The Cott Inne, Dartington, near Totnes, Devon (cut Abbotsbury water reed)

The Thatcher's Craft

RURAL DEVELOPMENT COMMISSION

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Contents

Acknowledgments

In producing this treatise on thatching, the Rural Development Commission is indebted to more people than it is possible to name.

We are particularly grateful to the late Mr. John Betjeman for writing the foreword, to Mr. Bragg and Mr. Alexander of Stanley Bragg and Associates, Chartered Architects, for their work on the chapter on roof construction, and to David Thomas for the chapter on the history of thatch.

The text was written by W. E. C. Morgan and F. W. Cooper and the photography was by V. Schafer. This edition has been revised by W. G. Trust and D. G. Wisbey. G. F. Carter designed the book and supervised the printing.

The Rural Development Commission is frequently asked to quote the length of life of the various thatching materials. We would like to point out that this cannot be given with any accuracy as it is dependent on so many factors, for example quality of crop and materials, weather conditions, situation with regard to prevailing winds and trees, and of considerable importance whether or not a skilled thatcher is employed.

For general purposes however the following is a rough assessment: Water reed, 50 to 60 years; Combed wheat reed, 25 to 40 years; Long straw, 10 to 20 years.

In this revised edition measurement is shown in both imperial and metric. Due to the nature of the materials a commonsense approach has been adopted, and measurements in metric have been appropriately rounded up or down.

Foreword by John Betjeman

ALL of us like the look of a village with thatched roof cottages gathered round the church and those snug collections of thatched farm buildings remaining in lonely combes or far off on the downs. These traditional and attractive ornaments of our landscape, seen in England in most counties south of a line joining the Mersey and Humber rivers, have come to be accepted all over the world as an essential part of English country scenery – what Henry James called 'unmitigated England'. Neither need thatch be connected only with the past; many property owners with a sense of beauty have had their new houses topped with this attractive material, knowing that they have chosen a roof-covering which will keep them cool in summer and warm in winter.

Over five hundred full-time thatchers in England and Wales are kept occupied today in maintaining and renewing these thatched roofs. The industry can thus claim to be of considerable importance in our country's economy.

The conversion of a thatched roof to a tiled roof is a very expensive business. This is because the pitch has to be different and new rafters and purlins of sawn timber must be substituted for the former rough timber supports. If a thatched roof is sheltered from the prevailing winds and not under tall trees whose rain-drippings cause moss to grow, it can be more durable than is generally supposed. There are known instances of a water reed thatched roof lasting over a hundred years; a combed wheat reed thatched roof lasting fifty years; a long straw thatched roof lasting thirty-five years. Though these figures should not be applied generally, at least they indicate that where thatch exists it is better renewed than changed for some other material.

The Thatcher's Craft, the first complete book ever to be produced on this useful and fascinating craft, fills a long-felt gap in books on country crafts. It deals with the history of thatching, the stage-by-stage construction using long straw, combed wheat or water reed, and has chapters on materials, tools and roof construction. Thus it is an authoritative work which will be of great assistance to young men entering the trade and to architects, builders and householders. It should also appeal to all those who have a love of country pursuits, for it shows that the thatcher's tools are few and simple and that his material is provided by nature, but that these two are blended together with great skill to provide a roof-covering of real lasting beauty.

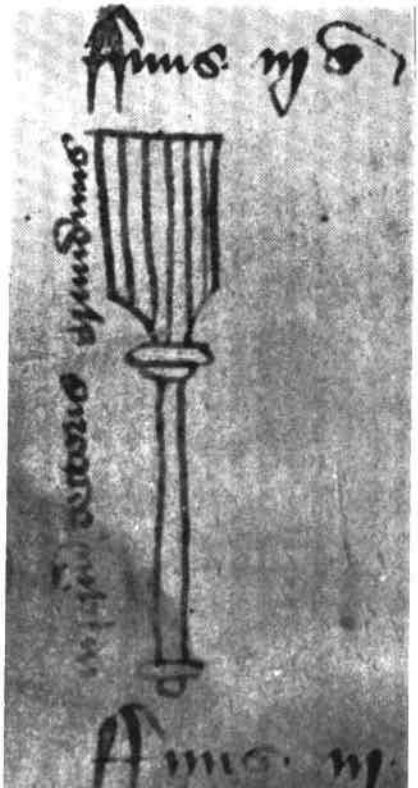
This remarkable book shows not only to thatchers but also to the outside world the skill and variety of the craft. I hope it will induce farmers and land-owners, in districts where thatchers and material

are available, to think twice before destroying an old roof. It may even encourage architects to consider this beautiful roof material for some of the smaller buildings they may be erecting in country districts.

J. BETJEMAN

1 | Thatching – a brief history

THATCHING is the oldest of all the building crafts practised in the British Isles. Until the introduction of burnt clay, stone and slate as building materials, thatch in one form or another had no rival except turf or sods – with which it was sometimes used in conjunction. Wild vegetation such as reeds, rushes, broom, heather and even bracken was undoubtedly in use before the advent of cultivated barley, wheat and rye straw, and today the marsh reed of coastal areas is still the most durable and highly-prized material. Even heather still survives as a thatching material in parts of the British Isles, though its use is now confined mainly to summer-houses and pavilions. All these materials had the advantage of being available ready for use and close to the site.



The craft of thatching as it is practised today has changed very little since the Middle Ages, and was almost certainly established before the Norman Conquest. A marginal sketch on a Court Roll of 1364 for the manor of Crowle in Lincolnshire illustrates a thatcher's legget or leggett very similar to those used in many counties today, while early accounts for familiar items such as ledgers, spars, brotches, ropes and 'pakke threads' have also been published. Though mostly used on farm buildings and cottages, thatch was not unknown as a roofing material for more ambitious structures. Six acres of 'rushes' were bought at Willingdon, Sussex, in 1300 for thatching the hall and chambers of Pevensey Castle, and were carried there by seventeen carts.[1] Churches were – and still are – sometimes thatched, though there cannot be

[1]We are indebted to L. F. Salzman's *Building in England down to 1540* (Oxford University Press, 1952) for this and much other valuable information.

2 many like that of Reydon, near Southwold, which, though thatched on the side away from the road which passed it, was tiled on the side visible to passers-by. This was in 1880, and it is curious that the parish authorities should at so late a date have regarded thatch as something unworthy, for thatch had been gaining fashionable attention for at least a century. In England the thatched cottage possessed many of the qualities of the 'picturesque' admired by connoisseurs in the latter part of the eighteenth century, and began to make its appearance in the work of popular artists like Morland, Wheatley and later Wilkie, Mulready and a host of lesser topographers and narrative painters. In France the hamlet in the gardens of the Petit Trianon placed the art of the thatcher on a new plane of fashion, and identified the thatched cottage with the new Romantic cult of nature. By the turn of the century the thatched *cottage ornée* was becoming an important feature of the English country estate. In 1811, the first year of the Regency, the famous thatched hamlet on the Blaise Castle estate near Bristol was built by Nash for Harford the banker.

The adoption of thatch by the wealthy as a picturesque adornment marks a new phase in its history. It began to happen at a time when thatch ceased to be the cheapest (and very often the only) available form of roofing for the greater part of the population. The commercial production of Welsh slate on a huge scale had begun by 1820, and the railways soon made this and other materials freely available for roofing in places where thatching was established. Moreover the French wars had raised the price of wheat and wheat straw to prohibitive levels, while machine reaping, with its damaging effect on the material, was to come later in the nineteenth century.

Thatchers, accustomed to working independently or as members of small family concerns, were ill adapted to meet large-scale commercial competition. Their craft is a solitary one, and until comparatively recently has survived without any sort of trade organisation. They have been able to benefit very little by technical advances which have helped other trades, and have sometimes resisted those likely to benefit them. There have, however, been some innovations which, by improving the quality of thatching material, have helped the craft to survive in the face of every kind of competition. The first of these was the introduction of devices for combing wheat straw so as to produce the clean, straight stems known as wheat reed.[1] The use of an iron-toothed comb for this purpose is recorded as early as 1807 in Somerset, and since that time combed wheat or wheat reed has been widely used in Devon and other southern counties.

More recently the widespread adoption of the combine harvester has made it necessary to look round more urgently for other materials. The finest of these, the aquatic reed *phragmites communis*, which has been in use since prehistoric times, is traditionally associated with the county of Norfolk. This reed, which grows wild in sea-marshes and by rivers, has in the past been cut by hand. This work has to be done after frost has killed the 'flag' or leafage on the stems, and so has to be carried out in the sodden, frozen conditions of late January and February. In view of this it is not surprising that fewer and fewer men can be found to do it, and it was for this reason that, on the suggestion of men on the spot in Norfolk, a means of mechanical cutting was devised by the Rural Industries Bureau.[2] This method has now been extended to reed beds in many parts of southern and western England, and not only has much toil been eliminated, but regular harvesting has enabled the reed to grow straighter and cleaner. The adoption of this method should help to counteract the loss of the familiar wheat straw which has long been characteristics of thatching in Hampshire, Dorset and Devon. Reed, however, being a wild plant, was in use before these 'traditional' methods were cultivated, and it is strange that technical advances in farming should result in a return to the earliest thatching material of all.

[1]Wheat was called 'rede' as early as 1534. Fitzherbert's *Book of Husbandry*.

[2]Rural Industries Bureau was incorporated into CoSIRA in 1968, later to become Rural Development Commission in 1988.

2 | Long straw

LOCAL building materials always form a harmonious feature in the landscape surrounding their place of origin. This is exemplified in the many attractive villages in the Cotswolds and in the Purbeck Hills, the pebble-constructed houses of the Norfolk coastal villages, and the mellow, multi-coloured slated roofs of Cumberland. However, the best example of all is seen in the large number of straw-thatched dwellings and other buildings to be found in the villages throughout our major corn-growing counties.

In former times, every farm had in the rickyard, large quantities of threshed straw. Much of this was required for a variety of agricultural purposes, but even so there was always a surplus of suitable straw available for thatching. Modern developments of farming, and the introduction of the combine harvester, have however seriously depleted the thatcher's source of supply.

The older varieties of wheat all produced good long straw, which not only provided ample bedding material for cattle, but also material for the form of thatch known as long straw thatch. These older varieties suffered however from various defects. The plants themselves were vulnerable to wind and rain, were easily beaten down, and were subsequently difficult to harvest. Scientific plant selection and breeding has now produced varieties which, whilst having a heavier yield of grain, are borne on stalks which are less pliable. Fortunately there are still varieties which are available to the farmer, and which serve the dual purpose of providing both a good yield of grain, and straw suitable for thatching.

The strength and texture of the straw will, for thatching purposes, be greatly improved if the crop is cut whilst the stalk is still partially green. Threshing too, must be carried out skilfully, as the straw can be damaged if it is not fed carefully into the threshing drum.

It is a very common practice to stack the straw loosely after threshing, a practice which not only makes subsequent handling more difficult and laborious, but causes damage through buckling. Strong winds will also scatter loosely-packed straw, causing considerable waste. To avoid this it is advisable to use a single or double string tyer behind the threshing machine. The straw will then be confined in a very much smaller compass, and, more important to the thatcher, can be tightly bundled with the butt-ends more or less together. The slight increase in cost occasioned by this method, is more than offset at a later stage, when the straw has to be moved. In addition, a better price can be obtained for the bundled straw.

It is also more satisfactory to the thatcher to buy

Manor House, Easton, Cambridgeshire

properly regulated bundles which can be quickly and easily checked, rather than a load of loose straw of estimated weight.

Long straw thatch, with its own characteristics, can be distinguished readily from the other thatching techniques. It is applied to the roof in yealms, and is not dressed into position with a leggett. From even a short distance, a roof thatched long straw wise may be recognised easily by the way in which the eaves and barges are invariably decorated with a pattern of ligger and cross-rods. This distinctive feature is not shared by either of the reed-laying techniques.

A closer approach heightens another impression; the feeling that the roof-covering as a whole has been poured over the underlying structure.

A house at High Street, Brampton, Cambridgeshire

The Bedford Lodge, Old Warden Park, Biggleswade, Bedfordshire

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Long straw

Above: *The Cottage, Brook Street, Elsworth, Cambridgeshire*

Left, top: *'Popples', Brettenham, Suffolk*

Left, below: *Cottages at Bluntisham, Cambridgeshire*

One or two buckets of water are thrown across each layer of straw. The bucket should describe an arc, and the water will then be evenly distributed over the whole layer.

This process should be repeated, layer upon layer, always building on to the *back of the heap.* An occasional light beating with the fork tightens the heap and makes it more shapely.

When a sufficient quantity has been treated, it is known as the 'bed', and should then be allowed to steep for a few hours before use. By this time the straw has become well soaked.

Standing to the *front of the bed*, the operator uses the fork with which he rakes out the crossed straws and tidies up the area before beginning the yealming process. A 'yealm' is best described as a tight, compact layer of straw, approximately 18″ (450 mm) wide and 5″ (100 mm) thick, having both ends level.

Working from the extreme right-hand side of the bed, good double handfuls of straw are drawn out, one after another, and laid side by side on the ground.

