were entirely faced with that material, as are those at Lavenham and Long Melford. It is this type of buttress that is, in several cases, ornamented with the square panel. Examples of these occur at Coddenham, Elmswell, Ixworth and Stratford S.Mary. The front of the stone-faced buttress may be a plane surface or sunk panels may be worked onto it in each stage. Niches for figures often occupy the upper stage when the buttress is designed in two, or the middle stage when the buttress is in three stages, while the remainder of the face of the buttress is panelled.(figs69,101). The sides of stone-faced buttresses are executed in plain flintwork, in plain ashlar, in flush panels or in chequer work, instances of which methods occur respectively at Stratford S. Mary, Long Melford, Ardleigh and Bildeston (figs.10,64,74,102)

The random spaces of flint filling that remained between the irregular quoins (whose courses did not align on either side the buttress) were made into rectangular patterns of flushwork in the majority of later works. In many cases, however, and particularly in the less ornate churches such as Sudbury, Clare and Stoke by Clare, the irregular method was not abandoned, but the flint spaces were either plastered to represent limestone or remained plain.

From the last arrangement was developed a simple alternating pattern by adopting quoins of regular courses and widths, bonded with the flints. When the longer quoins do not meet in the centre of the buttress a continuous keyed design is formed, as in the example from Corton tower. In other examples each alternate stone is of the whole width of the buttress and isolated rectangles of flint occur. Such buttresses are found at Stoke by Clare.

By interlocking the regular quoins rectangles of flint appear alternately on either side of the centre line of the buttress, as at Kessingland, or if the quoins interlock more intimately a somewhat different pattern is achieved, as that of Kersey. The use of these alternating patterns is chiefly confined to the tower buttress.

One of the commonest buttresses of the period has a course of two narrow vertical panels divided by a central stone, alternating with a course which has one central flint panel, the whole forming a simple chequered pattern. In one class of buttress the central stone is slightly wider than is the flint panel beneath but in most cases their widths are similar. The proportions of width to height of these panels, while some approach the square, and others are very tall and narrow, are most usually in the ratio of one to three,four or five. This motif is often the only ornament upon buttresses (fig.75) but it may be combined with cusped panels as at Bildeston or with niches as at Lowestoft.

The rectangular flush panel is applied with great frequency to buttresses. The narrow buttresses such as those of Blythburgh porch require one central series of panels only, while the wider type has a central strip of stone which divides the buttress laterally into two panels. The panels themselves, previously described, may be sunk or flush, plain, trefoiled, cinquefoiled or multifoiled,crocketted or otherwise embellished. In most cases the sides of the buttress are of plain flint and internal quoin stones are not em-

ployed, but in other instances, and particularly when they are in a prominent position, both their faces and sides are panelled in flint and limestone.

Local Schools

Considerations of space preclude the detailed description of the local 'schools' and types of flushwork design which occur all over East Anglia. Features, often no doubt by the same hand or hands, are peculiar to a confined district and bear the stamp of originality. Thus a very wide cusp is used at the head of the trefoiled panels in the south of Suffolk, and large crocketted heads are particularly prevalent. The clerestories at Cavendish, Long Melford and Gt. Bromeley are so similar as to infer a common designer. The towers of Bungay and Redenhall are very similar and both recall the example at Laxfield.

Having considered the motifs employed in the design of flushwork we proceed to examine its construction and materials.

Flushwork Construction

The flushwork and the knapped or squared flint facing of certain large builings, and the larger unbroken facades of some of the smaller buildings were, no doubt, in most cases applied to the rough flint wall after its erection. It is to the ruined churches that we must turn for such information. At Walberswick, for instance, (fig.82) a considerable portion of the knapped flint facing has fallen away from the main body of the wall leaving the face of the latter with an approximately even surface. The irregular cone shaped facing flints are bonded to the wall by a thick vertical joint of mortar which is usually of very good quality. We have it on record that at Norwich Castle a flint facing was erected in the fifteenth century to cover an existing wall - a fact that would indicate a practice. In several of the ruined churches of Norfolk the mortar in which the facing flints are bedded is of a different colour and composition from that of the wall itself. The expedient of this separate construction of facing and core was necessitated by the greater number and thickness of the joints of the latter. The wall had to 'settle' before the flushwork or flintwork could be applied.

From an examination of the ruined Churches we come to the conclusion that the builders took little pains to bond facing and wall and it is on account of the excellent quality of the mortar that much of the former remains in position. Limestone in flushwork is also essentially superficial, and extends no deeper than the flint with which it is used.

The core and the facings of the smaller buttresses, porches and parapets were almost certainly built together since their independent construction would be a difficult process.

Construction of styles and heads

The uprights or styles of flushwork were of long proportion and often one length of stone sufficed for a panel. The heads of rectangular panels,usually consisted of slabs, some of which were of considerable area. The space which was to be inlaid in these heads was often not pierced through the total thickness of the stone but was sunk into the slab to a depth of about two inches, one inch or even less - a fact that accounts for the dilapidated condition of much work. The merest chips of flints were most imperfectly secured in many square panel designs (fig.23).

It was usual to terminate the vertical style at the commencement of the curve of the panel head and to 'butt' the style above onto the slab into which the head was cut (fig.79). Two, three or more panel heads are often incised into one slab which forms a vertical joint with the next slab directly over the centre of a style. These heads either 'house' into quoin stones, square panels and window or door dressings to a distance varying between

half an inch and two and a half inches, or, in smaller work, extend to the full width of the adjacent vertical member. The panel head stone of a buttress nearly always forms the quoin on either side the buttress, whether the latter includes a single or a double row of panels. A substitute for a vertical joint over the style in the case of panel heads is found in making the joint in the centre of the panel. This form of joint, though it does not involve a 'feather edge', is objectionable on the score of its frequent inaccuracy. Still less satisfactory is the vertical joint which occurs at the springing of the curved head. It is found at Corton and S. Osyth (fig.28) and is happily rare. The common practice of placing panel heads at alternating levels gave an excellent junction and avoided the need for a central joint over an upright style.

The cutting away of portions of stone panel heads for the flint inlays results in a certain amount of waste of this precious material. In the less elaborate and inferior work comparatively small stones were often used for the panel heads, which were constructed somewhat after the manner of window tracery. By such means a small saving of stone was effected and smaller pieces of stone, which were more convenient for transport, were utilised (fig.83). In the porch at Dennington, where economy was abnormally rigid, we find the spaces between the panel heads, ordinarily of stone, filled with odd rubble and plastered (fig.84).

It was necessary to design the larger crocketted heads in two or more horizontal courses (fig.85). In cases where these heads are divided by a crocketted style the vertical joint may occur in the centre of the latter (fig.38) or in various parts of the tracery (fig.83). At S. Michael Coslaney, Norwich, no particular rules were observed by the mason and the jointing is haphazard.

A curious practice that was occasionally adopted to economise in the labour of the flint-knapper, consisted of merely recessing in the stone parts of the pattern that were generally inlaid with flints. The spaces between the crocketts of the panel heads on Ardleigh porch are thus recessed in the stone to a depth of about an eighth of an inch. The panel heads at the base of Capel tower and those of the buttresses of Kessingland tower are similarly treated. It is possible that these areas of stone were stained to resemble flints.

Black mortar, before referred to, was employed to fill very small and intricate areas of flushwork devices which were too small to accommodate flints. It was used as an auxiliary to flint, as fig. well illustrates. In other examples, such as some of the panel heads at Stratford, its employment for the filling of a large area which could readily have contained flints, was scarcely justified.

Flint in Flushwork

The labour placed upon the flints that were used in flushwork is extremely variable. Whole flints were not used, but irregular broken flints of the roughest possible quality are sometimes found, as those at Capel (fig.86). Such work often indicates a 'restoration'. Carefully knapped flints, with their white coating removed, but not gauged or squared, when their joints are thoroughly galletted, present an even homogenous surface which contributes largely to the appearance of such towers as Southwold and Lavenham (figs.58,25). The most characteristic filling for flush panels, however, is the squared flint. This may be backchipped to an even surface or its plane of cleavage may be smooth and regular. The mortar of the joint is, in the most careful work, invisible on the face of the wall, but it thickens rapidly with its depth since the squared and split flint are approximately conical. There is no distinct line of division between gauged and knapped flintwork for in the removal

of its white layer a flint may be approximately squared, and the gauging of a flint may be most inaccurately performed. With the single exception of whole flints, every description of flint and of workmanship is found in flushwork.

The greatest care was, in the majority of cases, bestowed upon those features which were likely to receive particular notice. Thus, in many towers, the quality of the flintwork decreases from the ground to the parapet. The workmanship of clerestories is often inferior to that of plinths, and porches. No general rule can, however, be postulated, since numerous examples attest the conscientiousness of the builders in this regard.

The colour of the flints is very variable. Rather than that the gauged or knapped flints of all shades should be mixed, flints of a similar colour were sometimes selected and used for certain panels and positions. This 'zoning' of flints in flushwork, of which many examples occur, approaches more nearly to polychromatic masonry than any traditional mode of building in England. White flints are used in a broad band across the tower at Laxfield and black flints have been chosen for the buttresses of the east end at Lowestoft but not for those of the south aisle. The spandrels of the west door at Wickham Market and the plinth below are in black flints and the remainder of the west front is of a grey tone. The porch at North Walsham is faced with flints that are carefully arranged in zones of various colours.

As a general rule, however, the flints of flushwork are of mingled black, white and grey, so that the latter colour represents the general tone. Owing to a tendency of some kinds of flint to fade it is not always easy to decide whether the white flints that we find so often among the darker ones have always been of that shade. In some cases this bleaching process has produced an effect which is the reverse of that generally associated with flushwork - the weather-stained limestone is thrown into relief by a lighter background of flint. In other cases, wherethe flints are white without exception in a particular portion of the work only, it is possible that they have not faded and that a distinct contrast between frame and filling was not desired.

Application of Flushwork

The parts of a church to which flushwork was ordinarily applied are the plinth, buttresses, porch, tower and clerestory.

Plinths

The plinth of the later fifteenth century church generally projects a few inches from the wall above and is protected by an overhanging limestone moulding. The base of the plinth itself projects from its face and is weathered by a splayed course of limestone. It is between the upper and lower string courses of the plinth that a large number of designs in flushwork and stone is found. It is not uncommon to find a 'double' or even a 'triple' plinth, formed by the addition of strings and offsets from the wall. Of these Needham and Kersey respectively may be cited as examples (figs.8990).

The projecting plinth came into fashion with the Perpendicular period. At first it was devoid of all ornament and consisted of a projecting base of flint walling under a weathered string.

The introduction of upright pieces of freestone at regular intervals along the plinth divided it into panels of various proportions. This type, which is fairly frequent, appears at Corton, East Bergholt, Wickham Market, Creeting and Halesworth (figs.8891).

Perhaps the commonest type of plinth is divided into small rectangular panels of various kinds, by far the most usual of which is the trefoil headed panel (figs.80,92). This familiar motif may repeat itself without interruption along the plinth, or, as at Wetherden and Framlingham, a series of rectangular panels may alternate with square panels. In other instances a row of rectangular panels occurs above one of square panels (figs.93,150), chequers, or a horizontal band of limestone or flint.

The square chequer pattern is in many cases applied to the plinth, where the former is, as at Lowestoft, Kersey, Pettestree, Cavendish and Covehythe, three courses in height. The diagonal chequer is also, though less frequently, employed (figs.66,93).

The square panel is a typical motif used in the decoration of the plinth, and more especially that of the west tower. In some these panels are carved in limestone and used in conjunction with flint panels, either square or rectangular. Good examples of plinths with square panels are found at Kenninghall and Elmswell. The quatrefoils of the plinths of Sudbury S. Peter, S. Osyths Priory and Blythford are akin to the preceding.

Composite plinths of an elaborate nature are occasionally found. Such is that at Kersey of which the stages are respectively: a ground course of rectangular panels, a course of quatrefoils and a course of diagonal chequer work, the divisions between each stage being marked by weathered mouldings.

A band of limestone under a course of sunk square panels which alternate with sunk rectangular panels without the introduction of flint, forms a base which was used especially in the case of large towers. It is found at Lavenham, East Bergholt, Laxfield and Long Melford (figs.94,95). The plinth of plain limestone serves tounify the various parts of composition.

The extent of the plinth of the ordinary small parish church of the fifteenth century is limited to porch, tower and buttresses. In more ornate work it is, in addition, continued round the entire building as a plain projecting band or as a fully elaborated plinth.

The height of the plinth bears little or no relation to that of the building of which it is the base. The porch of Kersey (fig.96) furnishes an example of a deep plinth to a small structure while that of East Bergholt illustrates the converse of such an arrangement (fig.97).

Porches

The porch, of all other features of the parish church, is the one upon which most care and expense was lavished. It was a small and a practically independent building in itself and hence could be added to an existing church of earlier date, if it were necessary or advisable, without interfering with the main structure. A number of the porches of the smaller churches have been so added between 1450 to 1510. Its prominence, and the fact that it would be closely observed by the entering worshipper, induced the builders to make it the most elaborate, and sometimes the only elaborate, external feature. Stone, we most conclude, was regarded as superior in appearance to flint, from the fact that when the builders could obtain limestone in any quantity it was used for the entire facing of the front elevation of the porch, and sometimes for the sides, though in such a case, flushwork, or even plain flintwork was usually relegated to this position (figs.98,99). Where any decoration at all is applied the face of the porch is always as ornate, or more ornate, than its sides.

Porches are almost always on the south side, occasionally on

the north, and, in larger churches, sometimes on either side of the nave.

The design of flush panelled porches is capable of much latitude of treatment, though in most cases the builders recognised certain broad principles.

Porches
General Design

The following is a description of the arrangement of the features of the typical porch. The central door has a drop arch, often beautifully moulded, with its inner orders supported upon an octagonal capital which crowns a cylindrical attached column. The dripstone usually mitres at its springing and apex with the projecting moulding which encloses the carved spandrels of the entrance.

Above the door a canopied niche is almost always present but its place may be taken, if the porch is of two stories, by the parvise window. Three niches, and in rare instances, five, are occasionally found over the door, as at Woolpit.

The angle buttresses are in all but a few examples, diagonally placed, though not necessarily exactly on a line bisecting the re-entrant angle (fig.100). Two pairs of buttresses at right angles to the walls of the porch are occasionally used. These were either, as at Lowestoft, placed so as to be continuations of the walls, or they were situated at a short distance from the angle, as at Bildeston, leaving a projecting quoin between them (figs.101,102). The upper, if the buttress is of two, or the middle if it is of three, stages, has, as often as not, a canopied niche for a statue. Porches without buttresses and with octagonal buttresses are exceptional.

The parapet of the porch is, perhaps, more usually pitched than horizontal. At Creeting the slope is steep, and at Lowestoft shallow, and all intermediate varieties are found. A weathered mould, corbie steps, open-work tracery, and castellations are among the most frequent crestings of porches. The whole was crowed by a gable cross in the centre and a carved figure on either side, over the angle buttresses.