Preparing the straw on the ground in readiness for laying on the roof is an important aspect of the work, and if carried out carefully and systematically will greatly assist the overall job.

The straw must first of all be wetted in order to make it flexible and less stubborn, and to enable it to be compressed when applied to the roof. This is done with a two-tined hay fork. A quantity of straw is taken from the load as delivered and thrown forward into a layer, using a shaking action to separate the bunches.

Walking slowly backwards, the thatcher continues this process throughout the complete width of the bed. The part of the straw which is grasped in the hands is known as the large end. The small end is that end nearest the bed. Care must be taken in laying the large ends in as straight a line as possible.

Bunches of the straw are then worked tightly together towards the feet to the required width of one yealm. By running the fingers through the straw the short waste will be removed.

Before the yealm is completed the superfluous straws are pulled out from both ends and returned to the side of the yealm.

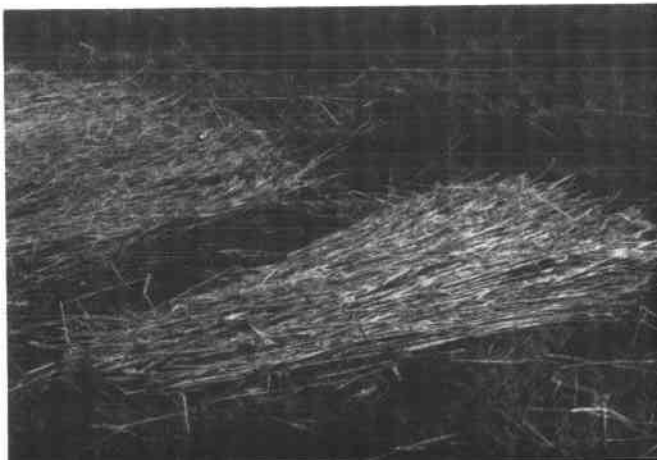
The yealm is made with the bunches of straight straw side by side, so that by gripping it on both sides, it can be picked up in a tight layer. It is then placed in the yoke with the large end forward each time, until the yoke is full and contains six or eight yealms.

The full yoke is then secured across the top with a cord or leather thong, underneath which a quantity of hazel spars may be carried. The loaded yoke is hoisted on to the shoulder and is now ready for transporting to the roof, leaving the one hand free to assist in scaling the ladder.

The process of yealming has been described in detail and should be regarded as being of the utmost importance. Greater efficiency in all the work on the ground will result in a much-improved standard in the finished job.

There is, however, another phase of the work which is invariably carried out on the ground against the bed. This is referred to as making the bottles which are required in setting the eaves and gables.

A yealm, rather wider than usual is made with an exaggerated large end. It is then folded in halves making it double in thickness.



Whilst the bottle may be tied with strong twine, it can if preferred be secured with a twisted bond of straw.

A small handful of long straw is placed in the armpit where it is held firmly under pressure from the arm. Both hands may now be used in a twisting movement whereby a strong rope-like bond is made.

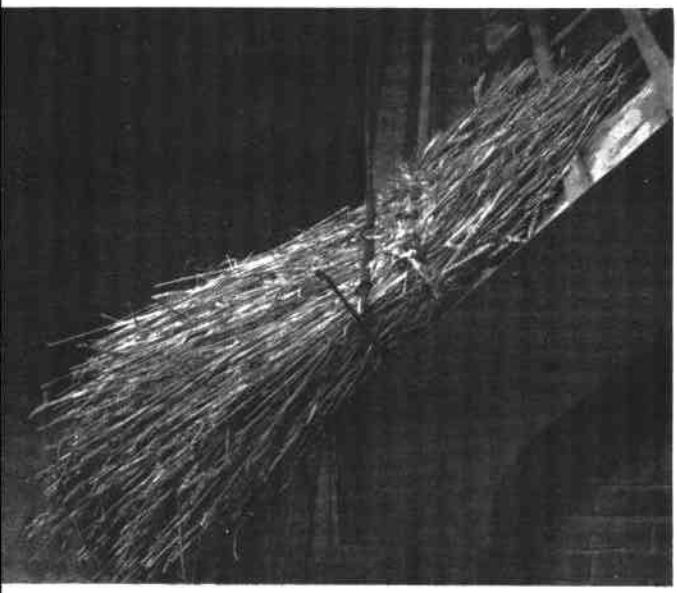
The straw bond is then firmly secured round the *small end* of the bottle.

Except for a little tidying up, the bottle is now ready for use.

Work on the roof is commenced by placing the first eaves-bottle at 45 deg. on the angle caused by the eave and the gable. It is held in position by lightly fixing, as a temporary measure, an iron hook on both sides. The bottle overhangs the eave-board by about half its length in order to provide ample scope for cutting a solid under-eave.

A second eaves-bottle is laid in position, and by running the hand between the two bottles, any crossed straws will be straightened out.

These eaves-bottles may, of course, be tied in with tarred cord, but the alternative method incorporating the hazel sway and iron hook is shown. The sway is laid across the bottles in the appropriate position, which will enable an iron hook to be driven into the rafter as low as possible.



Every effort should be made to provide a tight, solid eave, not merely for the sake of appearance, but also to facilitate the cutting operation at a later stage. Driving a long spar horizontally through one eave-bottle into the next, at a point just outside the edge of the eaves-board, will have the effect of drawing each bottle tightly together.

After several eaves-bottles have been laid, the position of the hazel sway in relation to the eaves-board, is clearly seen.

Once the corner is set it now becomes a simple matter to lift up the hazel sway to add more bottles, hooking the sway down and driving in the horizontal spar as the work proceeds.

Turning to the gable (or barge) the bottles are laid in the same way, each one overhanging the barge-board by half its length. The sway is started by forcing the large end, which has been tapered for the purpose, behind the sway holding the eaves.

Continuing to lay the bottles in the barge, the sway is hooked down as the work proceeds.

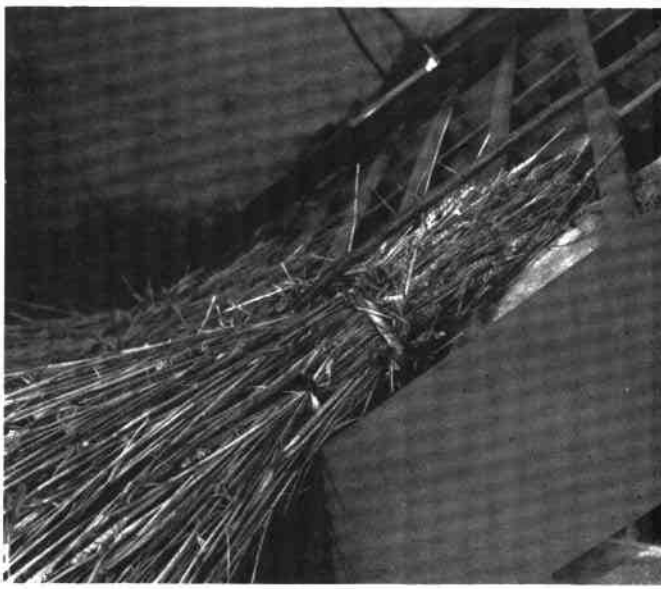
In order to tighten up the bottles as much as possible, the same method is used in the barge as in the eaves, whereby a spar is driven in a downward direction, through the first bottle and into the next.

The position of the spar is indicated in relation to the barge-board which is seen immediately below.

With the spar driven home, the bottle is drawn tightly into position. This procedure is repeated with each bottle, and it may even be an advantage to drive in occasionally two spars spaced evenly side by side, care being taken to ensure that each one is inside the barge-board and in no way protrudes.

Laying eaves- and barge-bottles can be done in stages, as it may be imperative to thatch-in a certain section of the roof.

It is very noticeable at this point that the pitch of the bottles already fixed in the eaves and barge, is less steep than that of the rafters. This is caused by fixing the bottle large end downward and by the tilting-board which is fixed to the eave and barge. It is most essential to retain this hollow effect throughout the whole roof area, as the purpose is to cause the lower ends of all courses to bristle outwards towards the weather, thereby giving greater durability.



Long straw

Before any courses are laid, a thin layer of straw is spread as a lining course over the battens. Although it is not a necessary requirement, it does have the effect of making the roof neat and tidy when seen from the inside. It should not however be confused with back-filling as used with other materials.

An extra yealm is laid on the corner to give added strength and thickness.

This extra yealm is fixed by means of a row of short spars driven into the firm portion immediately below the sway.

These spars are not driven in at right-angles to the slope of the roof, but with sufficient slope to eliminate the possibility of turning water inwards.

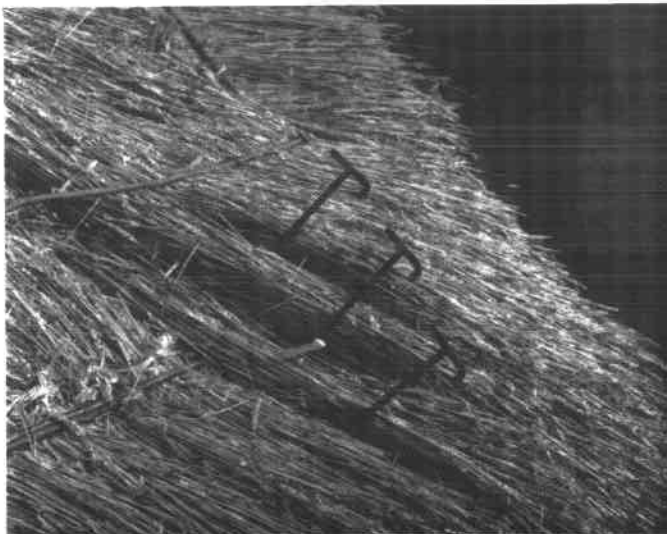
The first course proper is now laid. This is a single course – i.e. one yealm thick, which starting right on the angle of the corner, is placed almost as low as the eaves-bottles, with the large end of the yealm downward. One or two needles are used to force each yealm tight and the course brings the eave up to the required thickness from the eave-board.

Similarly this course is fastened with a row of evenly spaced spars, which are driven in just below the first sway.

There is, however, an alternative method by which a course can be secured. This is by twisting a straw 'bond' or 'scud' which is sparred down in the same fashion.

Working from the barge the second course is started. Of particular interest is the way in which each course is laid at the same angle as the bottles in the barge. These courses gradually turn from the diagonal position until, after about 6′ (2 m), they resume a position in line with the rafters.

Still keeping the large end downward, the third course is started in the barge, where it is placed in such a position as to overlap the previous course by two-thirds. This should provide a thickness of approximately 15″ (400 mm) through to the batten face. For the purpose of fixing, the second and third courses combine to make one double course, and the sway is hooked down, thereby securing the whole work. It becomes apparent therefore that a sway is fixed for every two courses laid.



More yealms are laid and the courses are extended. Each course is held firmly with a needle.

At the appropriate stage of the work, the sway is fixed down, and should be holding such a thickness as to require a 9″ (230 mm) hook.

The positions of the courses are clearly indicated. First the eaves-bottles and sway, followed by the single first course sparred in below the sway, then the second and third courses fastened down together.

From this angle it is possible to see the position of the sway holding the second and third courses, where it overlaps the vertical sway which holds the barge-bottles.

A good supply of yealms is contained in the loaded yoke, which for right-hand working, is situated on the left-hand side, with the large end of the yealms towards the ladder.

The cord securing the full yoke is released and lightly bound to a batten to prevent the yoke slipping down from the roof. The operator grasps the first yealm firmly with both hands.

Passing the yealm in front of him, the operator prepares to start the fourth course.

With the large end downward the yealm is placed in position in the barge, overlapping the previous course by two-thirds of its length.

The needle is used to force the yealm back tightly into line with the bottles which overhang the barge.

The fifth course is started in the same way, and in order to avoid unnecessary movement, the two courses are continued together.

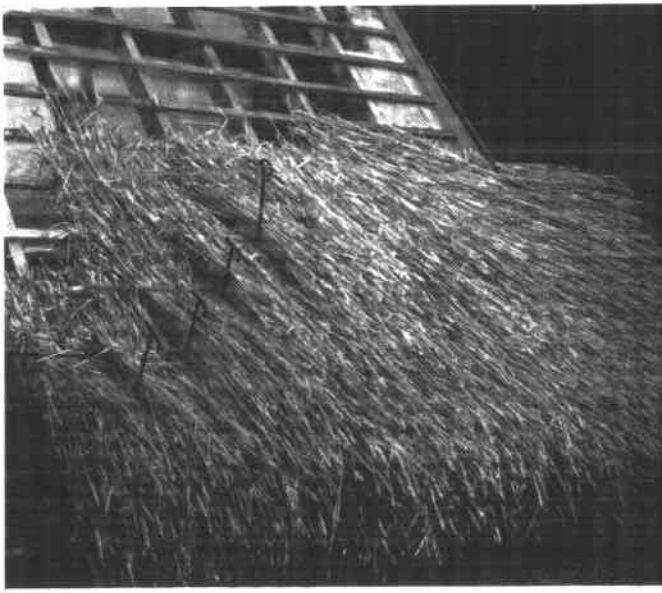
It is not sufficient merely to lay yealms against each other, since a sound joint must be made. This is done by gripping the farther side of the yealm and placing it squarely against the edge of the yealm already in position, following through by running the hands along the joint, one hand to the left, the other downwards to the right.

After lifting the remaining portion of the yealm into place, the needle is removed and the joint pressed down and completed.

The needle is now inserted in the new position which is the edge of the yealm just laid. A levering motion is used to force the work tightly together.

Pressing the left arm across the middle of the course, the free hand is used to pluck the long superfluous straws from the lower end, thus making the surface both level and tidy.

Any straws removed are retained in the hand throughout the process, after which they are placed beside the needle.



The fourth and fifth courses are shown at a more advanced stage, ready for swaying down.

The sway is fixed in position across the two courses, and it will be noted that there is an excellent hollow place where the next course will bed down.

More bottles are laid in the sloping position across the barge-board and these are swayed down as the work proceeds.

The sixth and seventh courses are now started in the barge in the same way as previously described.

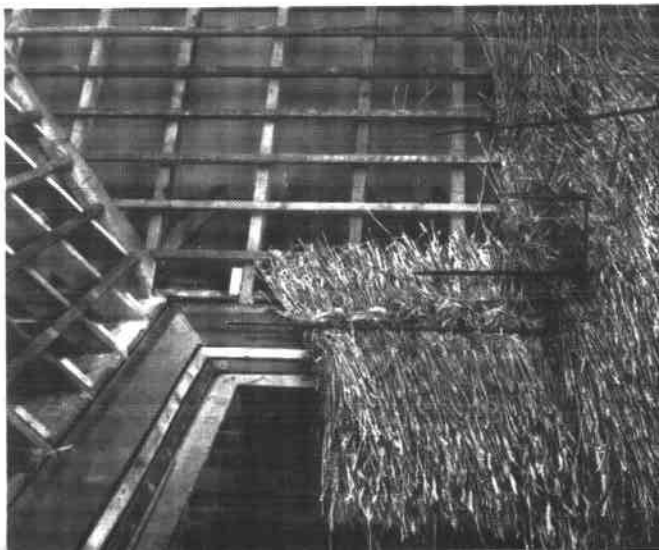
These two courses are continued, and when sufficiently advanced they are swayed down together.

The courses are shown in steps across the roof, giving the relative position of each sway.

When a section of the roof has been covered in, the side-rake is used with a combined beating and combing action.

The barge is raked in an outward direction according to the angle of the thatch, removing all short waste.

Continuing the courses along the roof, it will be noticed that the direction of the thatch begins to turn towards the angle of the valley, well before it is reached.



The eaves-bottles, as they approach the valley, are almost in line with the valley-board.

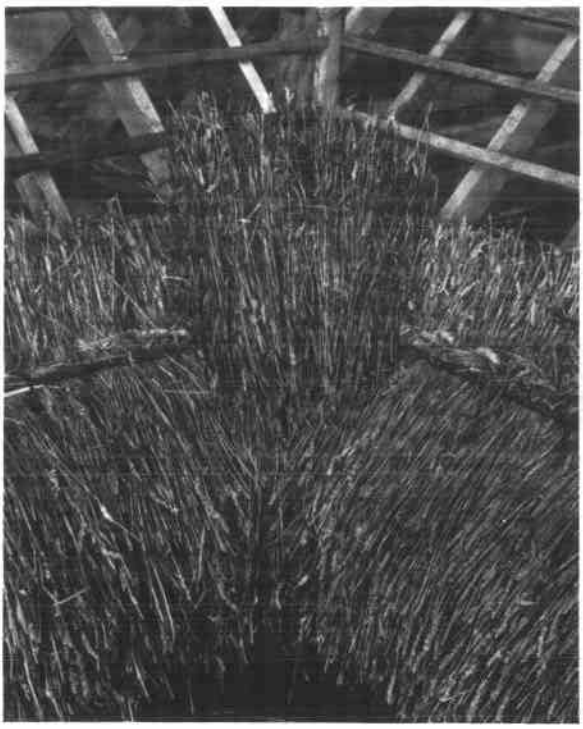
On reaching the valley the eaves-bottles come into line with the angle. The hook in the tilt-board is for the purpose of keeping the work tight.

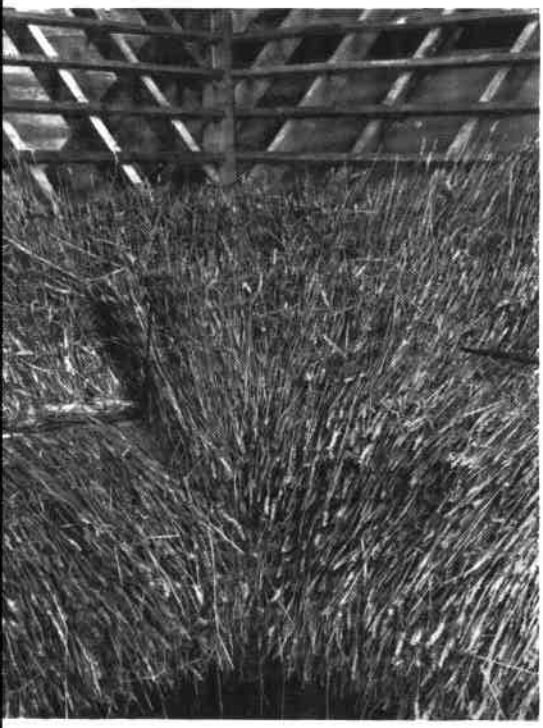
Looking straight into the valley the direction of the bottles is more clearly seen.

Once the valley is turned, a new sway is started. The pointed end of this sway is inserted just below the sway on the other return.

On leaving the valley, the eaves-bottles gradually resume the vertical position, until they are in line with the rafters.

An extra course for packing purposes is laid in the valley, with the small end just covering the sway. This also helps to give a sweep to the valley in preference to a sharp angle.

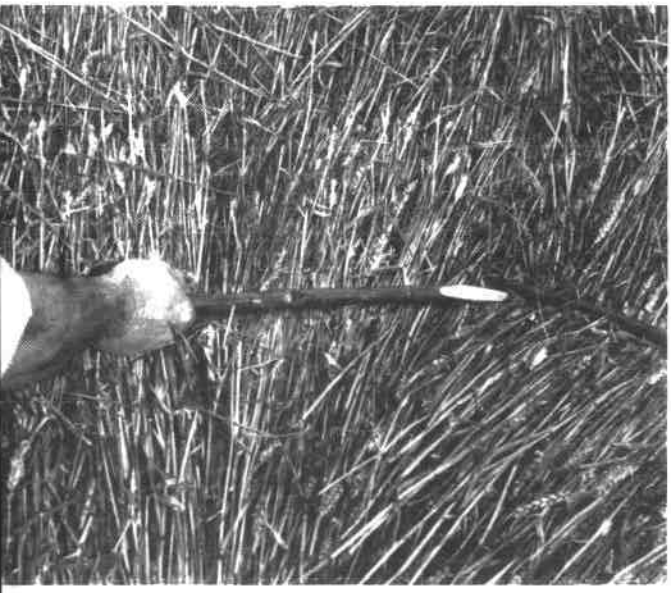


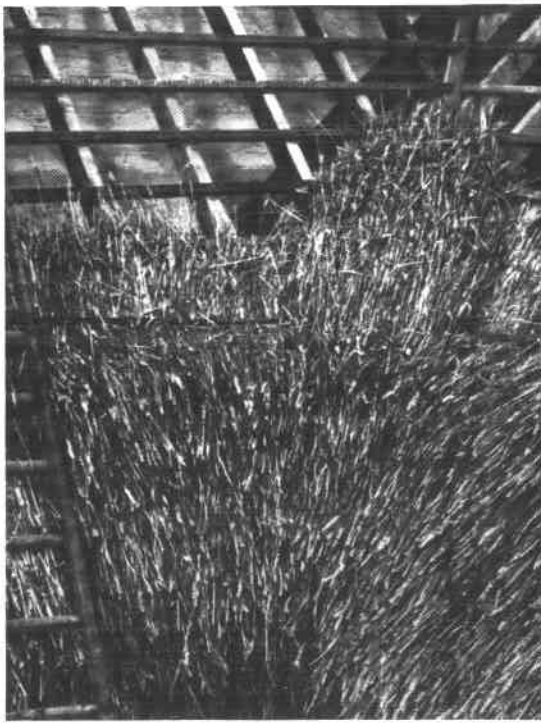


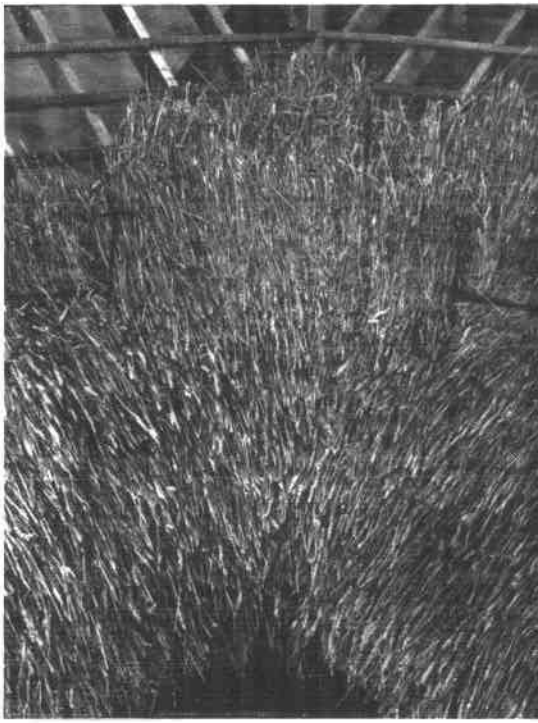
Continuing the courses round the valley, the yealms are laid large end uppermost.

This double course has been laid in the valley and is now ready for the sway.

The pointed sway on the return side is inserted below the sway already fixed.



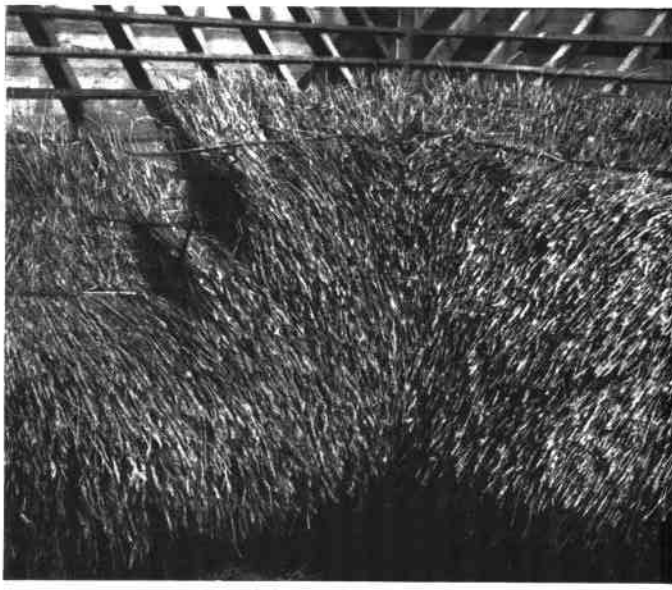




A closer view, shows the advantages of this method of joining the two sways, as it obviates driving a hook in the actual valley angle.

The next double course is continued round the valley and is swayed down. After this, a packing yealm may be laid with its small end covering the sway.

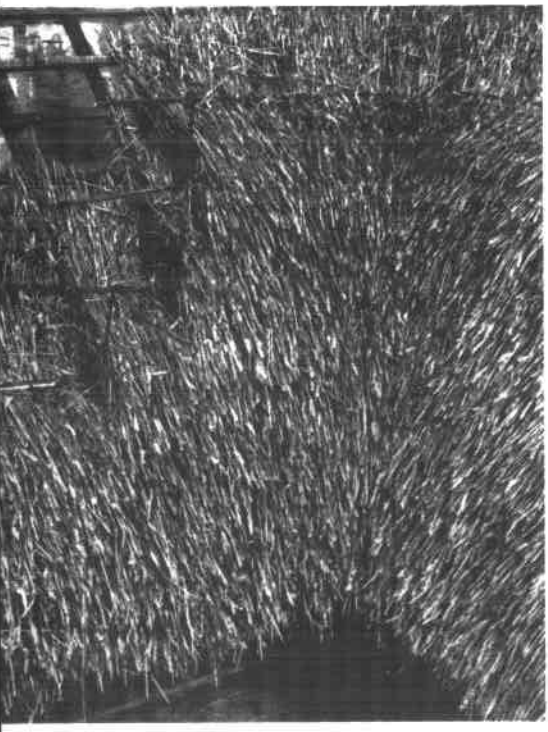
At this stage of the work, an extra course, as indicated by the two needles, is thatched very tightly over the packing yealms. This is done at intervals throughout the length of the valley, and has the effect of giving the valley the desired sweep in preference to a sharp angle.