Porches:
Flushwork

The plinth, of variable design and height, and of one, two or three stages, was an indispensable feature. Its ornaments of flint have been described. According to the class of work it either returns round the sides of the porch or terminates with the basis of the angle buttresses. In the great majority of instances the next well-marked horizontal division is a weathered string course at the level of the apex of the entrance arch, which extends to the angle buttresses, but rarely continues round them. Between the plinth and this string there occur, on each side of the arch, a series of one, two, three, or four rectangular flush panels. These are divided vertically into two heights by a series of suppressed panel heads (fig.103), a more emphasised band of panel heads, a secondary projecting string or a band of flush or sunken ornament (figs.104,105). Less often three vertical divisions are found in this situation, as at Lowestoft and Southwold. Occasionally a string at the springing of the arch takes the place of that at its apex.

In the typical porch the space on either side the central niche is divided into a series of rectangular panels which accommodate themselves to the rake of the gable, if such exists. In rare instances the upper series of rectangular panels is omitted; it is replaced at Mendlesham by six square panels, each of which contains a letter or a monogram. In the ill-considered design at Ixworth the upper range of rectangular panels does not accommodate itself to the raking parapet, but leaves a vacant tri-

angular space of flint. Such work is exceptional. Like the lower series of panels, the upper may be divided vertically into two or three sections or remain without division.

Above the upper range of flint panels we have a projecting string course which forms the base of the parapet. For this last is occasionally substituted a plain weathered coping (fig.108). A raking or horizontal band of ornament surmounted by a weathered coping stone is a familiar parapet which, like the other bands of limestone unite the component parts of the composition. The embattled, which is the commonest parapet, is similar in design to those of clerestories and towers, which are described later. Corbie-step gables however, are peculiar to porches and each step is usually occupied by two rectangular panels (fig.107).

Throughout East Anglia there are numerous porches constructed largely or entirely of limestone. Boxford, Woolpit, Beccles, Wilby, Long Melford and Lavenham (figs.99,109) may be cited as examples. A number of stone faced porches have their sides faced with flints which in some cases were thickly plastered to represent masonry, as at Woolpit, while in others the flints were knapped, and remained unplastered. The east and west sides of Southwold porch and the east side of Woolpit porch are entirely decorated with square chequer work, while the east side of Chelmsford porch is partly covered with lozenge chequer motif. The side walls of the porch are not generally flush panelled, though the plinth and parapet frequently follow the treatment of the facade.

A number of porches that were built after 1450 possessed little or no flushwork, and, in some cases, no ornament of any kind. They are constructed, as in the case of East Bergholt, of plastered flint rubble, of knapped flints as at Bramford, or of squared flints, as in the example at Blythburgh (figs.110,103).

Towers

The tower is the glory of the perpendicular parish church. Its function is more symbolical than practical. Without a tower the church lacks a focal point, an emblem of hopes and aspirations, and remains of the earth.

The building of spires was impracticable with flint as the chief material, so that, with the exception of a few of lead and limestone East Anglian churches are without spires, though many turrets have stone spirelets or pointed domical terminations.

It was only in a few instances that sufficient wealth was at the disposal of the builders to justify a tower of stone, or even one that was completely faced with flushwork. In the majority of cases flushwork was relegated to certain parts of the tower. These are the plinth, the buttresses and the parapet. By confining the ornament to these extremes, lateral and vertical 'punctuation' or definition was achieved.

The angle buttresses of the western tower of the fifteenth century are most usually set diagonally, but in some cases the older practice of placing them at right angles to the walls is still observed, as at Lavenham. It was common, where an additional pair of the latter buttresses would have obstructed the plan, to omit those on the east wall, which was extended on either side as a pair of buttresses. Octagonal buttresses, used in conjunction with a vice, were used to a considerable extent later in the period, while at Stoke by Nayland they are combined with the diagonal buttress with good effect (fig.116). The faces of the buttresses are treated in a multitude of ways and internal limestone quoins, though common, are in a great number of cases dispensed with.

The tower staircase, if it is employed, is either accommodated

within an angle buttress or is boldly emphasised as an external feature. In the latter case it was customary to place the stairs in an octagonal turret on the east side of the south wall of the tower (figs.117 118).

In the fifteenth century a doorway was usually built in the west wall of the tower - a feature that was absent in most ofthe earlier churches.

The typical plinth is of considerable height and in some cases extends to the springing of the arch of the lower door, where the upper dripstone may return downwards on either side or may be 'mitred and stopped' (figs.58 119).

Above the western door, there extends, except in the plainer examples, a string course or a band of ornament in carved stone or flushwork. This band or string is collateral with, or is placed immediately above, the square frame of the door (figs.58 119), or where the door spandrels are not framed it occurs at varying heights above the crown of the arch. In the latter case a 'relieving arch' of stone or brick and flints above the doorway is frequent.

Over the western door, and in the second stage of the tower, was placed the west window which is usually combined with niches. These latter are placed on either side of the window, above it, on either side of the doorway or between door and window.

The fifteenth century tower is divided by string courses into three, four and occasionally five stages, the uppermost of which has four louvred belfry windows. Between these and the window immediately over the west door, there are often one or more smaller windows which light the intermediate storey of the tower.

The parapet is, in most cases, embattled, with regular alternating merlons and crenelles, but in other instances the merlon is stepped as at Little Stonham, Earl Stonham and Elmswell. Certain towers of the period are not castellated but terminate in a plain horizontal coping.

We proceed to examine the application of flushwork to the typical East Anglian tower.

The tower plinth is similar to that of the porch in the design of its flushwork ornament, and does not require a separate description.

It was not customary, except in the larger towers, to fill the spaces on either side the tower door with flushwork. Rectangular panels, extending from the plinth to the first string course, are employed in this position in such towers as Laxfield and Southwold.

Between the plinth and the parapet of the fifteenth century tower it is exceptional to find any flushwork ornament except upon the buttresses. This frequently consists of a series of rectangular panels applied to the face of the buttress, but all types of buttress patterns are employed. The octagonal buttress is sometimes panelled as at Redenhall, and sometimes remains plain, with regular or irregular quoins.

The short depth of wall between the coping stones and the string course immediately beneath is almost invariably panelled if any ornament is applied to the tower. The design and arrangement of these panels depend to some extent upon the form of the parapet wall. Where the ordinary alternating merlon and crenelle occur, it is common to find the space under the crenelle occupied by a square flush panel and that under the merlon by one or more rectangular panels. Another common arrangement consisted of a row of rectangular panels which accommodated their heights to the contour of the parapet. The dispostion of the panels under the notched

merlon (figs.117,118) is similar to the preceding. In many cases square panels occur where the distance between the parapet and the string beneath is least, and rectangular panels, divided into suitable proportions, occupy the remainder.

Beneath the uppermost row of panels there is often an additional series, usually divided from the former by a projecting string. These patterns are generally of the square or running type, as those at Woodbridge and Framlingham, but the ordinary rectangular panel is seen at Ipswich and Laxfield.

In towers such as Southwold (where there is no crenellated parapet), there is little doubt that the structure was not completed. Here we find a running pattern of quatrefoils, and at Lavenham a similar pattern occupies the same position.

The designs upon tower parapets, though more often executed in flint and stone, are sometimes carved in limestone, thus connecting the limestone of the buttresses in a satisfactory manner and terminating the whole. Whether in stone or flushwork the variety of patterns is remarkable.

There is a number of large towers in East Anglia, which are more or less completely covered with flush panelling. In such examples the intervals between the string courses are divided laterally and horizontally into an appropriate number of rectangular panels, treated in the usual manner. Between these towers, of which Redenhall and Laxfield are instances, and the plainer typical examples, there is an intermediate group of towers which possess a variable area of flushwork between plinth and parapet. Such are Southwold and Bungay, which are ornate to the height of the string above the west window, and Kersey, where a series of panels extends on either side of this feature.

It was during the later 'perpendicular' period that a number of flint and stone belfries was added to the Norman and Saxon round towers. A round belfry was not in accord with the taste of the times, and so, when it was necessary, an octagonal superstructure was fitted upon the circular base. Four louvred openings are usual, and the remaining four sides are sometimes each furnished with the pattern of a window in flushwork.

Clerestories

The clerestorey, or the upper range of windows above the nave arcade and overlooking the aisle roof, is one of the most beautiful and typical features of the later East Anglian parish church. These windows, which have for the most part depressed arches of two, three or four centres, are spaced at varying distances apart, from those examples where a very narrow jamb remains between the openings (fig.135) to those where the intervening wall spaces are wider than the window. Semi-circular and flat heads were occasionally employed for clerstorey windows, and in some instances they are grouped in pairs and accommodated in one bay of the nave.

The spaces between the clerestorey windows are often panelled in flints, or are of flint rubble, plastered or plain. Rarely limestone was afforded for this position as at East Bergholt, and still more rarely, small buttresses, or rather pilasters, were introduced as at Southwold (figs.135). It was the usual practice to divide the external wall of the clerestorey into an upper and a lower division by the horizontal continuation of the label mould of the window, though in such instances as Long Melford, Cavendish and Gt. Bromeley this division is absent.

Where flushwork occurs in the clerestorey the spaces above and below this string are both panelled, with certain exceptions. Where the aisle is of no great projection and the clerestorey is of sufficient height the upper part of the flushwork is visible

at a short distance from the aisle wall. Strange to say, there are some instances where the lower division only is so decorated. Such are the clerestoreys of Woodbridge and Framlingham. It is difficult to conjecture the motive of the builders in elaborately decorating a part of the building which can only be seen from a distance which renders any notion of its intricate detail impossible.

The string course above the heads of the range of windows may form the base of the castellated pattern or the openwork tracery of the parapet, or a simple weathered coping may terminate the clerestorey.

In the ordinary clerestorey the area of wall between the window jambs is divided into a number of rectangular panels, which number is determined by the width of the wall surface and the character of the flushwork. These panels terminate in arched heads which are placed under the dripstone, or a square panel of characteristic design may intervene. At Gt.Bromeley, Long Melford and Cavendish the number of panels between each window is one, two and four respectively. In each case they are crowned with crocketted heads which extend higher than the crowns of the adjacent window arches. In some examples the limestone window dressings are so narrow as to produce an effect of weakness, while such compositions as the clerestories of Framlingham and Coddenham have substantial jambs which give an appearance of stability. The spandrels above the window arches contain flushwork tracery or shields, letters and fragments of crocketted heads. The number and arrangement of the panels above the windows is most often similar to those of series beneath.

At Bacton and Walsham-le-Willows the only motif that appears between the clerestorey windows is the square panel. In the latter instance it occurs both above and below the dripstone.

The clerestorey wall is usually surmounted by a castellated parapet embellished in the local manner.

Flushwork wall surfaces

In the ordinary parish church the designs in flint and limestone were confined to those parts of the building which have been specially described. Some of the larger churches, however, have extensive areas of wall panelled in flushwork. At Long Melford, which is one of the best known and finest of all East Anglian churches, the whole of the South side, with the exception of the modern tower, is in limestone and flint work. The wall surfaces of the Lady Chapel afford an interesting example of the treatment of late work, with crocketted heads, shields, bands and squares of limestone applied freely and somewhat indiscriminately to the entire exterior. At Lavenham, the south side is faced with limestone and the north side with a flushwork which resembles that of the south side of Long Melford. The gateways to the Abbey of S. John at Colchester, and the Priory of S. Osyth are magnificent examples of the application of flushwork to large areas, though the former has suffered severely from restoration (figs 150-153). The walls of each are divided into rectangular panels, crowned in the lower portion with trefoiled heads and in the upper with the typical large crocketted head. The South and east sides of S. Michael Coslaney, Norwich, are panelled in manner which is in several respects different from the foregoing examples.

The 'square chequer' and the 'diagonal chequer' patterns were largely employed for covering wall surfaces, especially in the secular work of the 16th century. The upper part of

the South front of Norwich Guildhall and front of Lynn Guildhall are examples of the diagonal and square chequers respectively. The Abbot's Tower (middle 16th century) and the Chapel of the Priory at S. Osyth are faced with alternating squares of flint and septaria. The north aisle wall at Mildenhall is faced with a similar pattern.

The east end of the parish church did not as a rule receive any other elaboration than what was applied to buttresses, plinth and parapet. Occasionally, a series of panels occupies the space under the window as at Mutford and the jamb between window and buttress as at Blythburgh.

Disposition of Flushwork

In the disposition of flushwork the builders appear to have almost invariably considered the approach to the church. The porch was usually on the south side and as a consequence it received as much detail as the builders were at liberty to afford. The neglected north wall, if sometimes interesting, is almost always a second best. Where the north porch does occur the wall on which it is placed is embellished and the south wall remains comparatively bare. Such is the case at Stratford S. Mary. It is not always possible to ascertain the position of the old path from the porch to the village, but from what evidence we have it seems that if it lay on the East of the porch the east wall was rendered interesting, and if on the west, attention was bestowed upon the decoration of the tower (given a sufficiently wealthy parish or patron).

Flushwork and Aesthetics

The use of flushwork has been regarded by certain of those that look for 'truth' in architecture as a counterfeit. An attempt is made (they say) to deceive us into thinking that limestone plays a part in the construction of the walls, or at least that it serves to bond the flint facing to the body of the wall. Flushwork (they say) is not 'structural', it is constructed ornament and never ornamental construction.

It will scarcely be maintained in our times that it is not a legitimate process to apply a facing material to a wall. The practice of constructing walls of similar material throughout is doubtless conducive to the best and purest type of architecture, but it is a practice that has in most cases to give way to considerations of cost and convenience. We are bound to assess architecture, to a great extent, in the light of precedent and with a taste that has been trained by the study of the history of building. Thus we find that the Greeks coated the coarse travertine limestone of their Sicilian temples with stucco to resemble marble and the Romans faced their concrete walls with marbles, brick, tufa and travertine. The Early Christians, in east and west, encrusted their domes, vaults and walls, internally with mosaics and externally with bands of coloured stone and brick; and so, from early times until the present day we have faced walls with materials more costly than those used in their construction, in the interests of economy and of appearance.

We are scarcely deceived into imagining however that the body of the wall is of necessity composed of the material with which it is faced. What is required of the latter is that it shall not be treated to counterfeit another material, that it shall have regard to the structure and design of the walls to which it is applied and that it shall be preferable, either in appearance or weathering properties, to the core of the wall.

Flushwork always complies with the first of these three requirements but sometimes transgresses in regard of the second. In such a case it becomes rather an end in itself than subordin-

ate to the ensemble. At S. Michael Coslaney, Norwich, Long Melford and in several similar works some of the windows have the appearance of having intruded upon a previous flushwork composition, to which they are either very uncomfortably adjusted or bear practically no relation. The difficulty of designing appropriate flushwork is always greatest where a large surface has to be treated and compositions where the ornament is confined to the smaller areas of buttress, plinth and parapet are generally the most successful.

It is a matter of individual taste as to whether the plain flint wall does not give a more pleasing elevation than the flint and limestone. It would seem entirely a question of the application of the latter and the degree of restraint and skill with which it is used. It can be most valuable to a composition when it is employed as a lateral and vertical 'punctuation'. Such examples as the east ends of Lowestoft and Blythborough and the buttresses of Stratford S. Mary (figs.56,10) may be cited as examples which are in the author's opinion, wholly admirable.

Walling Materials

A large number of East Anglian Churches of the fifteenth century, including some which belong to the latter half, are entirely devoid of external ornament. No attempt was made in most of these cases to face their walls with knapped flints or even to arrange the stones in level rows. By the omission of horizontal courses the building loses much in breadth of effect and this, added to the sombre colour of the flintwork, produces a most melancholy elevation. The churches of Clare, Sudbury, Stoke-by-Clare, Boxford and Hadleigh - all large perpendicular buildings - suffer from the quality of their walling, and their appearance is in no way improved by the introduction, in some cases, of dark red bricks into the facing. Doubtless these churches were formerly plastered or intended for that treatment. A very different effect is achieved at Stoke-by-Nayland where the tower is faced with whitish round flints alternating with courses of light red and orange bricks. Here the tone of the walling and the regular courses give a most attractive appearance to the tower, which, however, was originally plastered.

In addition to bricks and tiles, small pieces of limestone, irregular, hewn and of all shapes were built into the facings of many towers, and less often into the remaining walls of the churches. This material, like the sandstone that was used near the coast, was apparently employed more for the sake of its appearance than to obtain a bond with the wall. Many rubble churches of the period retain their plaster (figs.161162) which served as a substitute for ashlar.

Knapped flints and squared flints are characteristic walling materials of the fifteenth century. Often in walls thus faced layers of various depths, texture, colour and workmanship, are perceivable. The east end of Lowestoft (fig.56) illustrates this usage. The layers probably mark the intervals in the progress of the work when the wall in that part was allowed to settle. Upon resuming work flints were arriving from another district and different in quality from the preceding loads.

A similar practice to the last, though differing in that it was intentional, was that of facing portions of a wall with flints of a selected colour. Not only were zones of coloured flints used in flushwork but also in ordinary wall surfaces. A typical instance is seen in the upper part of the tower of Newton Green, where there is a simple scheme of decoration in

black flints cut approximately square, while the remainder of the tower is in mixed rubble. At the ridge level of the nave a broad band extends round the tower, above which there are a series of squares and two narrower bands of black flints under the parapet.

It was customary for the quality of the knapped and gauged flints to decrease as their distance from the eye increased. Especially is this the case in towers, such as that at Dedham, where the ground stage is faced with good black gauged flints, the second with approximately squared material, while the third and fourth are of knapped flints. The wall of the south side of Covehythe is a curious specimen, where the material grades from knapped flints above the plinth to gauged flints beneath the parapet.

The use of bricks in the facing of dressed flint walls is not so general as in that of rubble walls. At Lowestoft and Covehythe the long vitrified bricks of a yellowish colour are used in the upper parts of the walls, in the former case probably to re-inforce the internal quoins, Here their colour is not detrimental to the appearance of the building. Rows of double tiles laid in regular courses are used at Corton and Ixworth and rows of single tiles in the parapets of S.Peter's Sudbury and the tower of Gosbeck. The porch of the Guildhall at Bury S. Edmunds is banded with single courses of brick and the nave walls of Wittlewood are of alternate courses of brick and flint.

From early times put-log holes were constructed in the flint walls of churches. Each hole, of which the average dimensions were about six to nine inches square, generally had its sides formed in flints and was spanned by a piece of limestone or a large flint, and was subsequently filled in loosely with rubble and mortar. The builders anticipated that serious results would follow from the indiscriminate cutting of holes in the facing for the put-logs of the masons scaffold when repairs became necessary. The north aisle of Kersey has an elaborate system of put-log holes, three of which are placed at distances of about three feet six inches apart in a vertical line, on either side of each window. The towers of both Kersey and Pettestree (figs.132,66) are provided with put-log holes.

The use of Limestone

The construction of the window and door dressings of the period does not differ from that of fourteenth century. In the more ornate churches quoins are regularly toothed into the walls, while in others the bond is less pronounced or totally lacking (figs.125,71).

Embattled parapets are constructed in more important work by returning the weathered coping down the sides of the merlon and by filling the enclosed space with flint or ashlar. A simpler method consists of terminating the copings of the merlons and crenelles without mitres and returns and placing a flat piece of limestone on either side of the merlon. In poorer work these slabs are dispensed with and short lengths of quoin have to be formed in flints (figs.142,66).

Where aisles were present, as they were in many perpendicular churches, the piers of the nave arcade were constructed of limestone. For the sake of economy the soffits of the nave arches at Covehythe are of bricks and flints and were plastered to resemble the stone mouldings on either side. Above these are relieving arches in brick and flint.

The limestone used during the perpendicular period was principally from Caen but Barnack was occasionally used in the north

of Norfolk, in such churches as Terrington S. Clement and Swaffham. A few churches constructed chiefly of freestone occur, at Hilgay, Methwold, Lavenham, S. Margarets Lynn, and S. Andrews Hall Norwich, but its use as the principal facing material is mainly confined to the porch or tower. A number of porches are wholly faced with stone, while others have their principal elevation in stone and their sides in flint. Stone towers such as those of Beccles and Cawston are uncommon.

Brickwork and Flintwork

The use of brickwork for constructional purposes became a common practice towards the close of the fifteenth and the beginning of the sixteenth centuries as an examination of the ruined churches of this period reveals. Occasionally regular brickwork forms a backing to the flintwork as in the late towers of Dedham and East Bergholt. At Walberswick brick was used to re-inforce the flint construction. This interesting ruin was faced externally with knapped flintwork which has become detached from the core of the wall in some places (figs.172/173). The walls in general are of small shore flints laid randomwise in an abundance of mortar. There is a tendency to lay the flints on the inside faces of the walls in herring-bone fashion and in approximately level courses. Distributed at irregular intevals in the internal facing appear bricks (10" x $1\frac{3}{4}$" x $4\frac{1}{2}$" average) laid as headers. The internal angles, the piers between the clereostorey windows and some areas of walling are faced almost entirely with bricks and the internal arches of the aisle and clerestorey windows and doors as well as the relieving arches over the nave arcade are all constructed of brick voussoirs. In the complete building no brickwork appeared externally or internally, but was plastered.

Towards the middle of the sixteenth century, with the decline in the woollen industry and the Renaissance, Gothic Architecture in East Anglia comes to a close. From thence onward building energy was transferred to domestic work. The latter owes much of its character to the ecclesiastical flintwork which preceded it but new methods of building and many new combinations of material render domestic flintwork a subject which requires separate treatment at length.

1 PENTLOW: DETAIL

2 BURGH CASTLE: DETAIL

3 FRITTON ROUND TOWER

4 PENTLOW ROUND TOWER

5 BLUNDESTON ROUND TOWER

6 RUSHMERE ROUND TOWER

7 KNAPPED FLINT WALLING

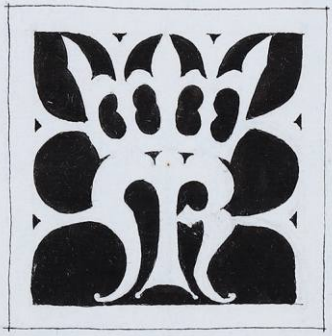
8 BRIDEWELL NORWICH : WALLING

9 BRIDEWELL NORWICH

10 STRATFORD ST. MARY : BUTTRESS

11 ELMSWELL : TOWER PLINTH.

12 DEDHAM : TOWER PLINTH

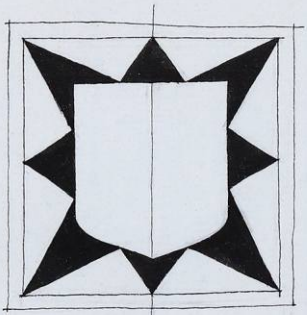


13 DEDHAM TOWER

14 SOUTHWOLD : PORCH.

15 WOOLPIT CLERESTORY

16 ELMSWELL TOWER

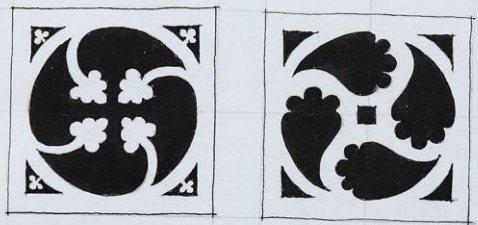


17. UFFORD PORCH

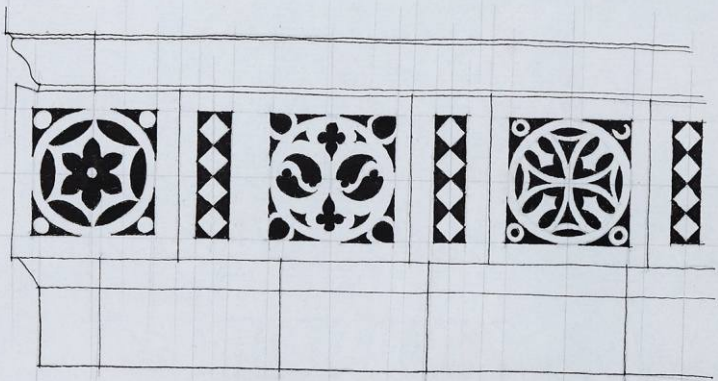
18 NEEDHAM MARKET

19 ELMSWELL TOWER

20 UFFORD PORCH



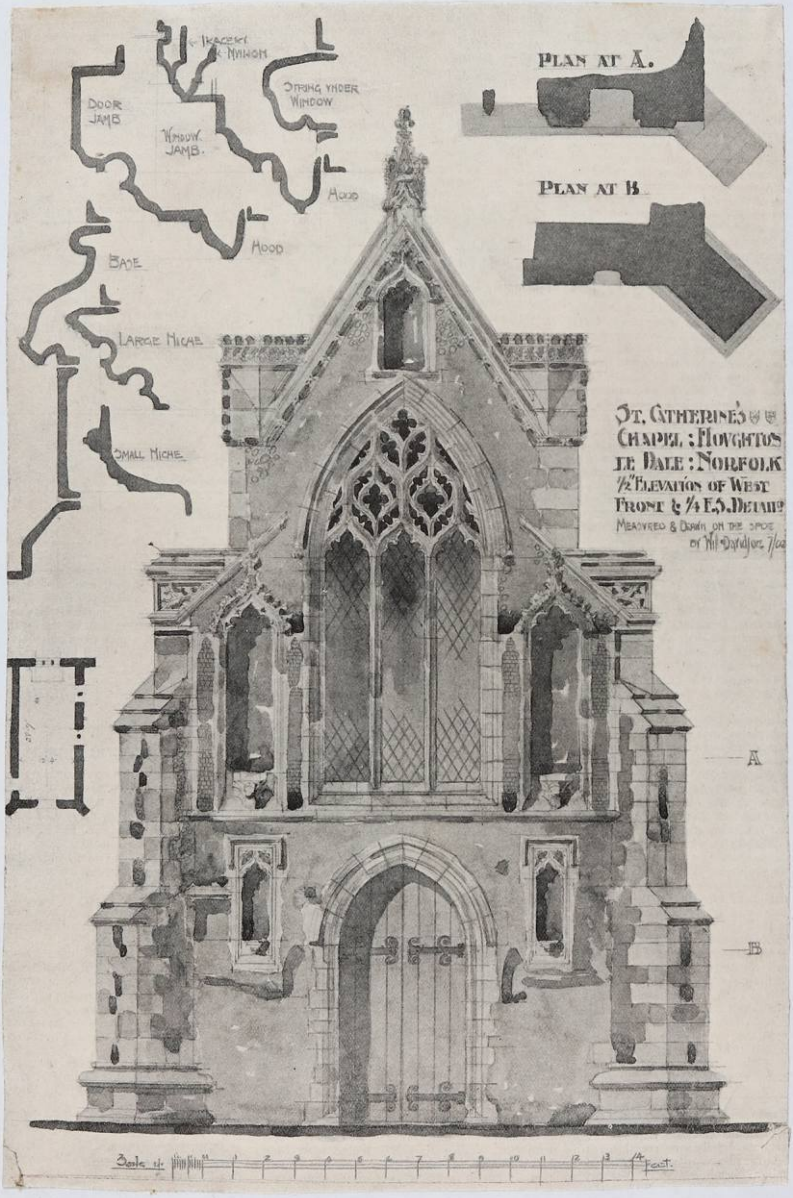
21 EYE



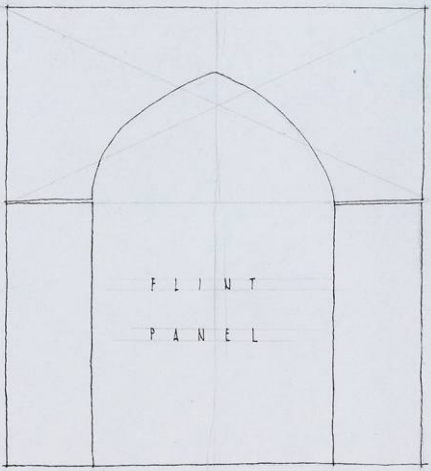
22 KENNINGHALL

23 ELMSWELL

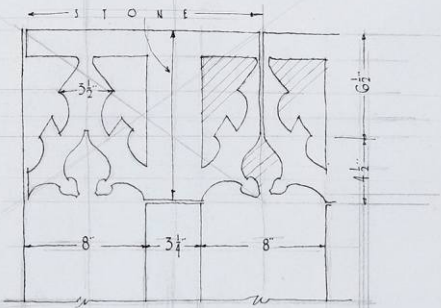
24 ELMSWELL


Tracery & Mullion
String under Window
Door Jamb
Window Jamb.
Hood
Hood
Base
Large Niche
Small Niche
Plan at A.
Plan at B
St. Catherine's Chapel: Houghton le Dale: Norfolk
½ Elevation of West Front & ¼ E.S. Details
A
B