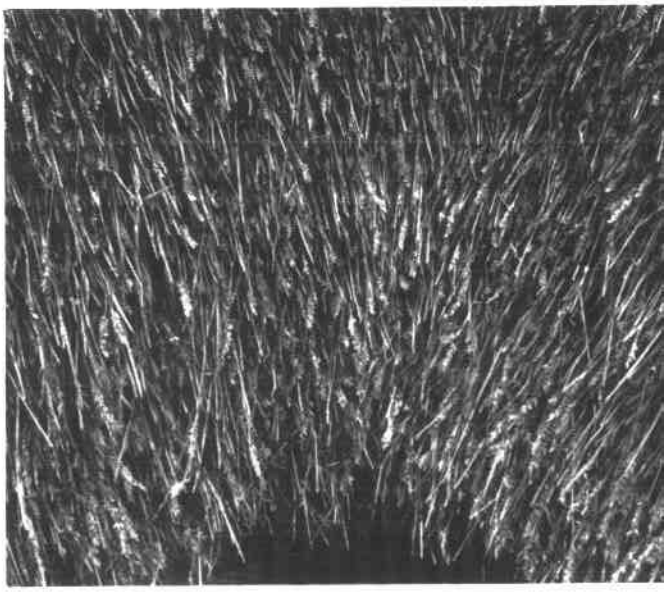


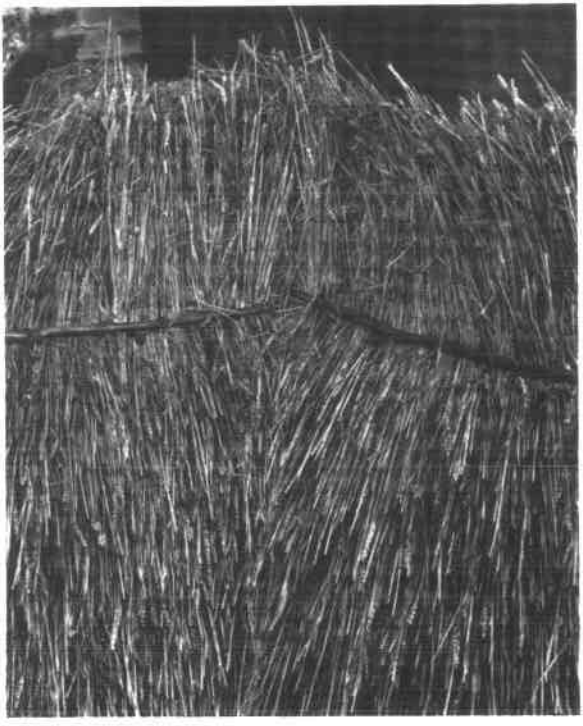
Taking a yealm from the yoke another double course is turned round the valley.

In the actual valley area, the yealms may be laid with the large end uppermost, but care should be taken to press each one tightly home.

The third course is completed in the valley and is swayed down.







A more advanced stage is shown after the fourth double course has been fixed.

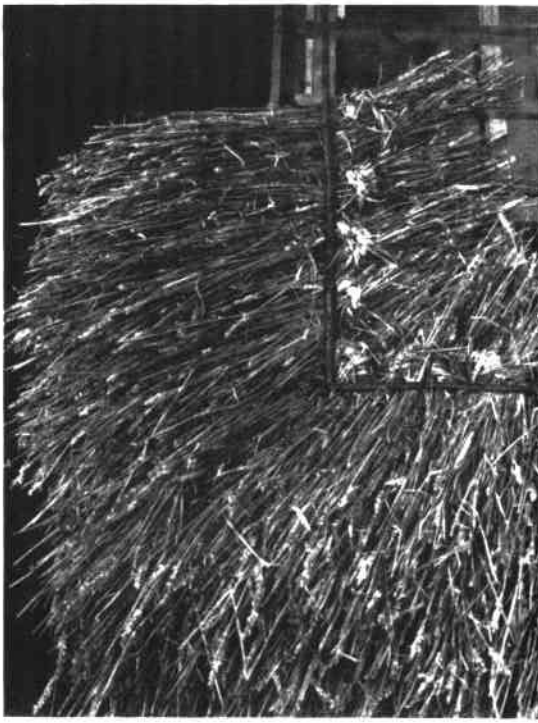
This closer view of the valley shows there is no definite angle, *but instead the area is swept round to distribute the water over a wider surface, thereby decreasing the effects of weathering.*

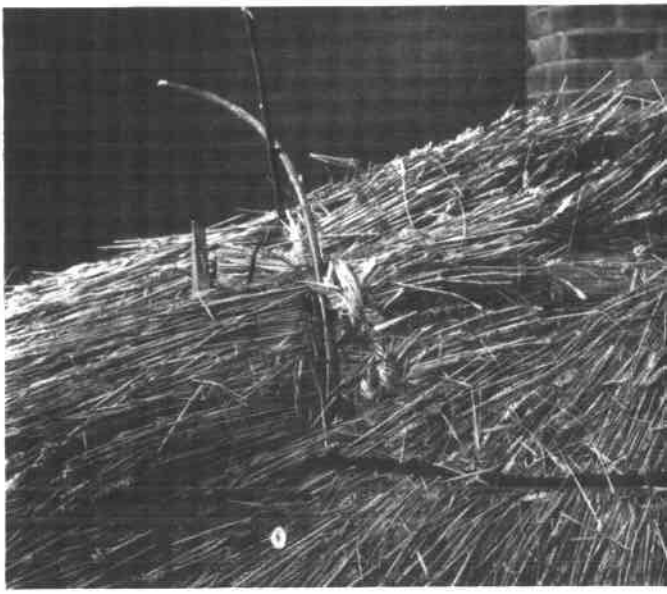
The top of the valley is reached and the sways are fixed in the normal way.

Turning to the left-hand barge, the necessity for setting the corner bottle separately, *and working inwards to join up*, is clearly illustrated.

The corner of the barge is set and the eaves join with the main work.

Setting the bottles in the barge is the next procedure. These are swayed down allowing ample overhang as previously described.

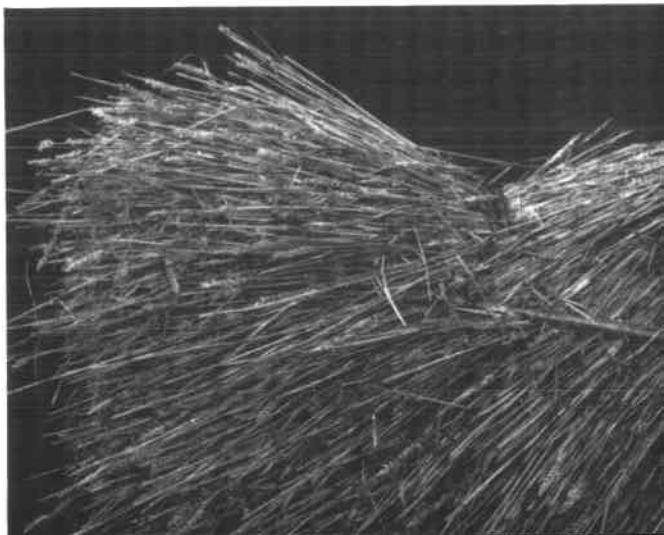


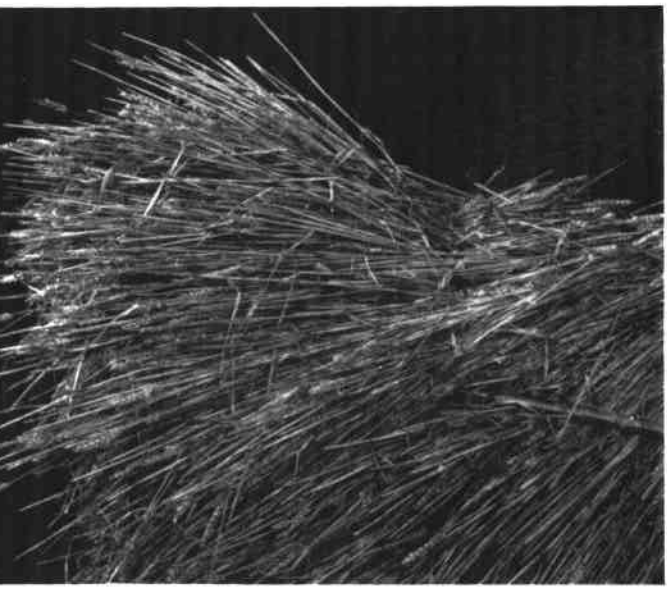


Starting on the extreme left hand and working inwards, the double course is laid and swayed down.

The remainder of the left-hand barge is repetition work until the apex is reached. This is shown before the top course is laid. A roll has been fixed to the ridge-board and the two sways which hold the barge-bottles will secure the final point.

More bottles are laid on the apex and the two sways are hooked down. The top course is also completed.

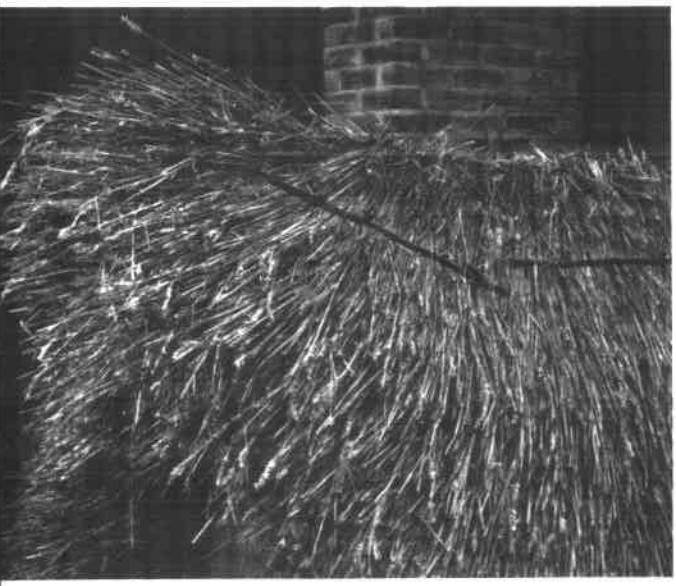




In order to provide extra thickness in the apex of the two barges, a large yealm is laid each side and is sparred down against the sway underneath.

The next procedure is to lay the side courses which go to make up the ridge, as it is intended to show a flush ridge with no cut pattern as an alternative method of finish, it is unnecessary to lap a deep course to form the thickness for cutting.

The tops of the small ends of the yealms oversailing the apex are twisted together and sparred down into the roll. This ensures a firm solid top for the ridge-course.



The side courses are laid and the tops twisted in ready for laying the ridge. The rods showing are of a temporary nature and are removed as the ridge is laid.

Turning now to the chimney in the ridge, the top course on either side is swayed down and ready for twisting in. The lower rod is a temporary fixing.

The sway in the cavity in front of the chimney is fixed as high as possible.

Grasping the yealm piece by piece, the ends are drawn out to make it longer.

Half the yealm is now gripped firmly towards the ends and bent across the ap by bringing the hands together. This is repeated with the remaining half and the ridge-course assumes a pointed shape.

The needle is inserted centrally and used as a lever to force the yealm tightly against that part of the ridge already laid This ridge-course should measure approximately 6″ (150 mm) in thickness the apex.

A further course, having the tops twisted inwards, is firmly laid in front of the chimney, and a twisted straw bond is sparred down for fixing.

The process of laying the final ridge-course follows

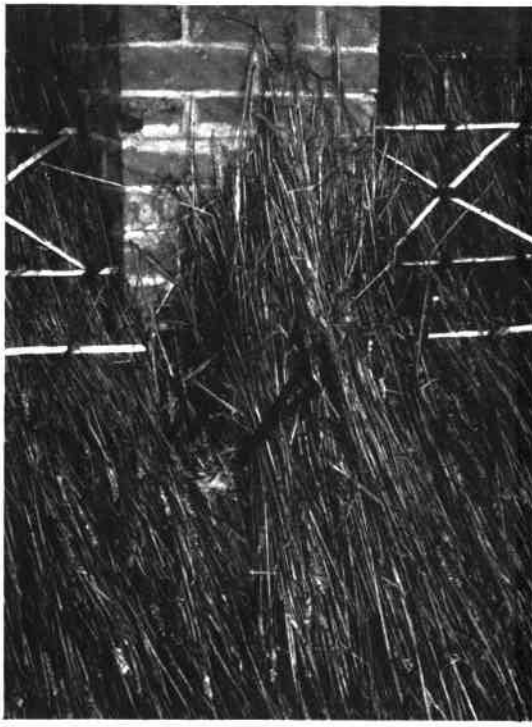
Straddling the apex, the operator takes a yealm from the loaded yoke, which is situated just behind him.