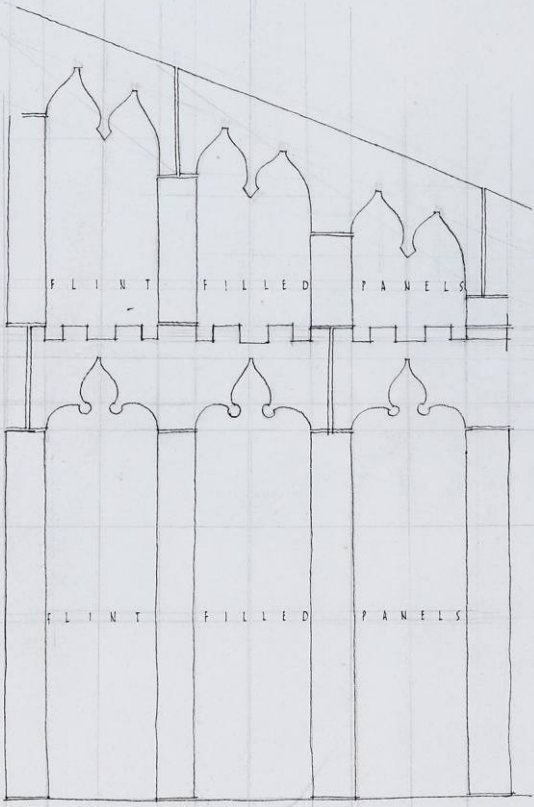
26 CORTON BUTTRESS



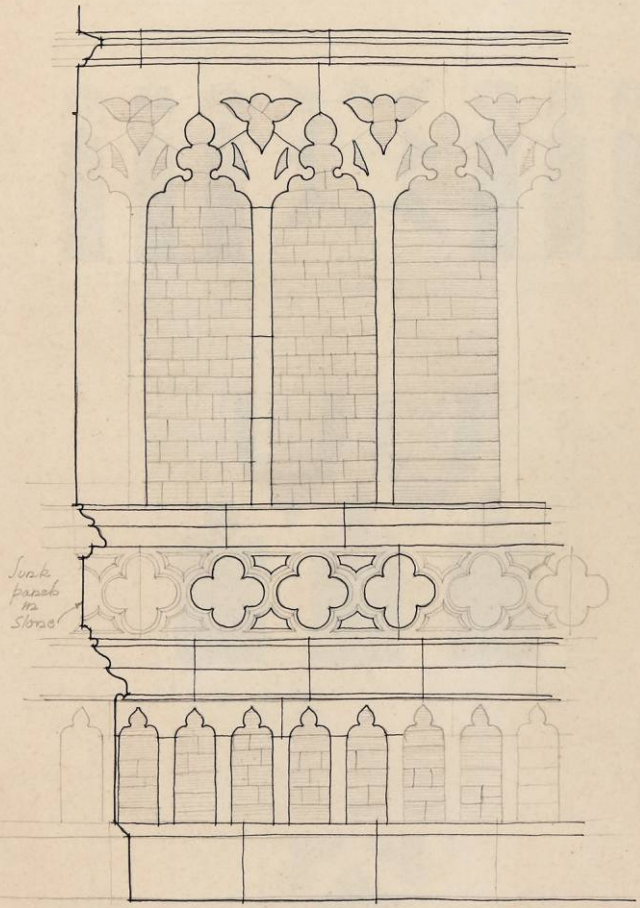
27 THE PLAIN ARCHED HEAD



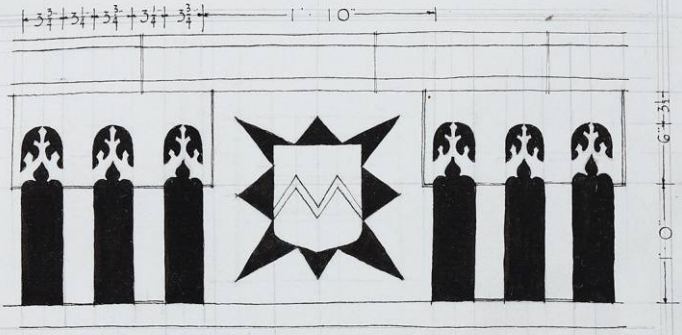
28 CORTON: BUTTRESS



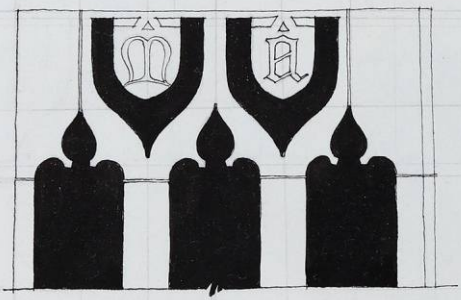
29 KERSEY: PORCH



30 WORSTEAD: BASE OF TOWER

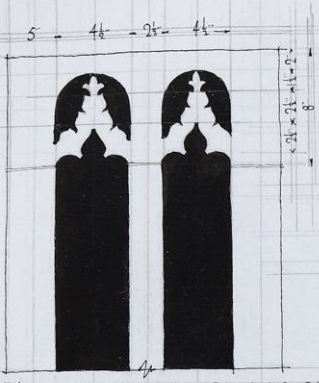


31 WETHERDEN PLINTH

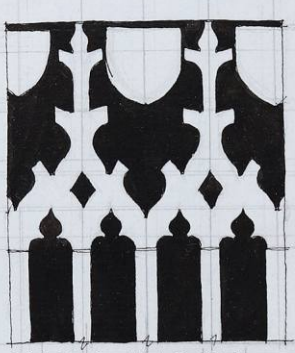


32 ARDLEIGH PORCH

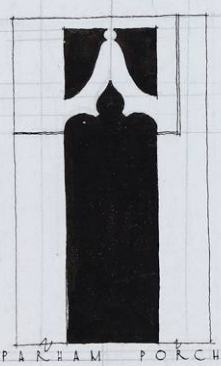
33 KERSEY TOWER PARAPET



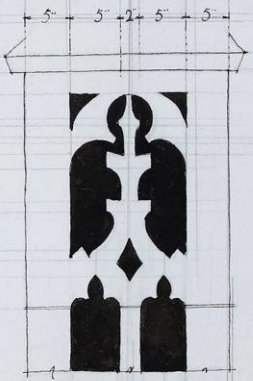
34. WOODBRIDGE PORCH



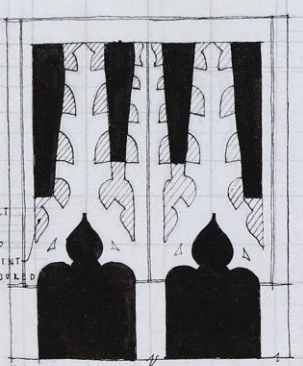
35. LONG MELFORD



36 PARHAM PORCH



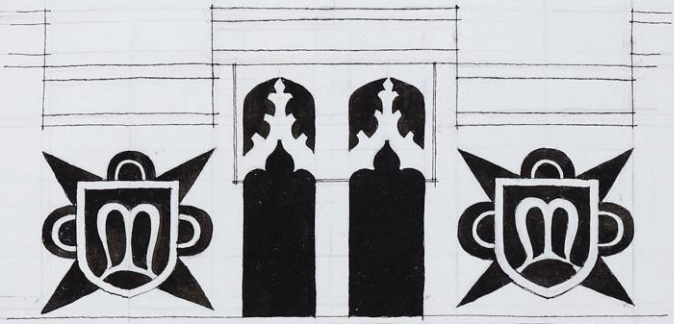
37. EAST BERGHOLT
BUTTRESS



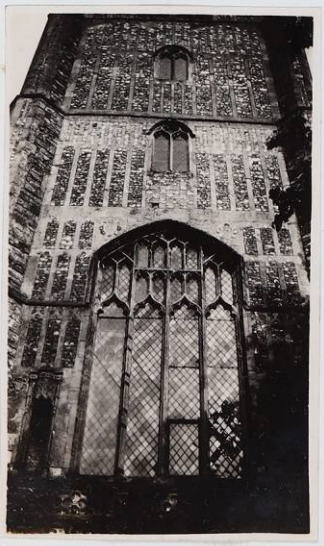
HATCHED PART
IS LIMESTONE
SUNK $\frac{1}{8}$TH INCH
LEVEL WITH FLINT
PROBABLY COLOURED

38. ARDLEIGH PORCH

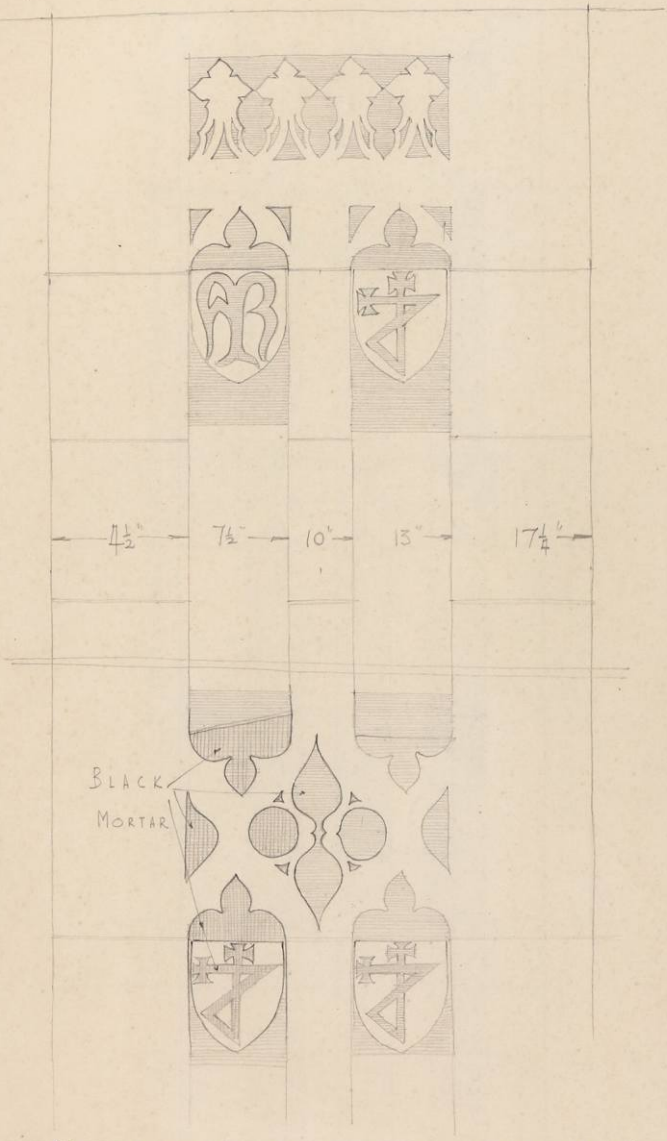
39 EARL STONHAM



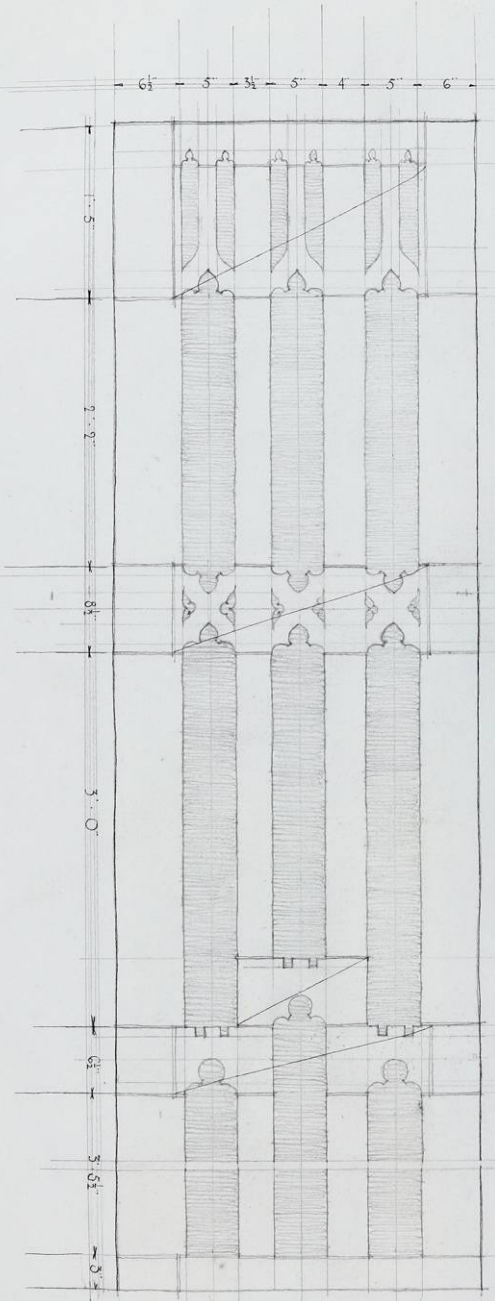
40. RATTLESDON CLERESTOREY



41 LAXFIELD: TOWER

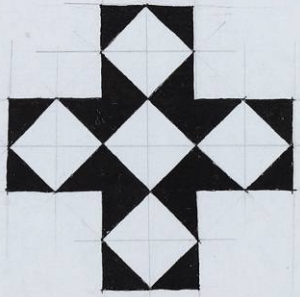


42 STRATFORD S. M. BUTTRESS



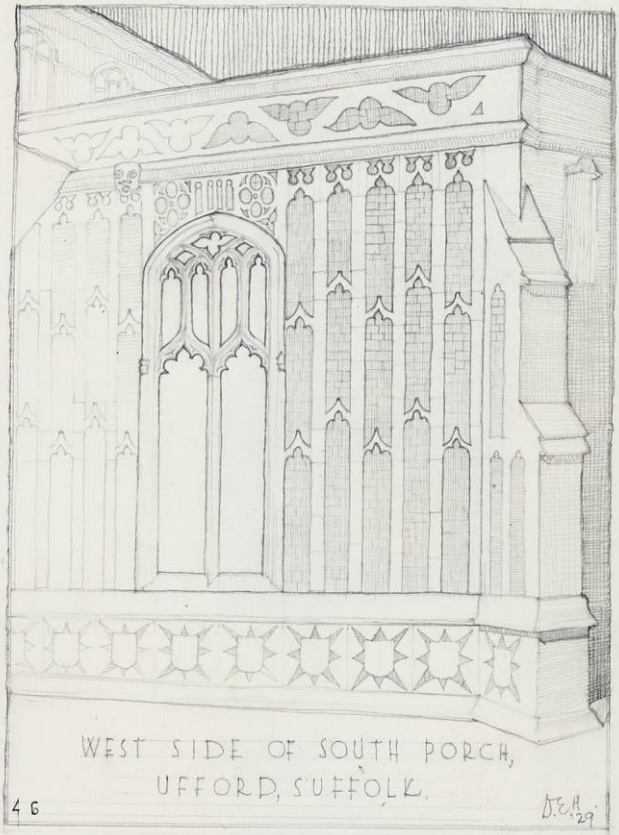
43 S. MARY BUNGAY

DETAIL OF TOWER (SEE FIG)



44. COCKFIELD: PANEL

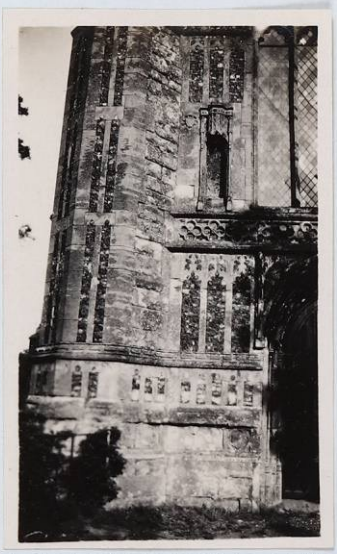
45. LONG MELFORD: CLERESTOREY.



WEST SIDE OF SOUTH PORCH,
UFFORD, SUFFOLK.

46

D.E.R. '29

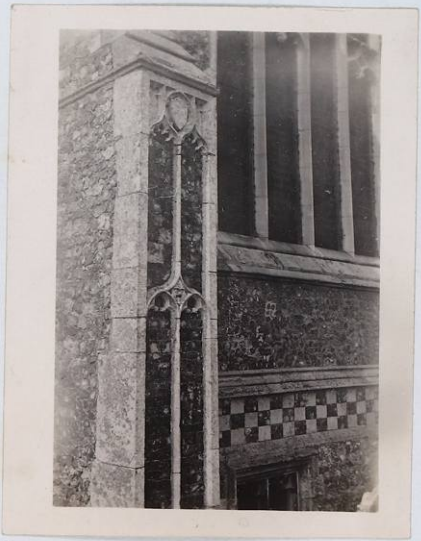


47 LAXFIELD: TOWER BASE

48 NORWICH: ERPINGHAM GATE

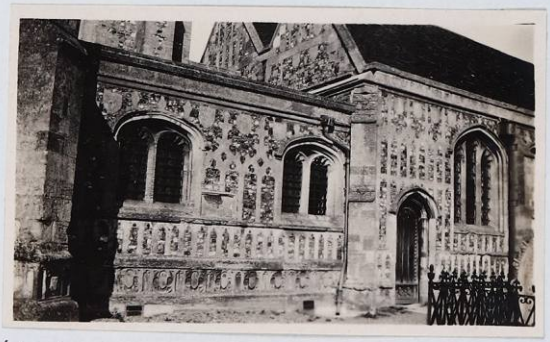
49. NORWICH: ST. MICHAEL COSLANEY.

50 LOWESTOFT: EAST END.

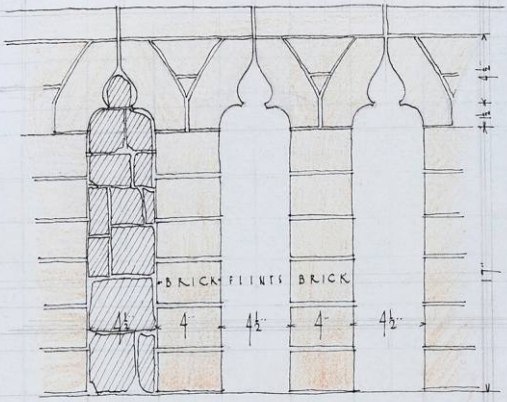


51. LOWESTOFT: BUTTRESS.

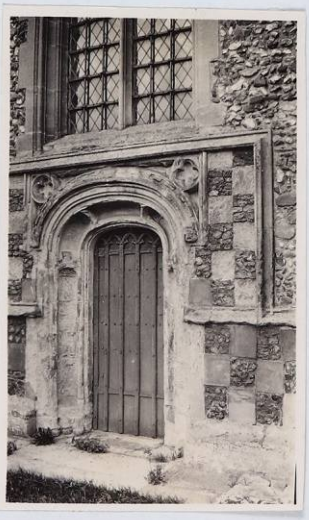
52 GREAT BROMELY



53. LONG MELFORD : LADY CHAPEL

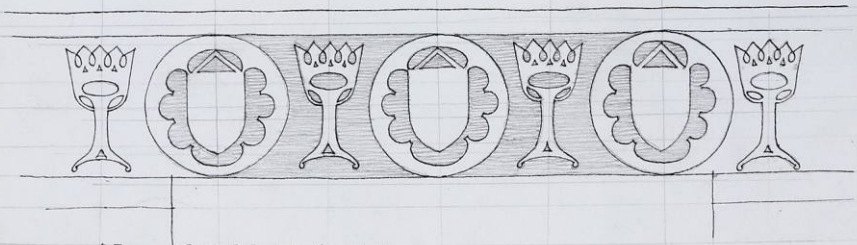


54 GT. BEALINGS PLINTH OF PORCH



55 CAVENDISH PRIEST'S DOOR

56. LOWESTOFT CHANCEL

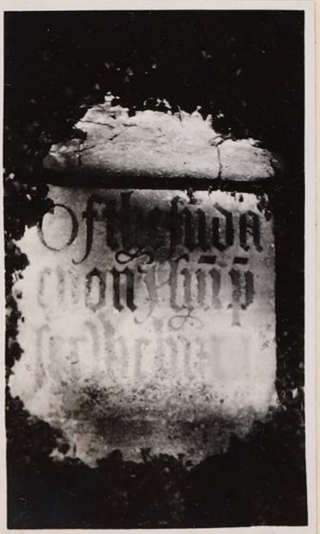


57. COTTISHALL

58 SOUTHWOLD: TOWER

62

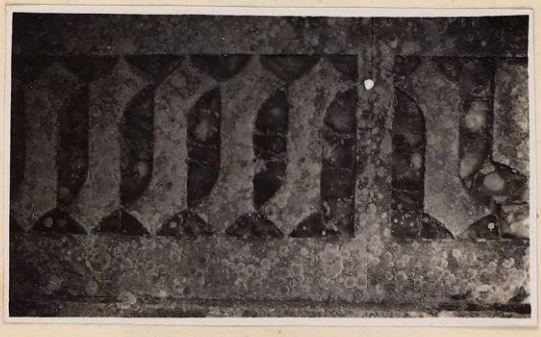
61 STRATFORD S. MARY : PLINTH, N. AISLE.



59 BRADFIELD S. GEORGE
N. TOWER BUTTRESS

60 BRADFIELD S. GEORGE
S. TOWER BUTTRESS

63. STRATFORD S. MARY BUTTRESS

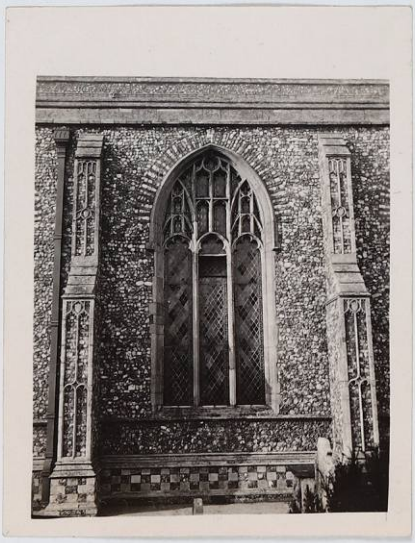


64. STRATFORD S. MARY PLINTH

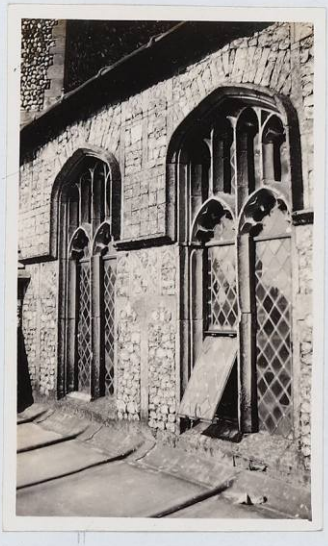
G4 SOUTHWOLD

G5 DEDHAM: TOWER

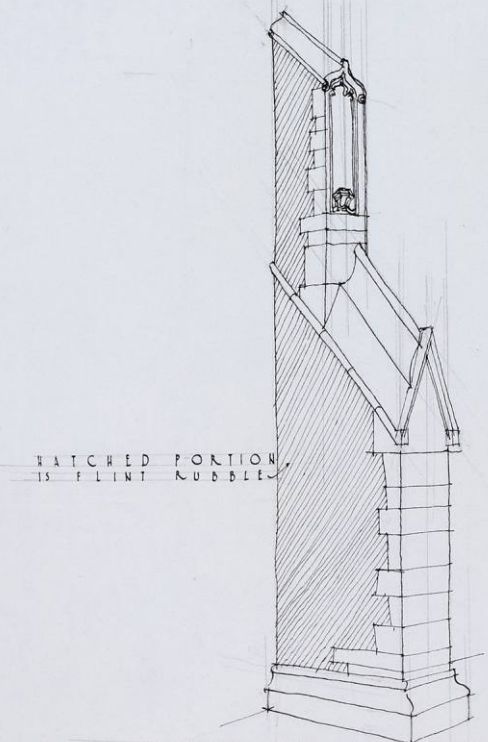
GG PETTISTREE : TOWER



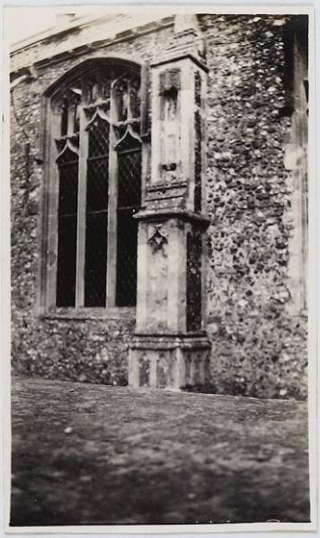
G7 LOWESTOFT N. AISLE



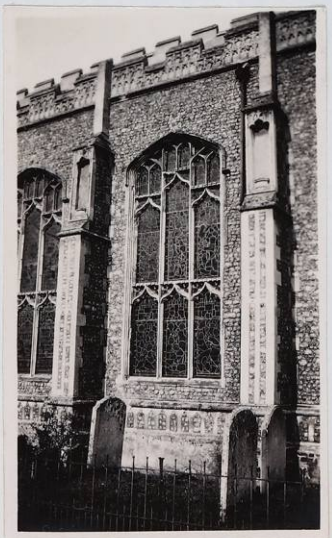
G8 WOOLPIT CLERESTORY



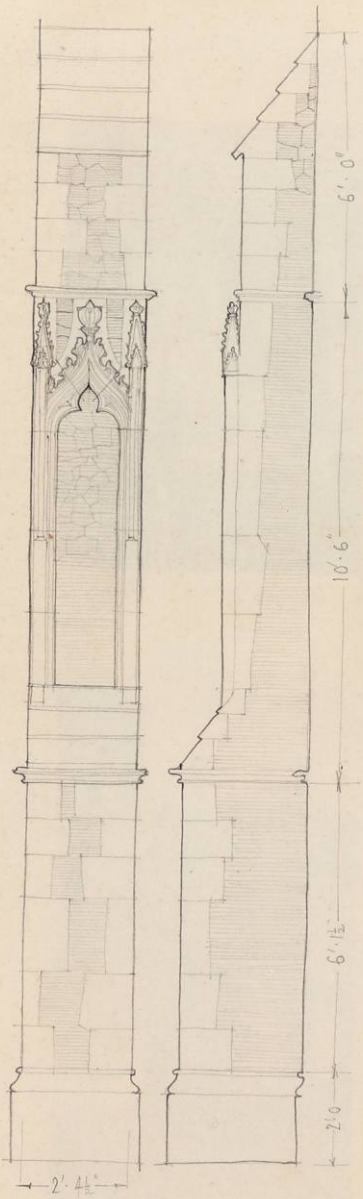
G9 BUNGAY BUTTRESS (DIAGRAMMATIC)



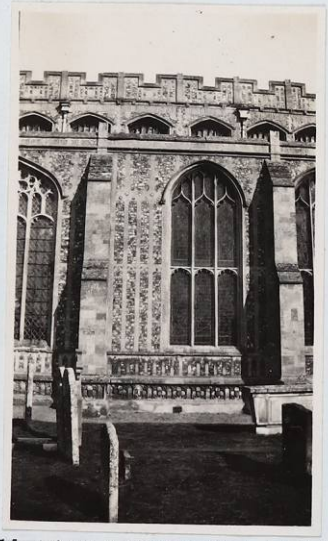
70 BRAMFORD N. AISLE.