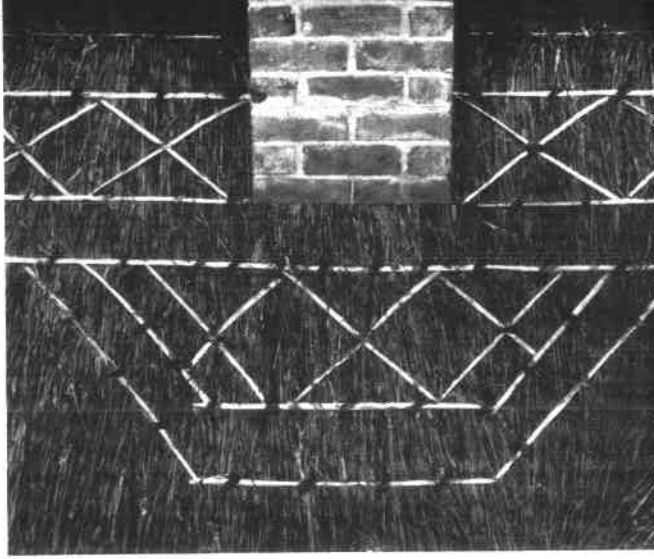
As one end is larger than the other, half the yealm is reversed to make both ends equal.

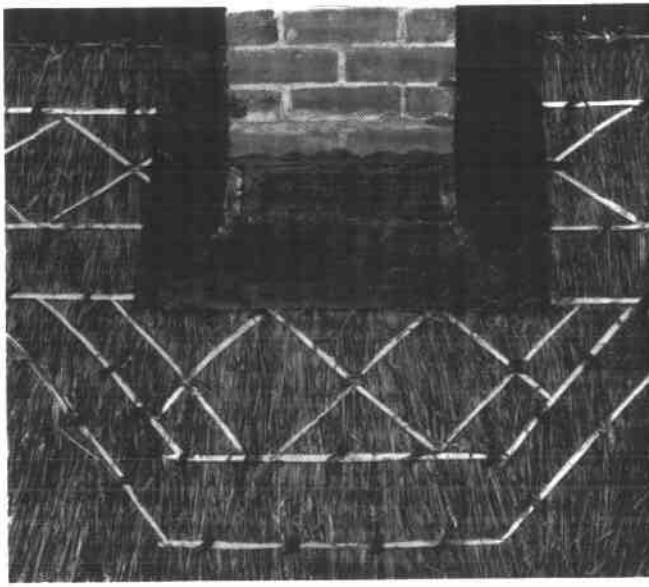
Whilst still in this position on the ridge, the thatcher is able to fix the top ligger. This has the two-fold purpose of sparring the ridge course down to the roll, which is tied to the ridge-board, and also has the effect of producing a straight horizontal line which is the hall-mark of a well-finished ridge.

After working the ends of the ridge course closely together, three liggers are sparred down and cross-rods fitted to any required pattern. The spacings between the liggers shown are 8″ (200 mm), 12″ (300 mm) and 6″ (150 mm) respectively, from the top downward.

The final course in front of the chimney is now placed in position and must be worked very firmly together.



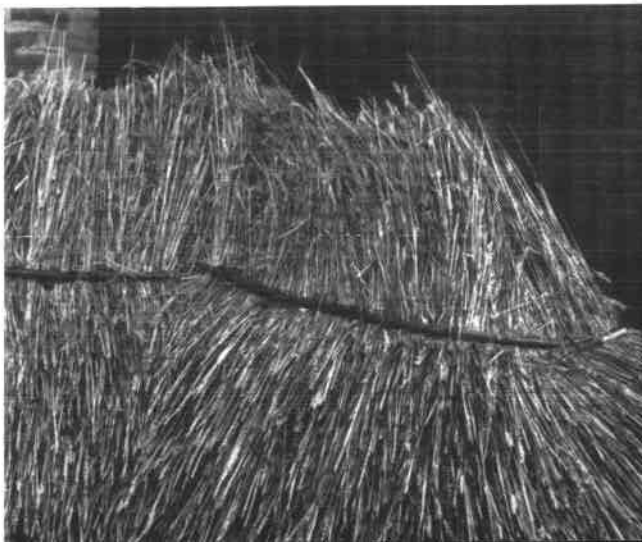




Liggers and cross-rods are now sparred down and the top of the course is cut in a straight line against the brickwork.

Lead flashings and aprons are fitted to the chimney-stack, and a completely water-tight junction with the brickwork is effected.

The hip- or cap-end now has to be finished off. The top course has been laid and is now ready for the side course and then the ridge.

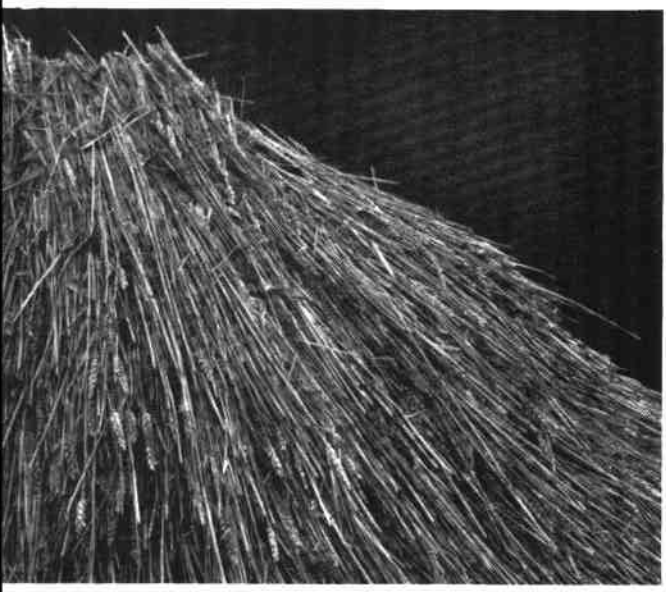


The sway is covered with a good thick side course, which is packed in tightly, with the large end of the yealm downward.

The side course is completed, the tops are twisted together and sparred down into the roll beneath. The ridge may now be laid.

To start the ridge on the cap-end the ring-topped needle is inserted centrally in the apex. A good yealm is lengthened out with both ends made equal. After bending it in the middle, it is swept forward on either side of the needle, in line with the straw in the hip-end.

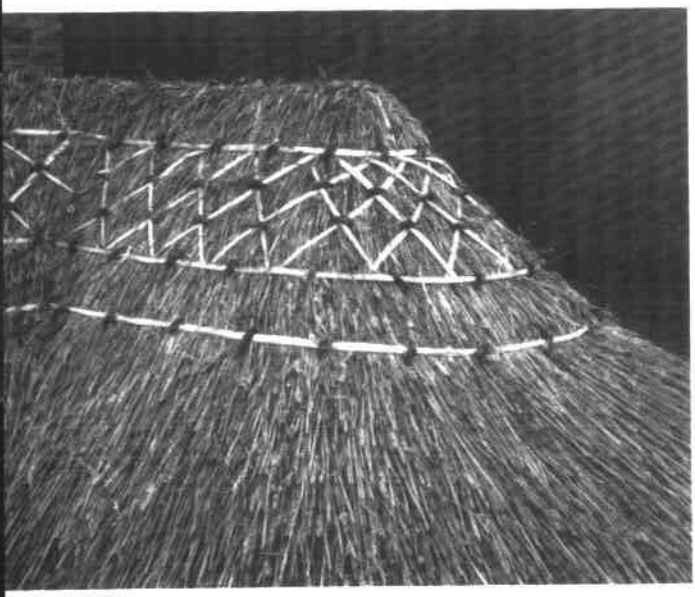
Another needle forces it tightly together and more yealms are laid to it as previously described on pages 37–39, until the whole ridge is completed.



Long straw

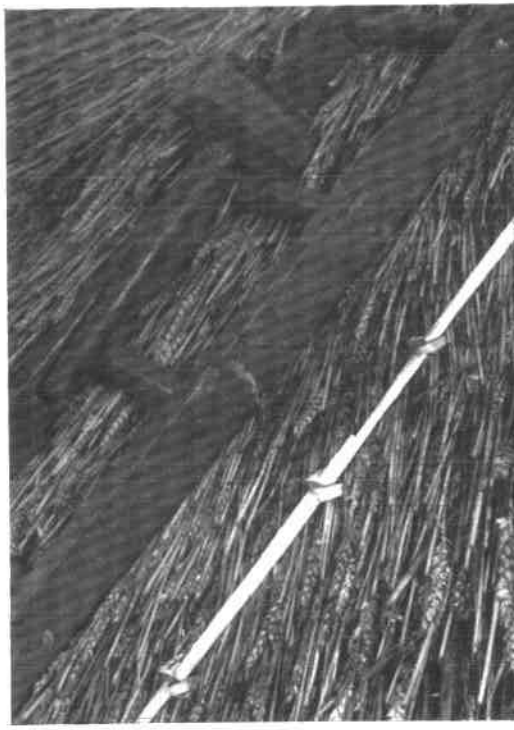
Providing a sufficient thickness of straw has been tightly laid, a firm solid ridge will result.

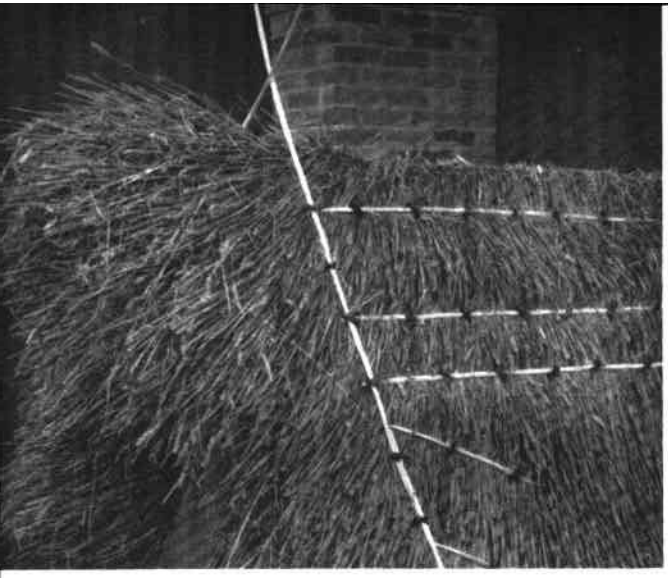
The alternative pattern shown, is one known as the 'triple diamond' pattern. Spacings between the liggers are again 8" (200 mm), 12" (300 mm) and 6" (150 mm) respectively, from the top downward. The main coating of thatch has been well combed down with the side-rake and a neat and tidy finish obtained.

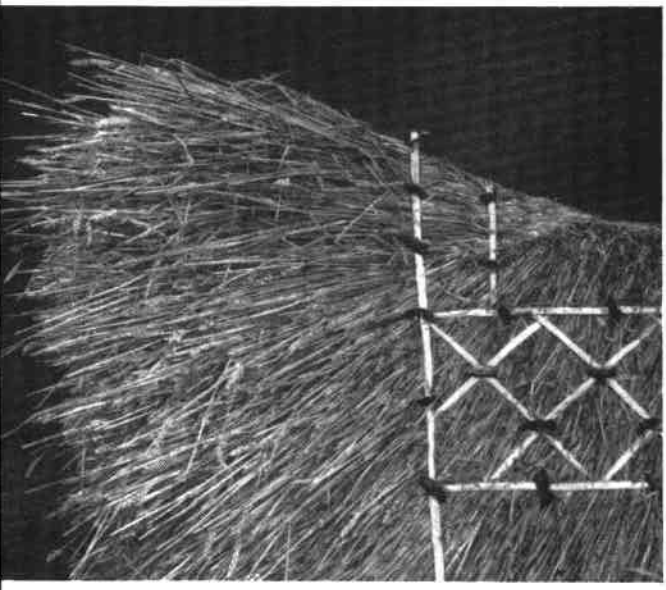


Before the barges are cut they must be sparred down with a ligger. Using the needle as a guide, the ligger is fixed immediately above and in line with the barge-board. To make a neat joint the ends of the liggers are tapered and halved together under a spar.

The spars are driven in horizontally and slightly inwards to avoid carrying the water downward into the thatch.







Now that both liggers are fixed to the two barges of the gable end, it will be seen that beneath the spot where they cross at the top, further yealms are required to complete the apex and to enhance the ridge-line as shown in the next photograph.

The two liggers are sparred down and the superfluous ends removed after the yealms have been packed in. This addition to the ridge is known as a 'pinnacle'.

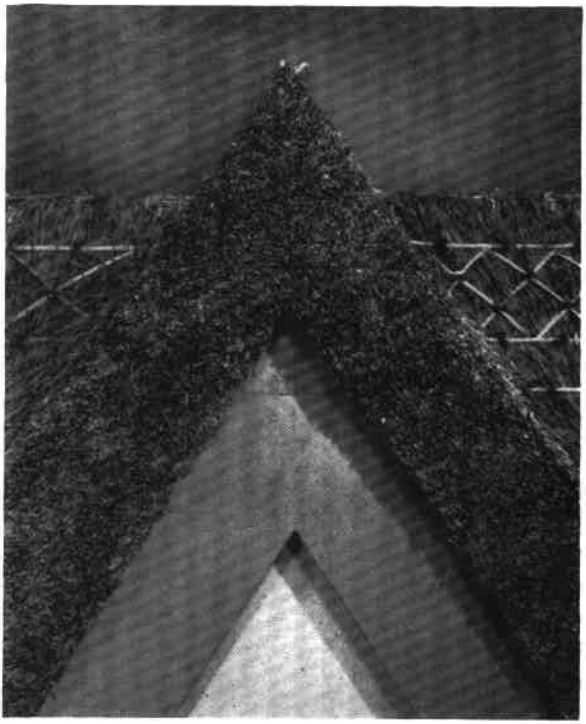
The completed barges are now ready for cutting, and although the actual method and tools employed may vary from county to county, the method shown is more generally used.

In order to simplify the cutting process, a straight-edge can be fixed accurately on each barge to act as a guide for the knife.

The knife is held with the handle leaning slightly outwards, to provide a drip on the topmost edge of the barge. The lower edge of the cut will overhang the barge-board by about 4″ (100 mm).

The barge may, of course, be cut without the use of a straight-edge, in which case needles are used as markers to ensure a straight cut.

After the main cutting with the long knife is finished, superfluous straws are removed with the shears.



By using the shears, all edges are squared and lines straightened, to ensure a neat and tidy finish. This applies to windows and eaves for which exactly the same cutting method is used.

The advantage of clean straight lines will be apparent from the completed section of the gable.

STULCH

This method involves the thatch being laid in a strip from eaves to ridge approximately 30″ (750 mm) in width, final finish to work is carried out as previously described.

CASING OVER OLD THATCH

One of the most important features of this type of thatching is the preparation of the roof before the actual thatching begins.

All decayed and superfluous thatch should be removed, down to a thickness of about 10″ (250 mm), to eliminate unnecessary weight on the roof. All barges and all decayed eaves should also be stripped out and new straw fixed in with hazel sways and iron hooks.

The new coat of thatch to the main roof may be sparred into the old thatch, using the method shown on pages 17 and 18 whichever is preferred.

The rest of the work is practically the same as that already prescribed for new work.

RIDGING AND REPAIRS

A roof thatched in long straw can be given a new lease of life when it is re-ridged and carefully repaired.

The decayed part of the old ridge, together with any remaining liggers and spars, should be removed.

A new roll which can be sparred down centrally along the ridge will in all probability be required.

A flush or patterned ridge, according to requirement, can then be laid. This would include the appropriate side courses or skirts, using the same method as that which applies to new work.

The main body of the existing thatch can be cleaned down and all holes and worn places carefully filled with new straw. This should be fixed with short, thin spars and the new straw neatly trimmed.

New liggers should be sparred to all eaves and barges.

3 | Combed wheat reed

IN the preceding chapter, the laying of long straw was described in detail. There is yet another technique of thatching in straw, that known as combed wheat reed. Though these two materials and the present-day difficulties of supply are similar, there are considerable differences in their preparation and in the technique of laying them on the roof.

Thatch in combed wheat reed, though seen throughout the thatching counties, is most widely used in the south and west of England. Its name must not, however, allow it to be confused with water reed, the two materials coming from very widely separated types of plants. There is, however, a distinct similarity in the method of the application of the material to the roof, both of which are laid 'reed-wise' with the butts of the stalks exposed. It is thus easy to see how this method of thatching with straw came to be known as wheat reed thatching.

Unlike the long straw thatch which has been described as giving the appearance of having been poured over the roof, the combed wheat reed presents a neat, close-cropped finish. From a distance it could easily be mistaken for water reed, but on closer examination it will be seen that the eaves and gables of the wheat reed are cut to shape, a distinguishing point between the two techniques. The water-shedding qualities of the straw reed and the water reed are also similar. The drops of water can be seen dripping from stalk to stalk over the whole surface of the roof, rather than running down the solid surface of a roof covered with other material.

Before the days of mechanisation on the farm, combing was carried out by hand. This was tedious work and was normally undertaken by women. Now these hand methods have been superseded by a machine known as a reed comber. This machine, which is fitted on the top of an ordinary threshing drum, removes the grain and leaves from the wheat, without the straw going through the drum. The straw thus comes from the machine undamaged and with the butts all laid in one direction.

Having passed through the comber, the wheat reed as it is now called, is conveyed along moving belts to a tier, where it is tied into bundles of convenient size for handling. Each bundle is butted on to a board known as a spot-board, and after being trimmed is stacked near by to await delivery to the job. Alternatively, when a tier is not available, the reed may be hand-tied. In this instance, the reed falls into a cradle immediately it leaves the comber. It is then placed in a winch-frame which is used to draw the reed tightly together under pressure, thus facilitating tying.

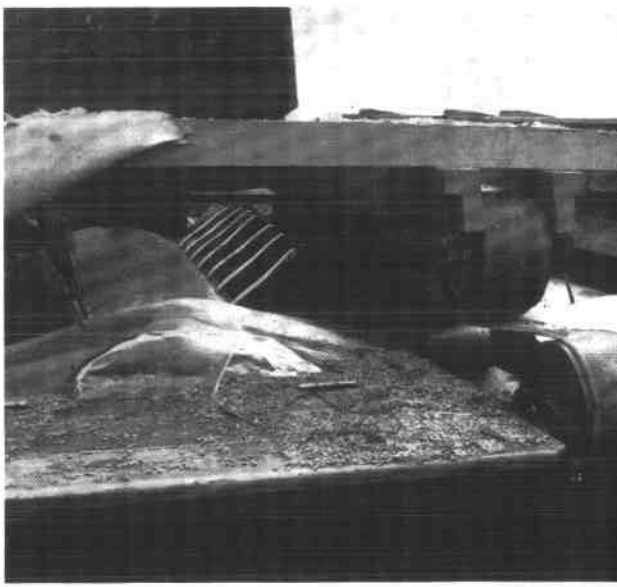
Combed wheat reed

The traditional bunch of wheat reed is known as a 'NITCH' and should weigh 28 lb (13 kg). It is normally tied with binder twine. Bulk orders are quoted at 'per tonne on the farm'. Though the process of combing and tying slows down the work of thrashing, this loss of time is offset by the higher price obtainable for the straw in the form of combed wheat reed, and providing the length does not fall below 27" (680 mm) it is still suitable for combing, although the ideal length is 36" (1 m).

The Agricultural Development Advisory Service, Exeter, of the Ministry of Agriculture, Fisheries & Food, has in liaison with CoSIRA carried out extensive trials in the growing and testing of new varieties of wheat mainly in the best interest of agriculture but also of considerable benefit to the Thatching industry. CoSIRA's particular interest in this sphere is to ensure a plentiful supply of high-performance material for thatching.

New varieties of wheat are now presented to the farmer more frequently than hitherto and the testing and choosing of varieties has become more intensive. The continuing objective is to produce a variety of wheat to yield a satisfactory weight of grain on a straight hollow-stemmed straw, approximately 36" (1 m) in length, with good combing properties and durability.

A dual-purpose crop of this kind involves harvesting with a binder, stooking, stacking and combing, a labour intensive activity calling for a co-operative endeavour by the farmer and thatcher alike.



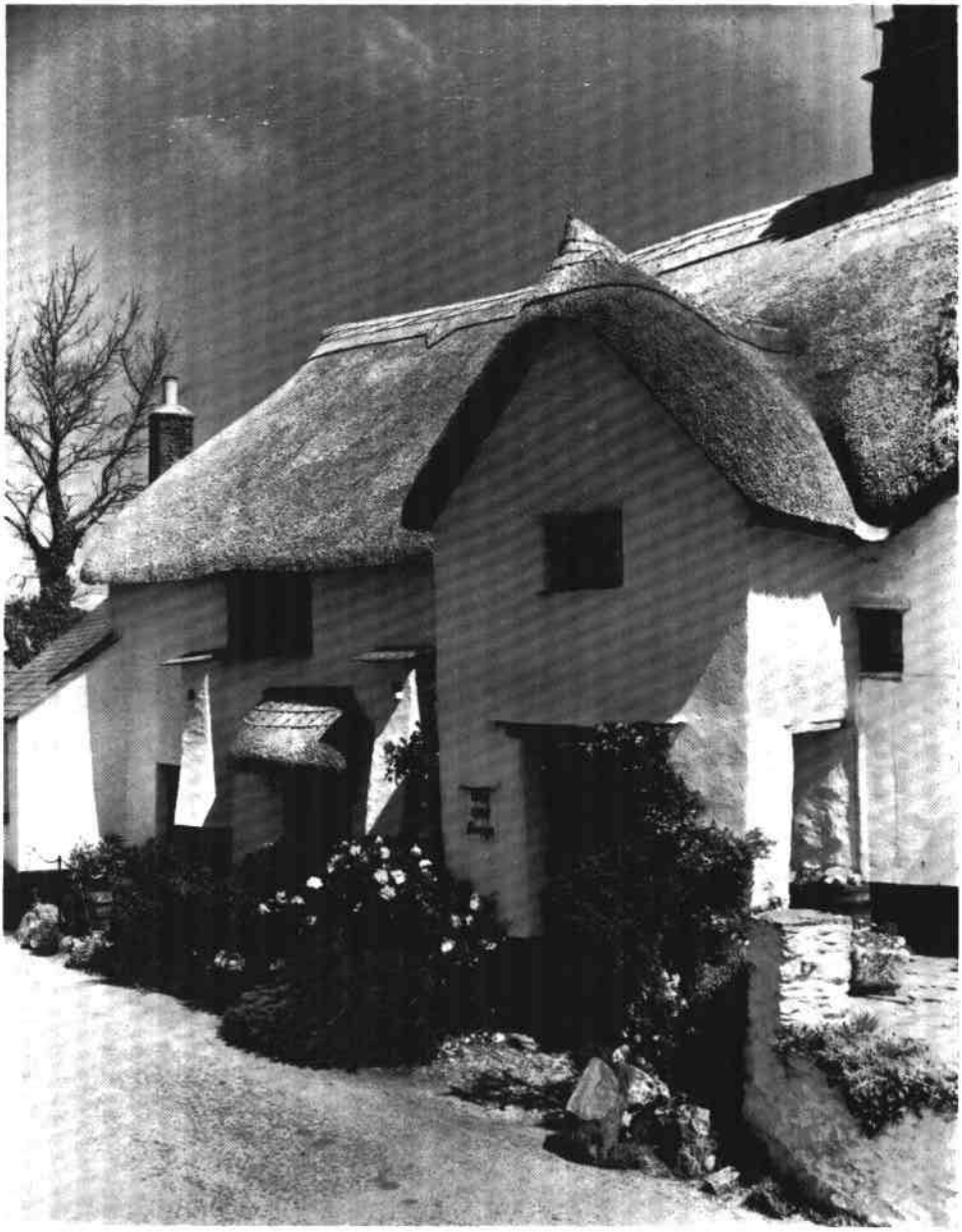
Feeding the wheat into the conveyor belts of the comber

Detail of the feed mechanism of the comber

Wheat reed leaving the comber

Butting a bundle of reed on the spot-board after it has left the tier

Stack of wheat reed ready for the thatcher



Above: *The Old Forge, Kingston, near Kingsbridge, Devon*

Left, top: *Burgate Farm, Burgate, Fordingbridge, Hampshire*

Left, below: *Cottages at Little Bredy, Dorchester, Dorset*

'Petoc', Tigley, Devon

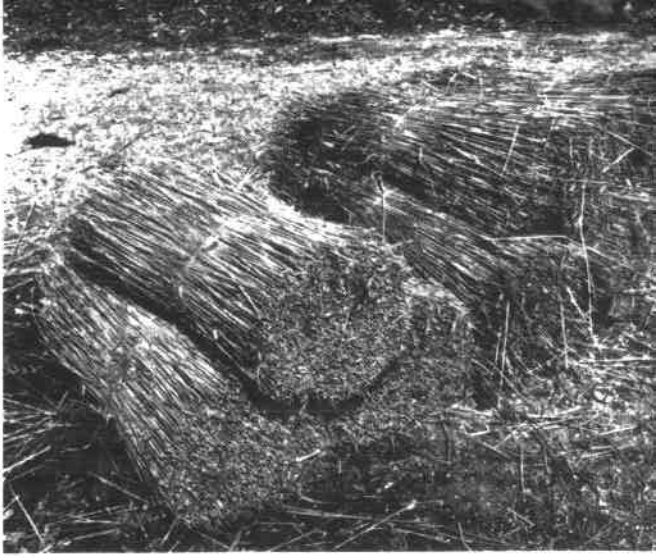
'Oak Apples', Bradfield St. Clare, Suffolk

A convenient place on the site is chosen to stack the reed and it is suggested that a layer of old thatch or similar waste material is used as a base, to protect the reed from rising damp. The stack should, if possible, be covered with a tarpaulin as a protection against adverse weather conditions.

One great advantage with wheat reed is the minimum of preparation required on the ground. Taking the bunches from the stack, each one is butted on the spot-board to level the butts.

Straws are removed from the butts end by clipping with shears.

Combed wheat reed



Dressing the reed before use is most worth while as shown in the illustration.