71 EAST BERGHOLT S. AISLE



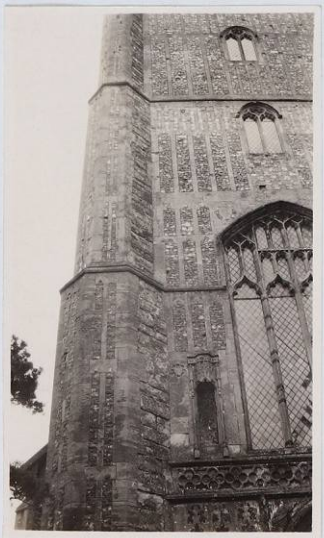
72. DEBENHAM BUTTRESS



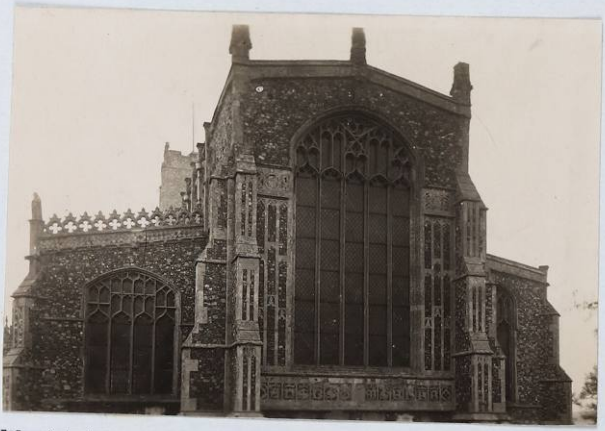
73 LONG MELFORD: S. AISLE

74 ARDLEIGH PORCH

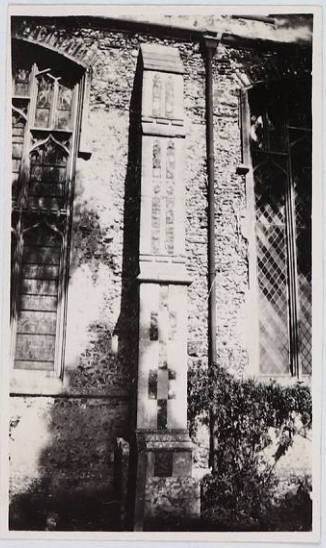
75 PARHAM



76 LAXFIELD: TOWER

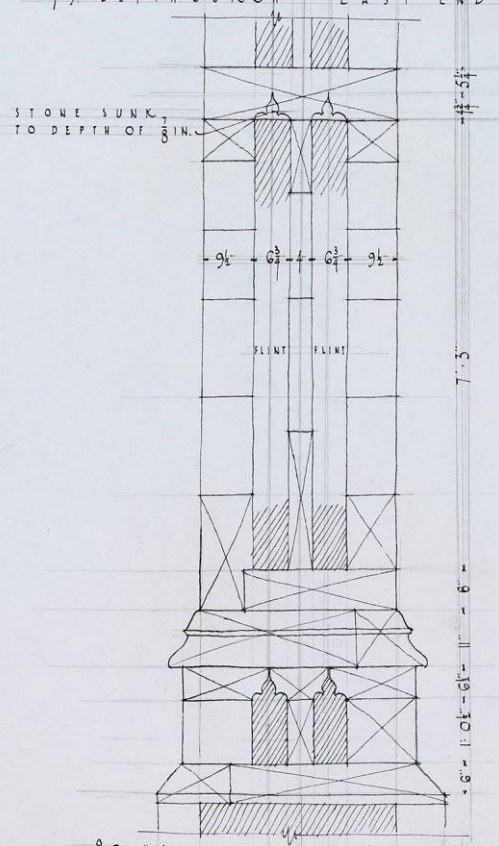


77 BLYTHBURGH : EAST END

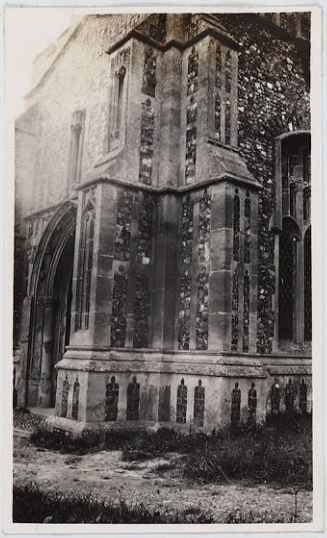


78 E. BERGHOLT BUTTRESS.

79. BLYTHBURGH EAST END

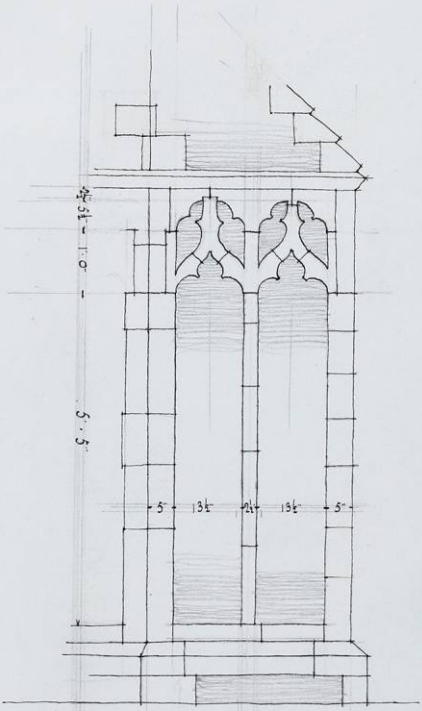


80 KESSINGLAND BUTTRESS

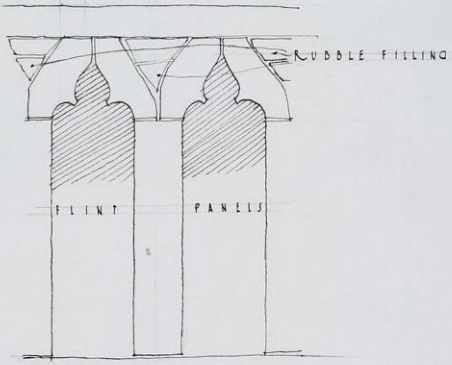


81 BILDESTON PORCH

82 WALBERSWICK : WALLING

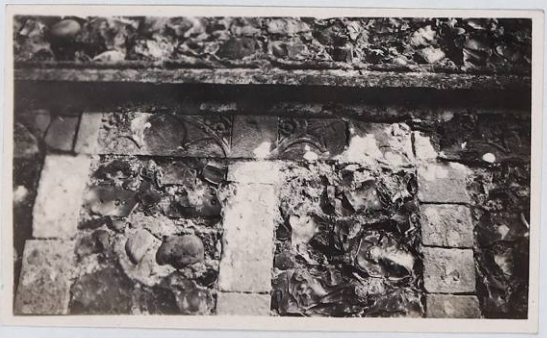


83 MUTFORD BUTTRESS



84. DENNINGTON PORCH

85. ABBEY OF S. JOHN COLCHESTER



86 CAPEL S. MARY TOWER BASE

87 NEWTON GREEN

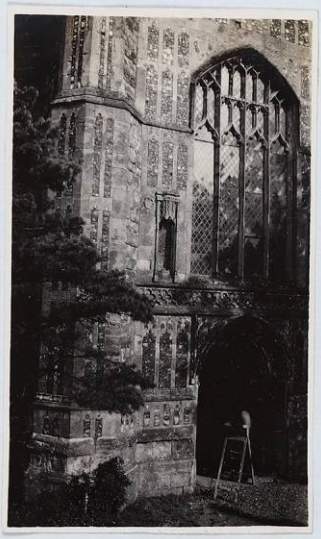
88 WICKHAM MKT., E END

89 NEEDHAM MARKET

90 KERSEY : TOWER DOOR.

91 GREETING PORCH

92. LONG MELFORD: S. SIDE.



93 LAXFIELD TOWER

94 LAVENHAM TOWER BASE

95 EAST BERGHOLT TOWER (UNCOMPLETED)

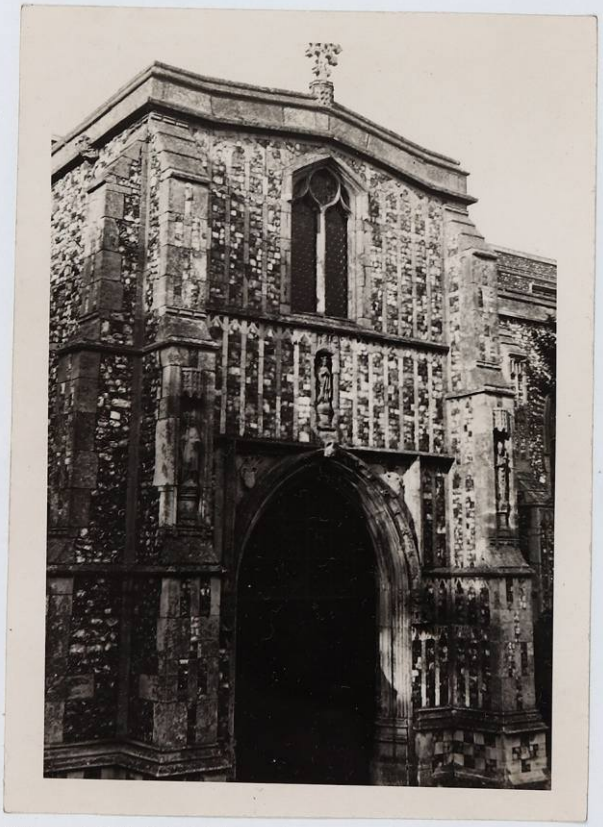
96 KERSEY S. SIDE

97. E. BERGHOLT PORCH

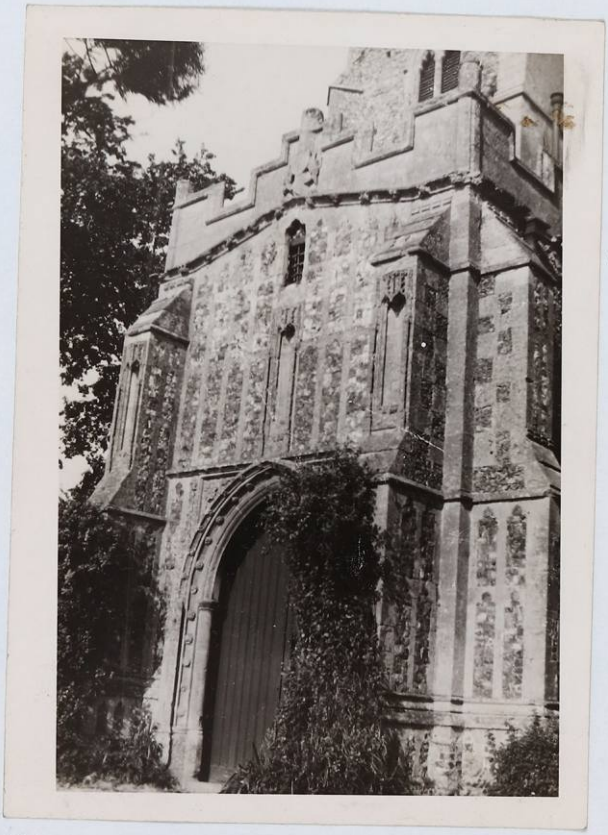
98 WOOLPIT S. PORCH

99 BECCLES S. PORCH

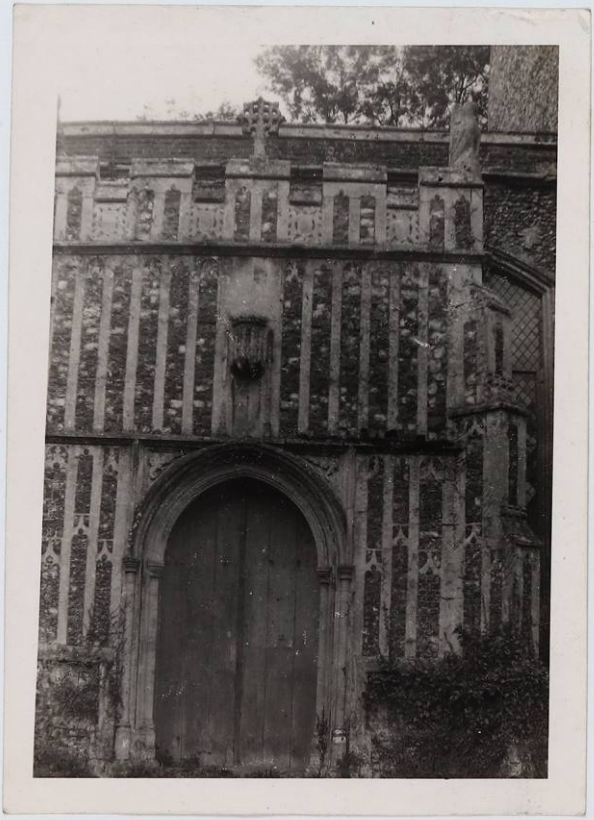
100 BLYTHBURGH S. PORCH



101 LOWESTOFT S. PORCH



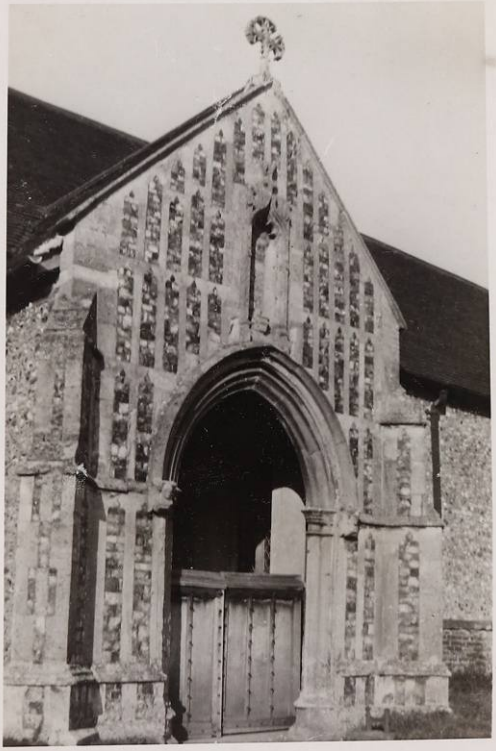
102 BILDESTON: PORCH.