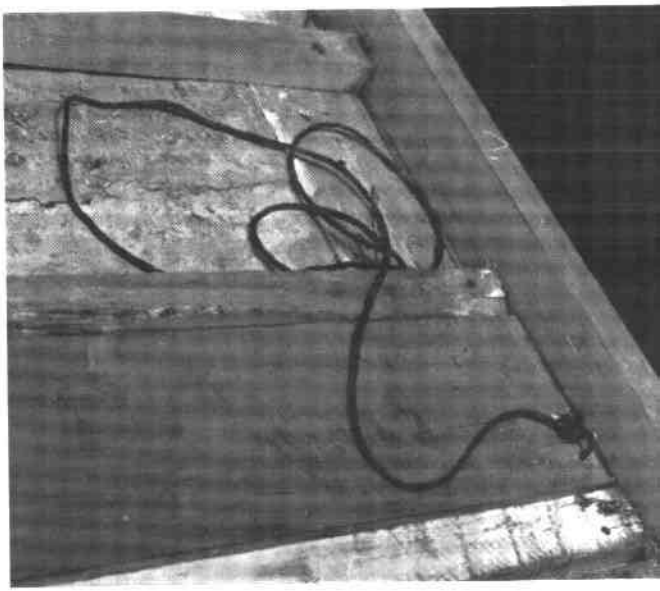
A quantity of bunches are stood closely together and water is sprinkled into the end of each bunch.

The bunches are then laid in a horizontal position and allowed to soak, after which they are ready for use.

A wadd, prepared by working a good double handful of reed together, is required for the setting of the eaves and barges.

The wadd is held lightly in the crook of the arm and butted on the spot-board.

Gripping the wadd between the knees, it is tied firmly with string or twisted reed bond.



The wadd is butted again on the board and is now ready for use. As the foregoing constitutes most of the preparation on the ground, work on the roof may now go on unhindered.

The illustrated method of fixing the eaves and barges is that whereby the wadds are laced in with tarred cord. The staple and string are fixed for tying in the corner wadd.

A straight hazel sway may be nailed on the battens, just inside the barge-board. The under-side is trimmed to enable it to lie flat.

As the barge-wadds are laid, the tarred cord passes round them, lacing them to the firmly fixed sway.

The first eaves-wadd is tied in on the corner at about 45 deg. The cord is passed round the lowest batten and pulled very tight. The action of the tilting fillet is clearly seen in the amount of upward pressure at the lower end of the wadd.

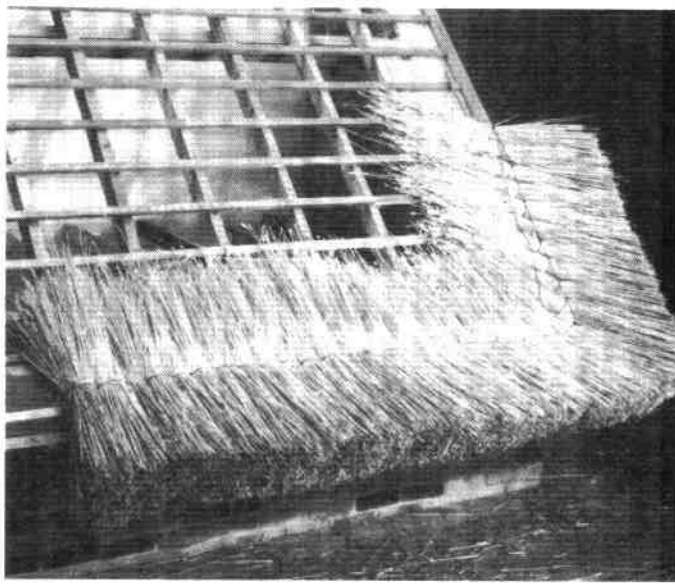
More eaves-wadds are laced in.

Combed wheat reed

The leggett is used to dress the wadds into line. This also tightens them in the cord.

Lacing the barge-wadds. The tarred cord passes over the wadd and underneath the hazel sway.

Emerging between the two wadds, the string is pulled very tightly, whilst at the same time pressure is applied to the wadd with the free hand.



The cord is tied with the appropriate knot and a further wadd is laid.

The leggett is used to dress the wadds in line as the work proceeds.

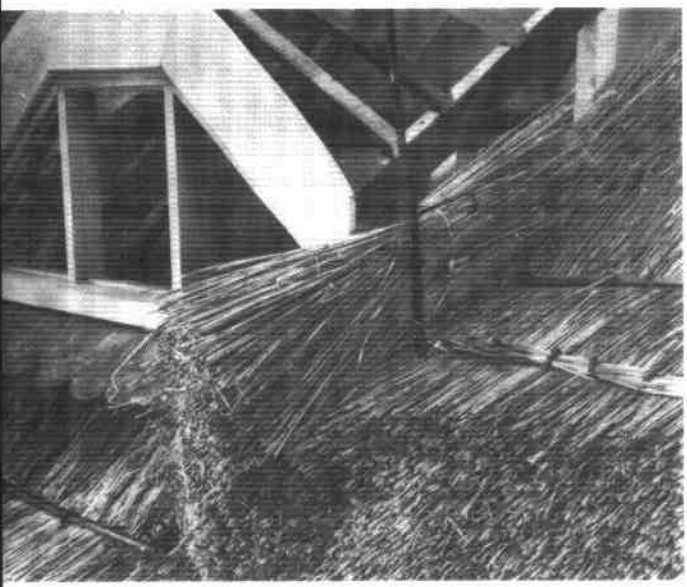
A portion of the eave and barge is now ready for the next stage.

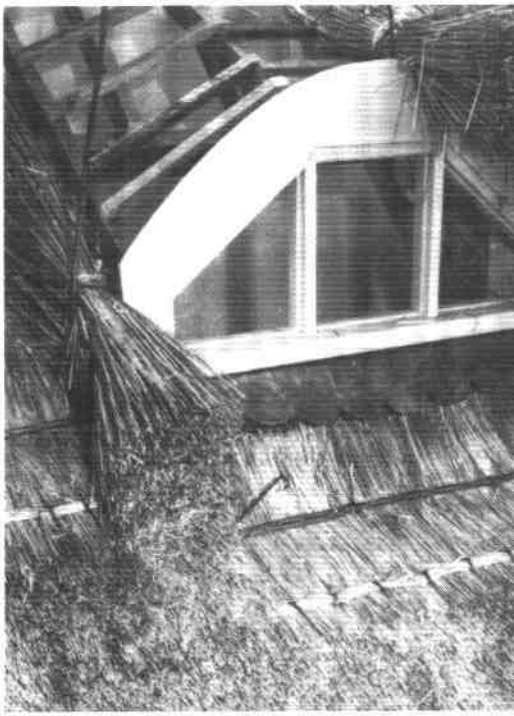
The second course is completed beyond the window.

No further main courses are carried through, and it will be seen here that the third course finished against the window-frame.

It now becomes necessary to set the eaves over the window. Allowing sufficient overhang for cutting, the wadds are laid and a sway is started.

Combed wheat reed





The fourth main course now joins up with the eaves-wadds.

The eaves-wadds are carried over to the centre of the window and the tying-in method is resumed on reaching the battened portion.

The eaves are started on the left-hand side after the corresponding main courses have been laid and fixed.

All the eaves-wadds are now tied in over the window. The upward pressure of these wadds is exaggerated by the tilting fillet in the window construction. This pressure, combined with that of the next course, makes a tight eave.

The brow-course is carried over and swayed down. Ample back-filling is applied to the top of the course.

A further course is now carried over the window and fixed with a hazel sway. The courses which follow have been previously described and until the ridge area is reached, are merely repetition work.

For other windows, the work of cutting the eaves is commenced in the centre, proceeding from left to right.

The left-hand side is cut with the eaves-hook and the shape of the window is clearly defined.

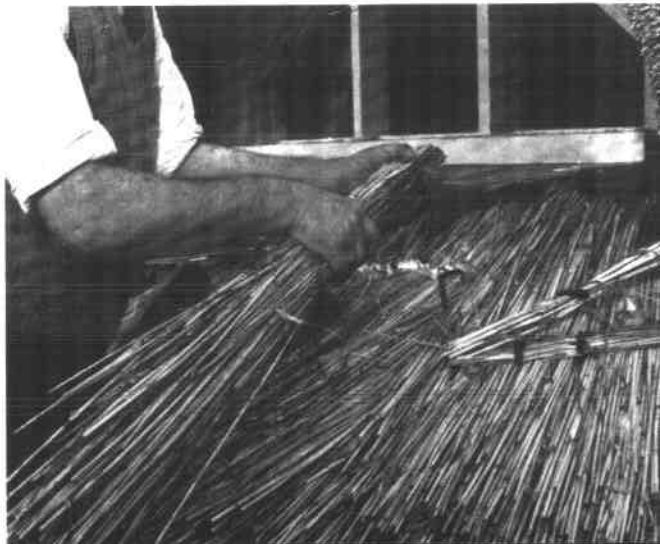
Moving to the cavity in front of the window, a method which may be used to bring this area into line with the main work is described. A tight course is laid with the reed reversed to provide the thickest part uppermost, and is held in position by a temporary sway.

When the whole course is laid it is hooked in with a hazel sway, and for extra strength, a twisted bond is sparred in if desired.

After removing the temporary sway the ends of the course are levelled off with the shearing-hook.

The next course to be laid provides the thickness for the ornamental pattern which will give an artistic finish to this type of window. For a plain finish this course would not be necessary.

Combed wheat reed



The position of the pattern course, and how it is fixed with twisted bond sparred in is shown.

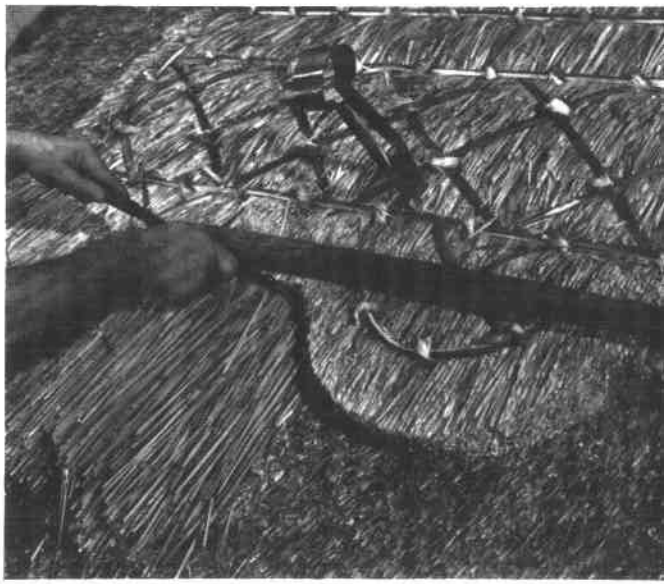
The finishing course is worked right under the lead. A handful of reed is folded over at the small end.

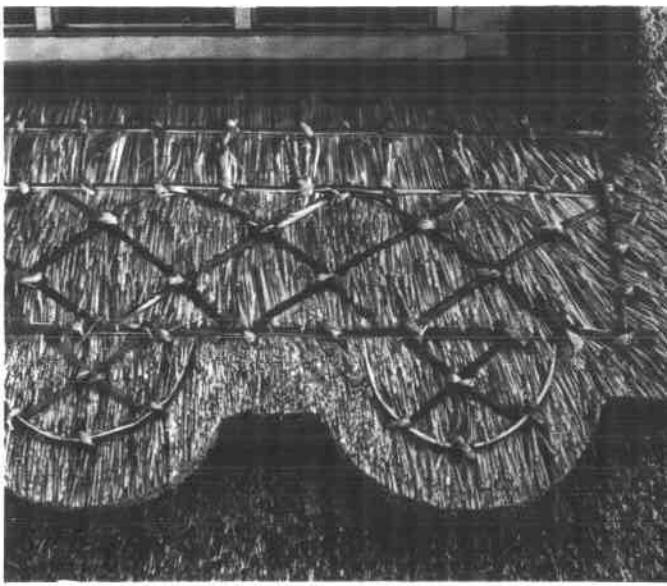
A tight knuckle is made.

The reed is worked tightly underneath the lead apron and held in position with a temporary sway.

The lead apron may now be dressed neatly on the thatch and this is followed by the process of fixing the hazel liggers.

The liggers and cross-rods are sparred in according to the design chosen.





After the first cut round the scallop is made with the small knife, the shears are used to trim the pattern into shape.

A side-rake is often useful as a straight-edge when cutting.

A section of the finished apron is seen in greater detail. If a plain finish is preferred, the final course of reed which is worked under the lead, would be fixed down with two liggers. The lower ends of the course would then be sheared off flush with the main coating.

The illustration shows an impression of the completed window. This would not normally be finished until all the coating is laid and would, in fact, be one of the last jobs.

There are many variations of the type of window which occurs in thatch, thereby presenting unlimited scope to the architect. In most cases the principles of construction would be fundamentally the same.

Before any of the courses of reed reach the apex of the roof, a good tightly made roll or dolly needs to be fixed. The process of making this roll of any required length is described in the chapter on water reed thatch on page 173.

A method of tying the roll to the apex, which involves the use of strong tarred cord, is now shown. The cord is passed underneath the batten and pulled very tight, whilst pressure is applied with the right hand.