103 PARHAM PORCH.

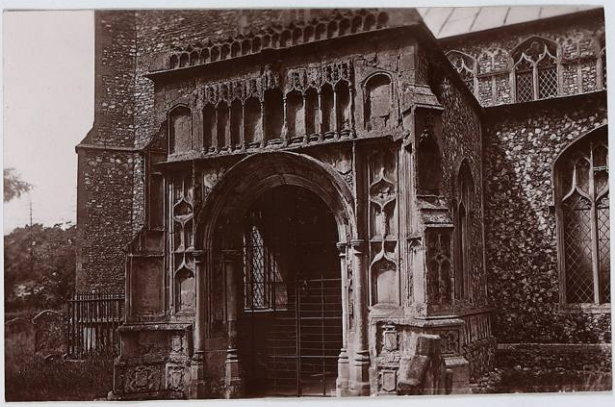
104 ARDLEIGH PORCH

105 WOODBRIDGE PORCH



106 GREETING PORCH

107 RATTLESDEN PORCH

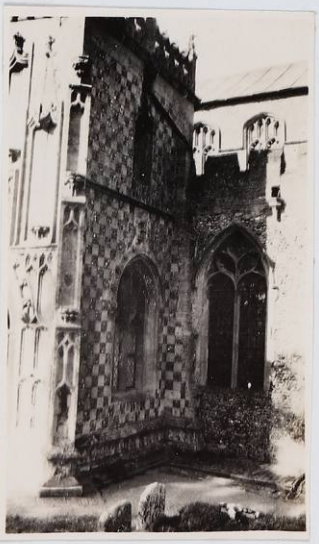


108 WILBY PORCH

109 WOOLPIT PORCH.

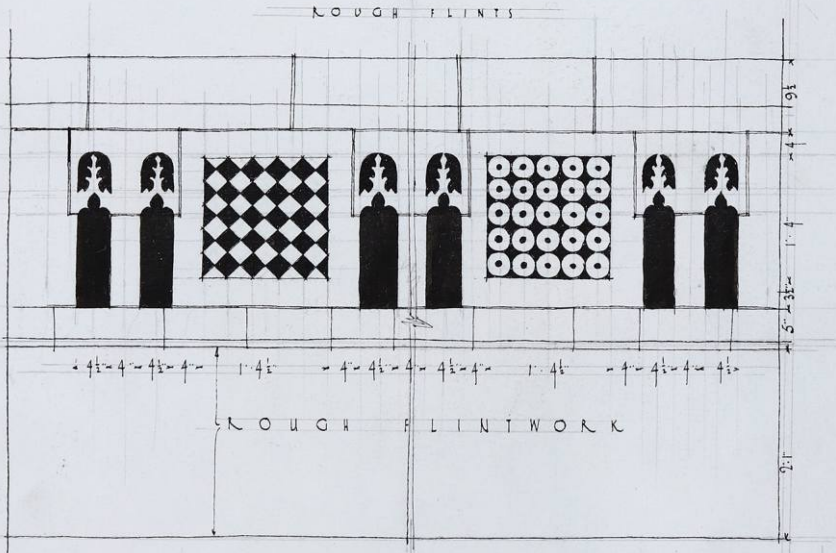
110 BRAMFORD PORCH

111. UFFORD PORCH

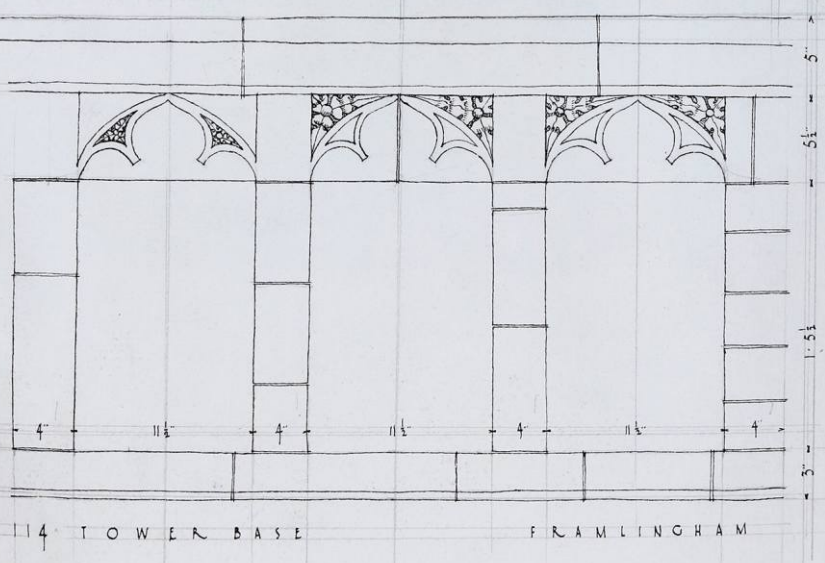


112. WOOLPIT L. SIDE OF PORCH

113 SOUTHWOLD PORCH



115 TOWER BASE FRAMLINGHAM.



114 TOWER BASE FRAMLINGHAM

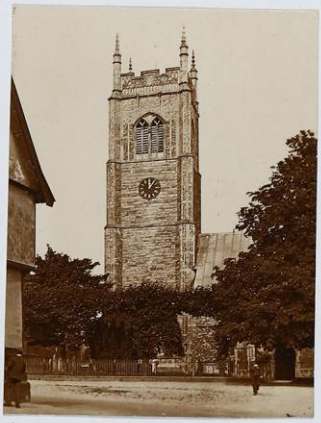
116 STOKE · BY · NAYLAND

117 EARL STONHAM

118 LITTLE STONHAM

119 KERSEY W. DOOR

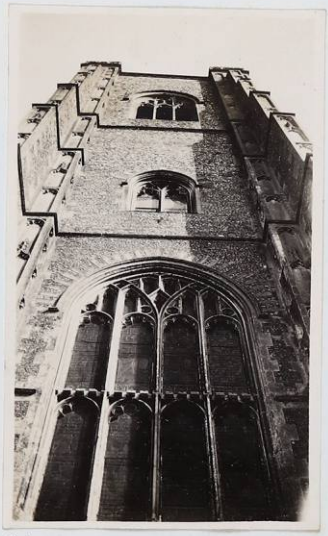
120 LAXFIELD



121 LAXFIELD

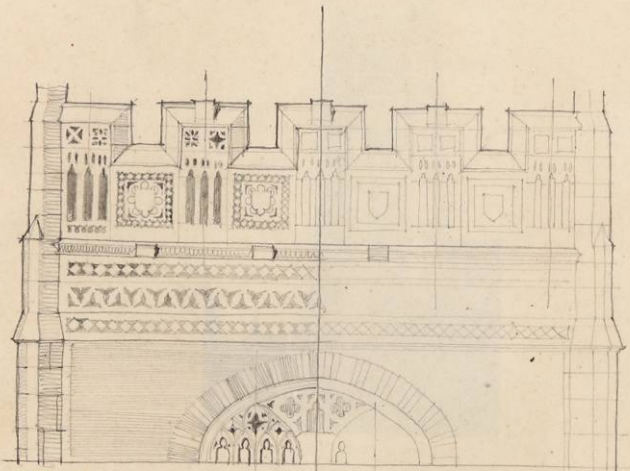
122

123 LAVENHAM

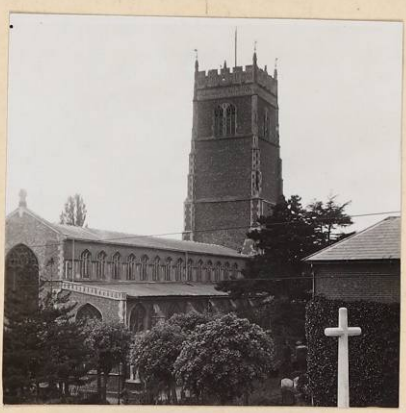


124 LAVENHAM : TOWER.

125 LAVENHAM TOWER



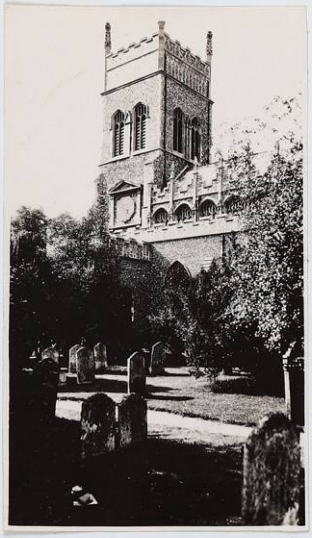
126 WOODBRIDGE TOWER PARAPET



127 WOODBRIDGE

128 DEDHAM

129 SOUTHWOLD



130 IPSWICH

131 BUNGAY

132 KERSEY

133 ELMSWELL

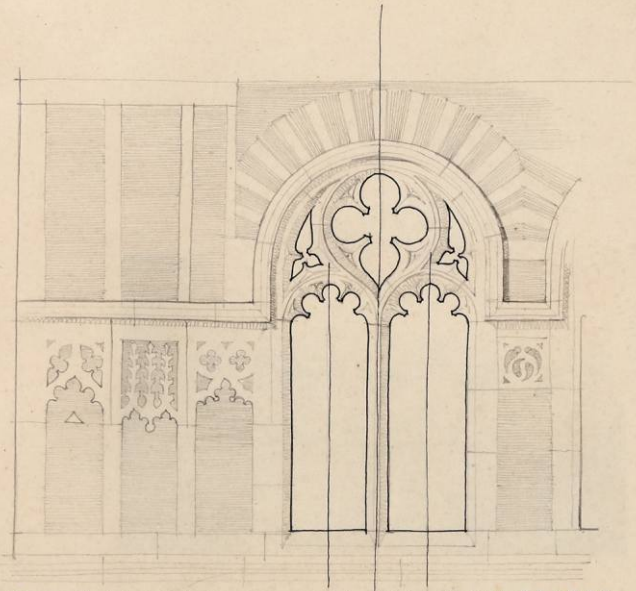
134 MUTFORD

135 BOXFORD

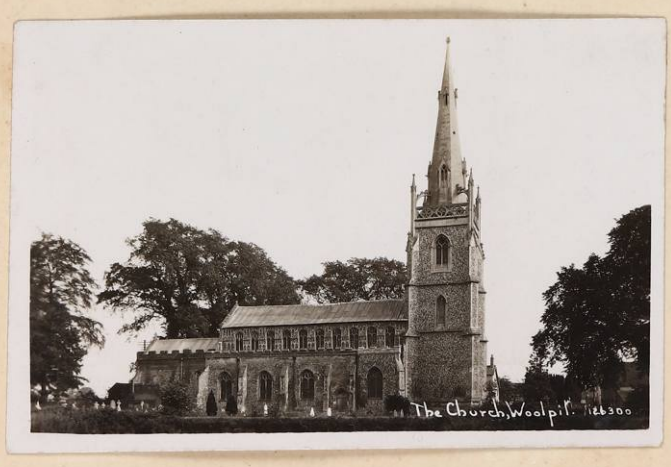
136 EARL STONHAM

137 EAST BERGHOLT

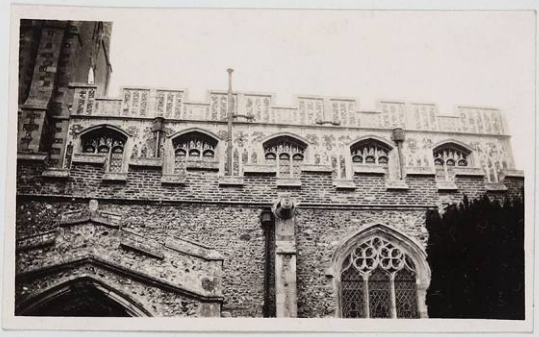
138 FRAMLINGHAM



139 WALSHAM · LE · WILLOWS CLELESTOREY

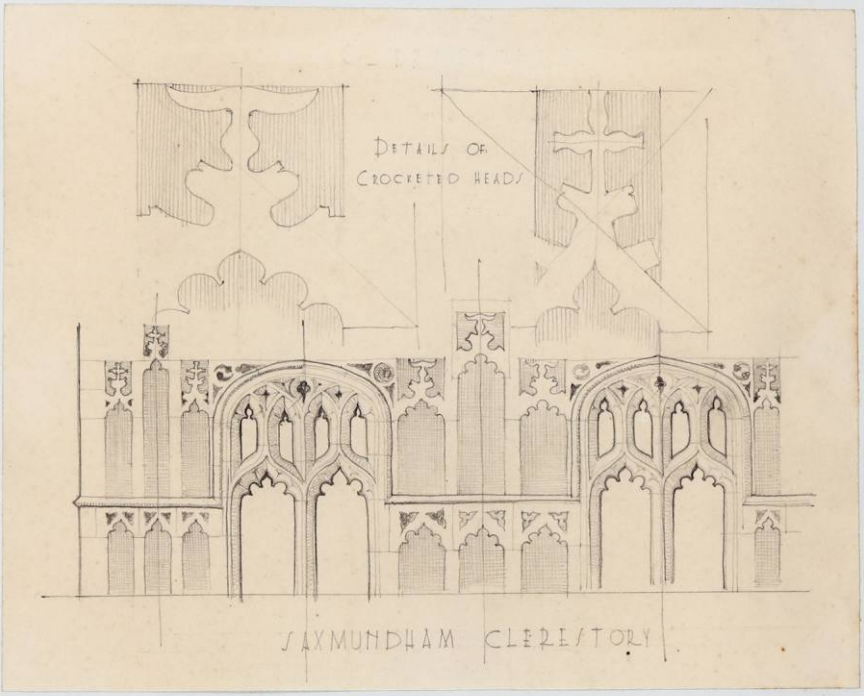


140 WOOLPIT

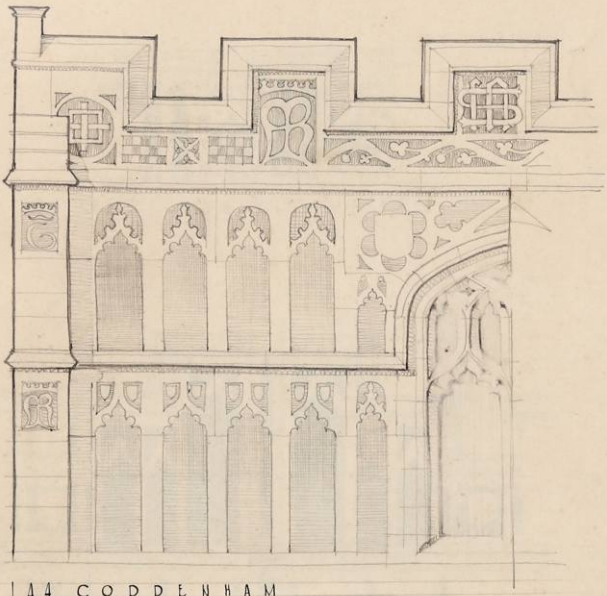


141 CAVENDISH CLERESTOREY

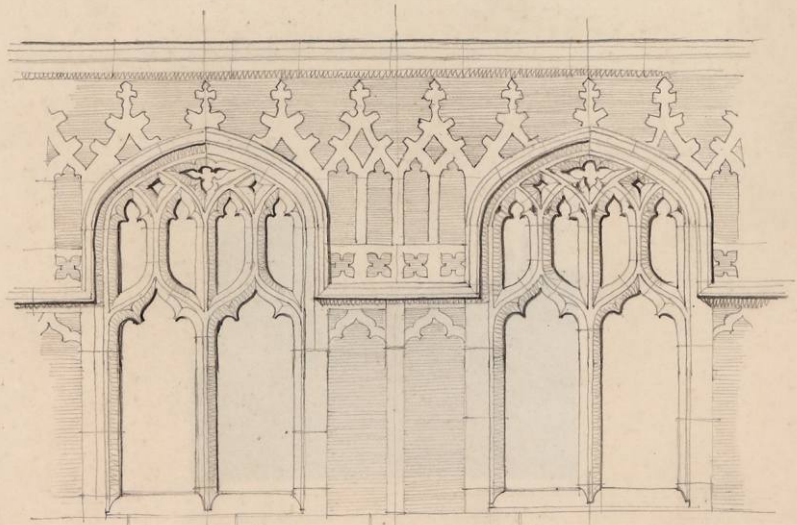
142 EARL STONHAM CLERESTOREY



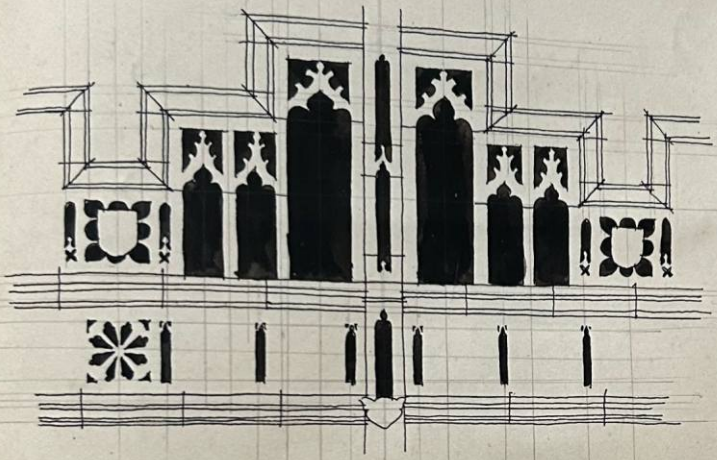
143 SAXMUNDHAM: CLERESTOREY



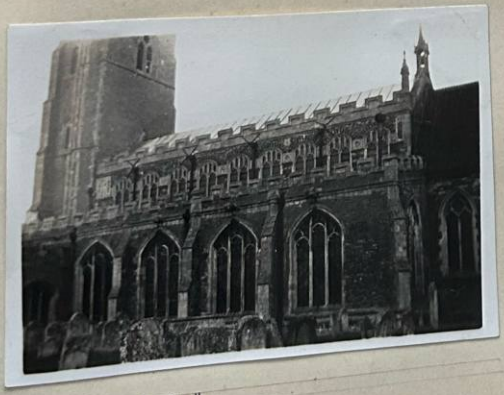
144 CODDENHAM



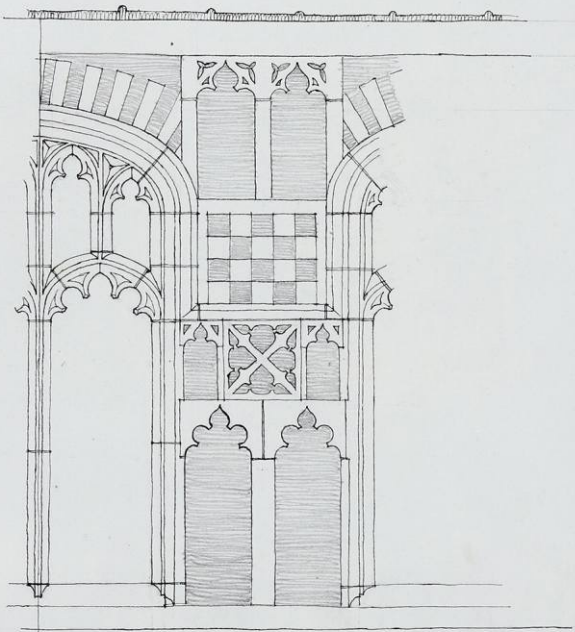
145 S. CLEMENT IPSWICH



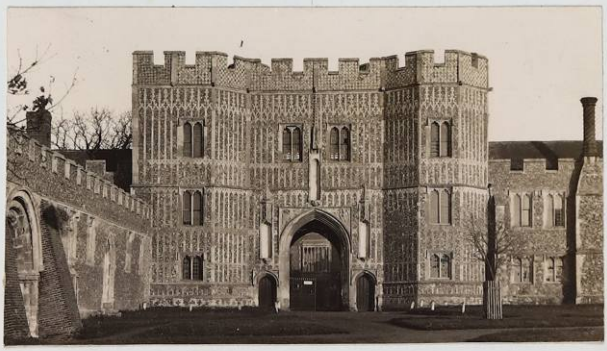
147 FORNHAM ALL SAINTS



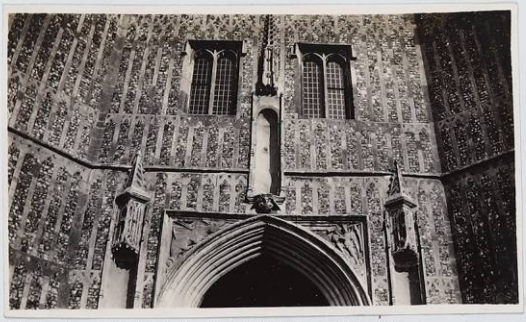
148 MARCH



149 WOOLPIT: CLERESTOREY
(drawn to ½ inch scale)



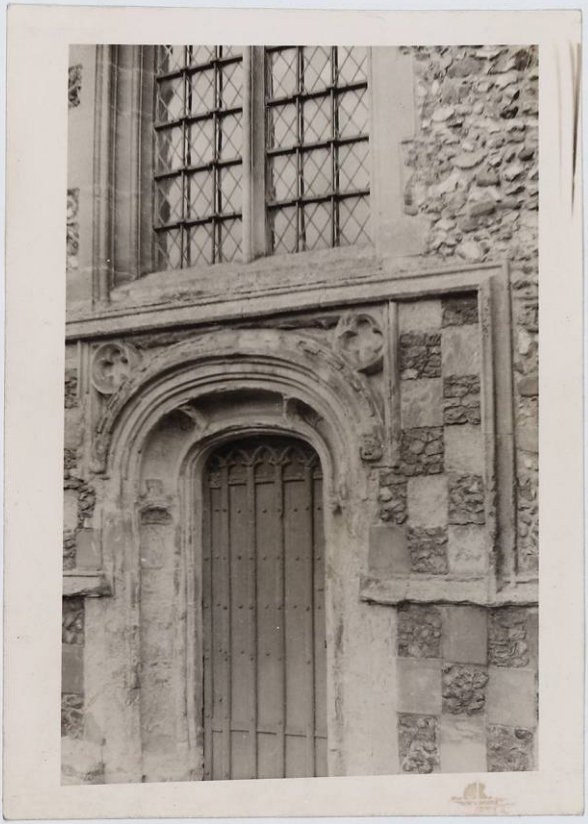
150 S. OSYTH'S PRIORY GATE.



151 S. OSYTHS PRIORY GATE

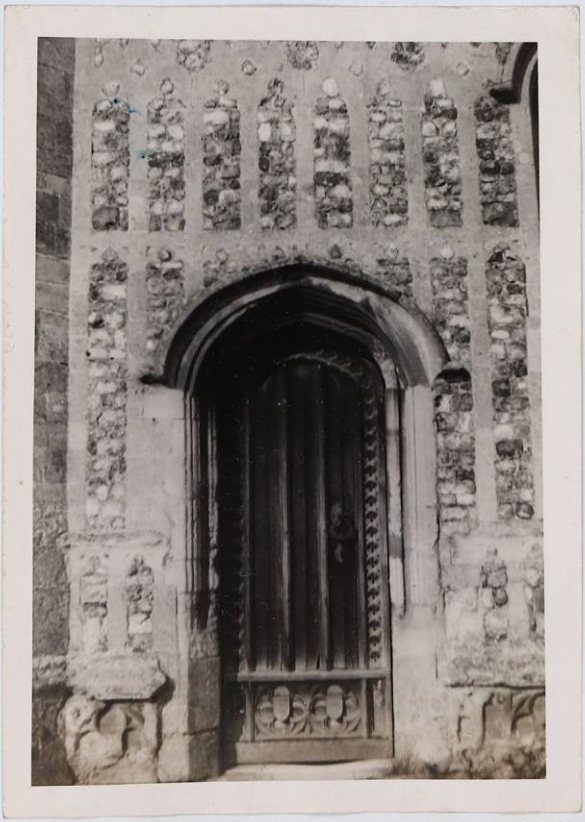
152 DETAIL OF ABOVE

153 DETAIL OF ABOVE



154 CAVENDISH PRIESTS DOOR

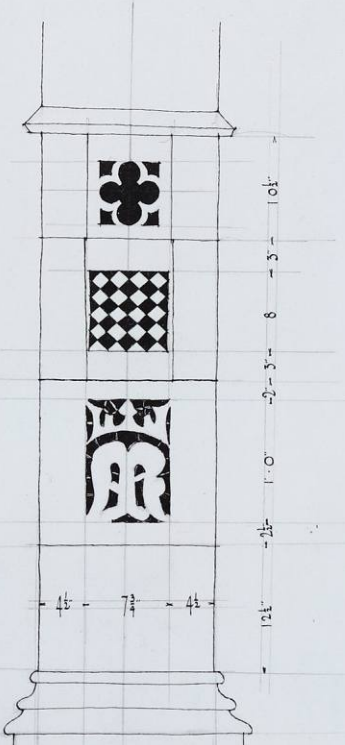
155 LAVENHAM N. AISLE



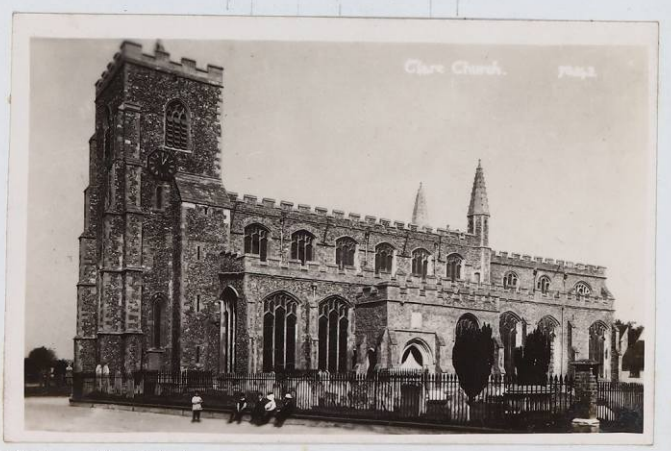
156 LONG MELFORD PRIEST'S DOOR

157 S. OSYTH'S PRIORY

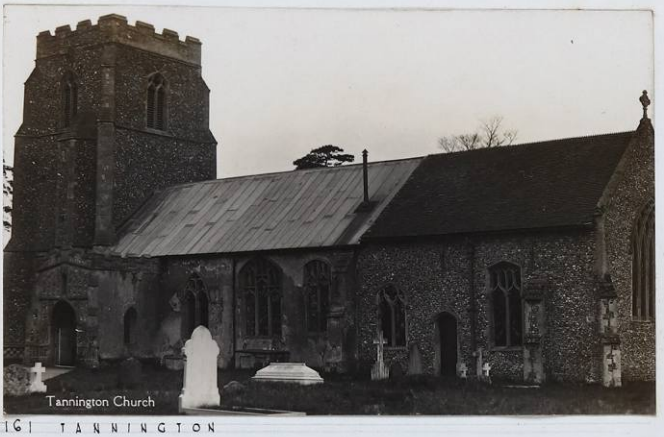
158 EYE



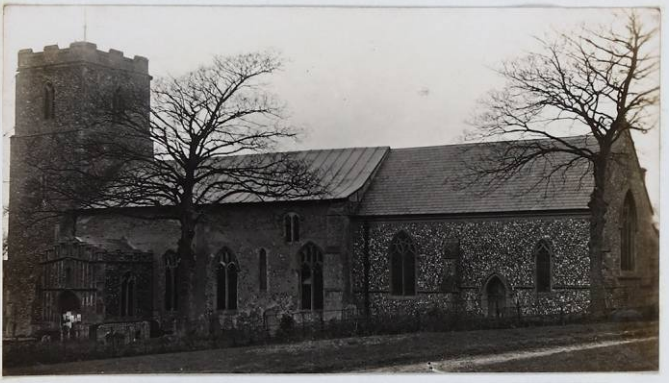
159 STRATFORD S. MARY BUTTRESS



160 CLARE



IG1 TANNINGTON



IG2 BADINGHAM

IG3 BRUNDISH

164 LONG MELFORD

165 CAVENDISH

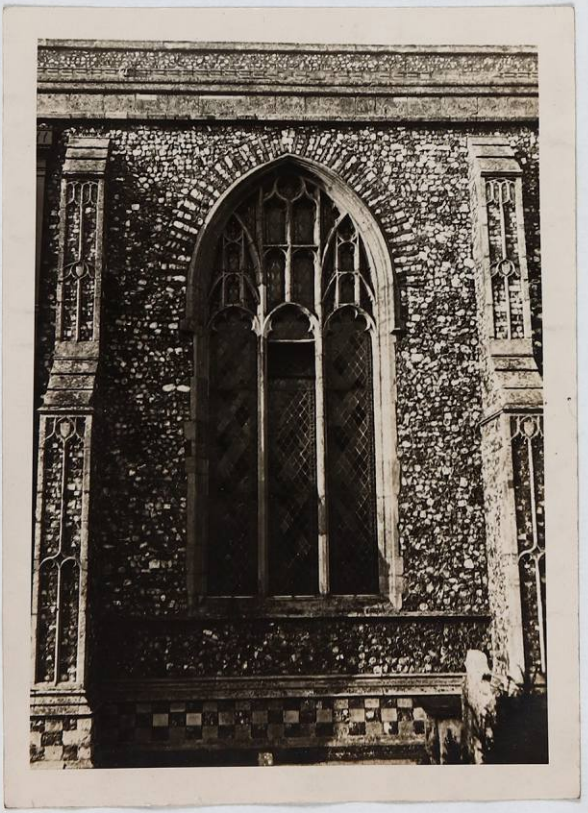
166 KERSEY

167 SAXTEAD

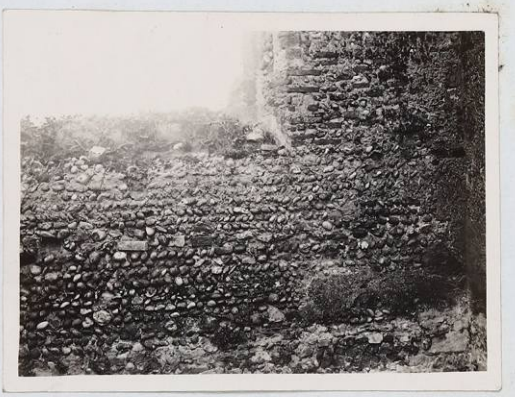
168 CAVENDISH

169 FRAMLINGHAM

170 STOKE BY NAYLAND

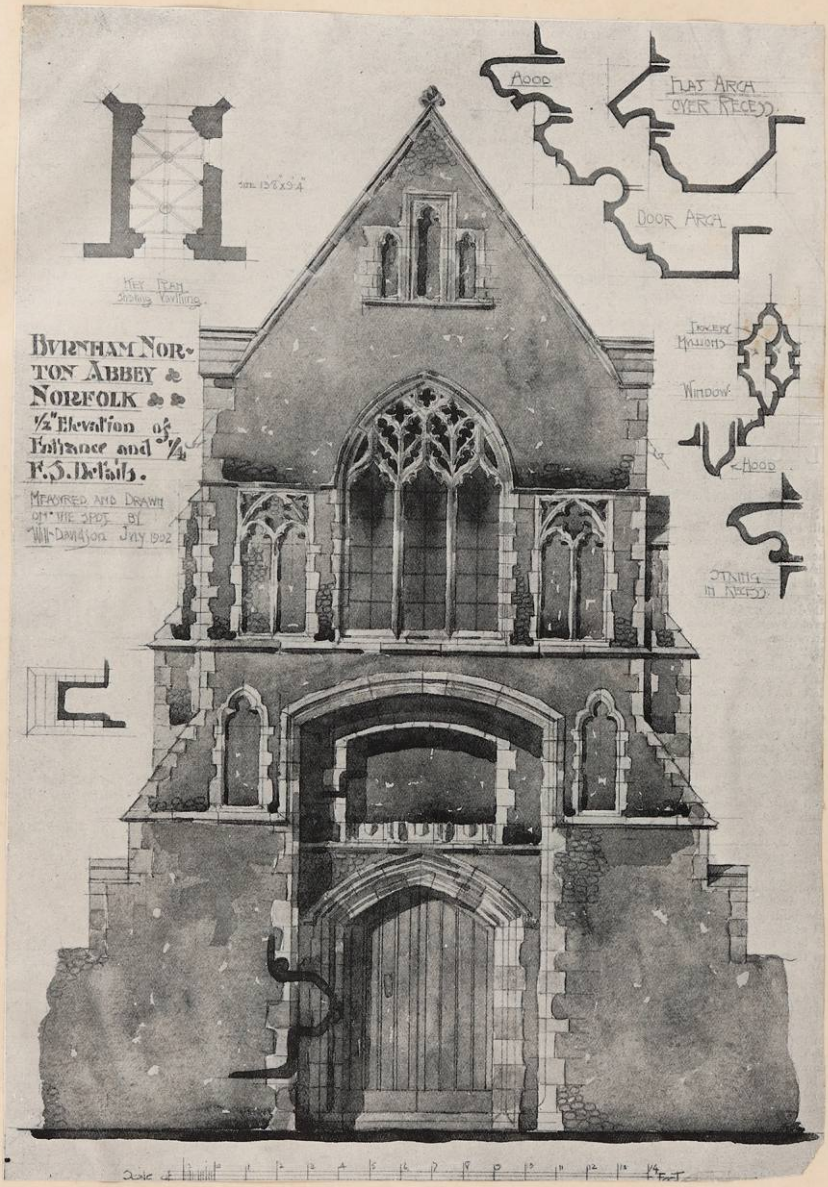


171 LOWESTOFT S. AISLE.



172 WALBERSWICK CHANCEL (INSIDE)

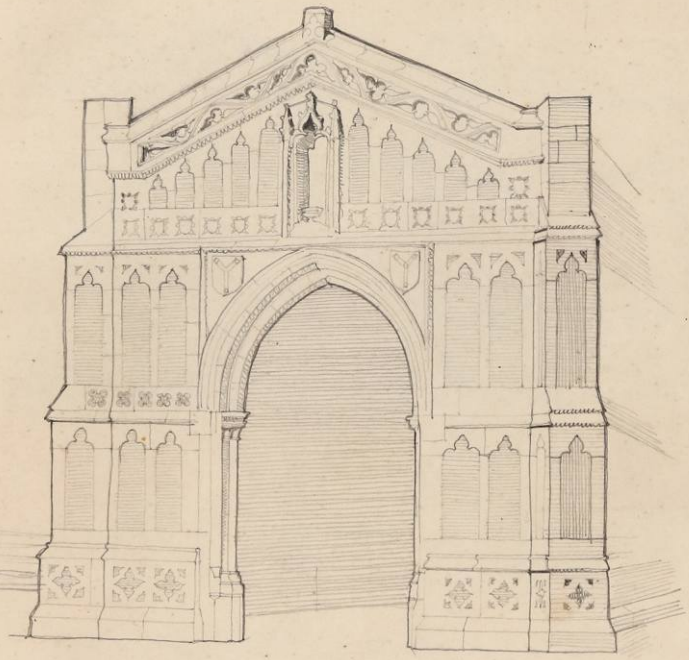
173 WALBERSWICK : NORTH AISLE



Burnham Norton Abbey Norfolk

½" Elevation of Entrance and ¾ E.S. Details.

Measured and Drawn on the Spot by W.H. Davidson July 1902



175 BLYTHFORD : PORCH

176 EARL STONHAM CLERESTOREY