Whilst retaining the tension with the left hand, the cord is passed under the tie, thus locking the stitch.

The cord is now carried over the roll and under the batten on the other side and the procedure is repeated.

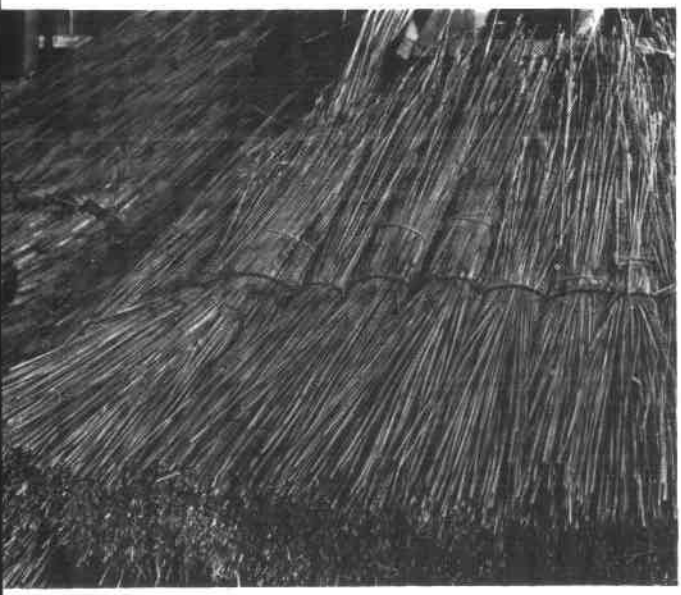
Using the short-handled knife, the end of the roll is cut off to the required length.

The roll serves the two-fold purpose of (*a*) providing extra springing to the top course of reed; and (*b*) a tight base into which spars may subsequently be driven.

When dealing with the half-hip it is usual to complete both barges up to the level of the eaves-board. The eaves of the hip are then started by tying the first wadd right on the angle of the hip-rafter.

Leaving the angle of the hip these eaves-wadds gradually turn until they are in line with the centre rafter.

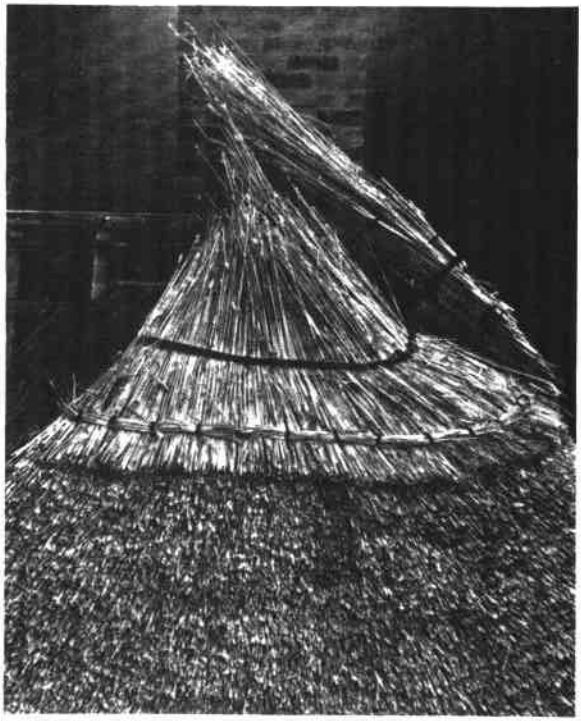
Combed wheat reed



From the vertical position of the centre rafter, the eaves-wadds now turn in the opposite direction, whereupon they join up with the left-hand barge, in line again with the angle of the hip-rafter.

The first and second courses are now carried round the hip. It is important that the tops of each course of reed always point towards the apex of the roof following the run of the rafter.

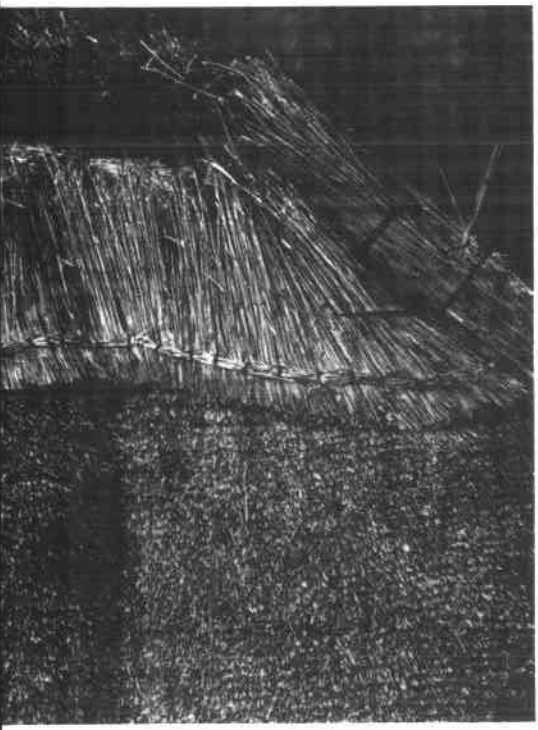
The brow-course in the half-hip now turns the second angle, where it merges into the main roof.



The second course is also carried round the hip and is swayed down.

As the top of each course gets narrower, it becomes even more necessary to keep the reed pointing towards the apex, at the same time keeping the face tight.

We now see the position of the courses as they sweep round the hip, with their tops pointing towards the apex.



The final course now remains to complete the coating of the hip, as the previous courses have now merged into the main roof.

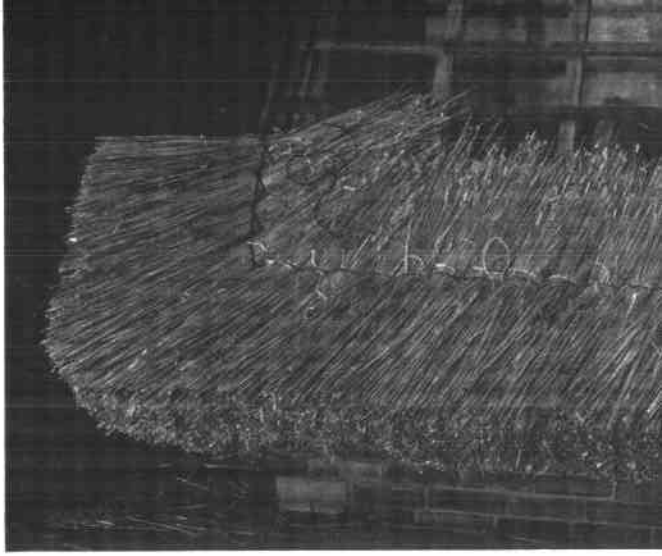
Before any more reed is laid round the hip, the tops which oversail the ridge-roll on the first side must be dealt with. They can either be cut off, or better still, twisted in as shown.

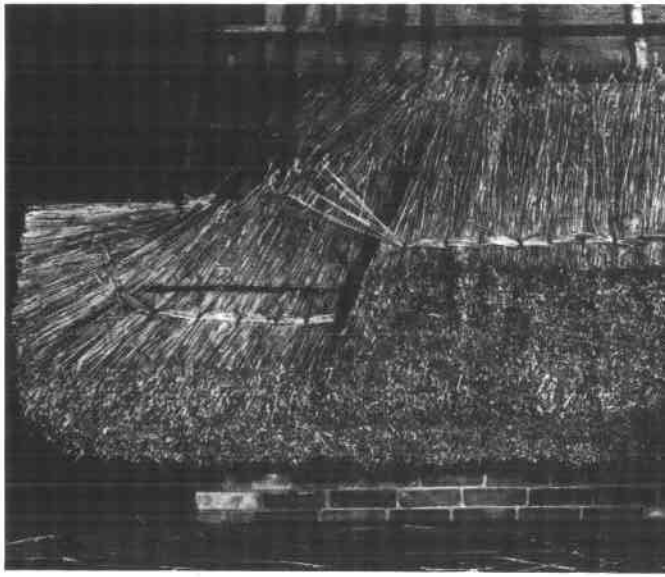
The handful of reed is twisted and folded back.

The twisted knuckle is forced against the previous twist.

The knuckle is then pressed firmly home and a twisted reed sway is sparred into the roll to secure the twisted tops.

Here we see the tops of the first side twisted in and sparred down. The lower reed sway is the temporary one and will be removed.





Before dealing with the final stages of the work involved in laying and finishing the ridge, mention must be made of the left-hand barge. It is, of course, a repetition of the right-hand barge in reverse, but the reed must start turning well before the corner is reached.

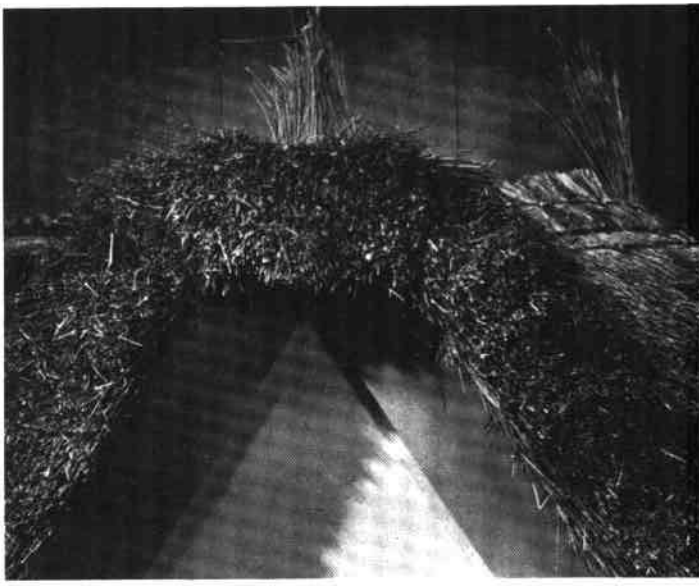
The wadds are tied in as previously described and each succeeding course fades away in the barge.

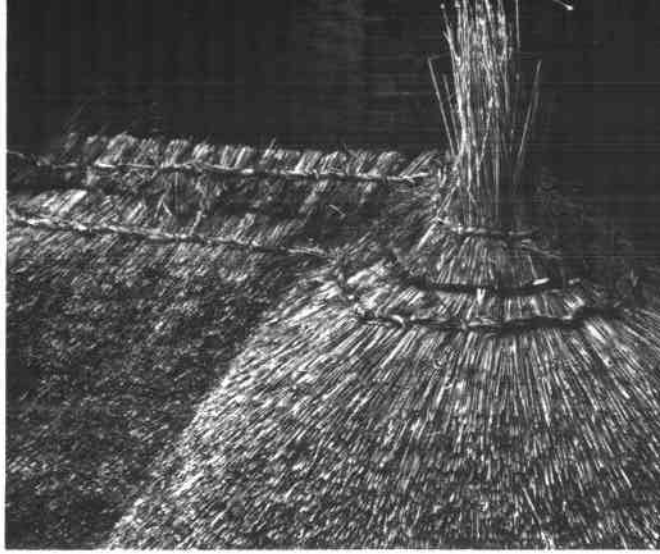
Special care is required as the wadds reach the top of the gable. In the example illustrated, a cap-end will be formed in reference to a pointed finish. The ridge-roll is cut back, and the apex formed by the junction of the two barge-boards is removed to the level of the ridge-board.

The wadds in the two barges are now joined and those in the centre portion form a small eave for the cap-end.

The top course on the second side is seen in relation to the twisted tops of the first side.

Now that the final course of coating is laid on the second side, these tops also are twisted in and sparred down.





All the tops are now twisted in except the tufted end which will be drawn into the next roll.

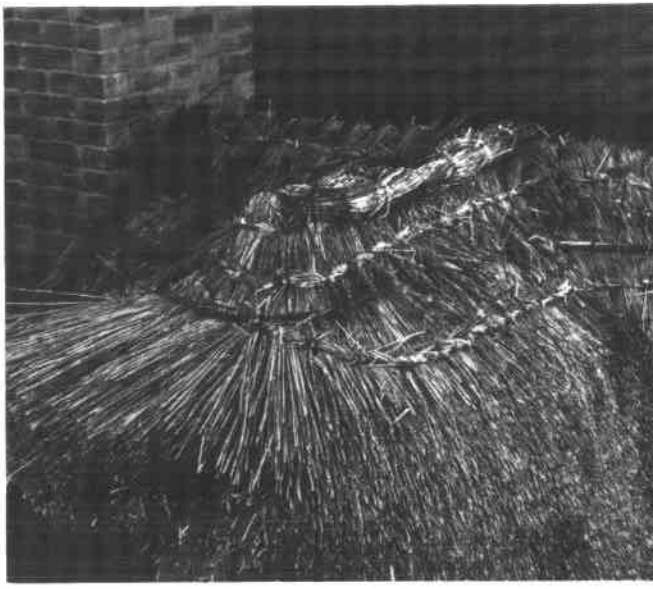
Before the pattern courses are laid it is suggested that the surface is lightly sheared to a depth of approximately 2′ (600 mm) from the sway. This will simplify the process of finishing off after the pattern is cut.

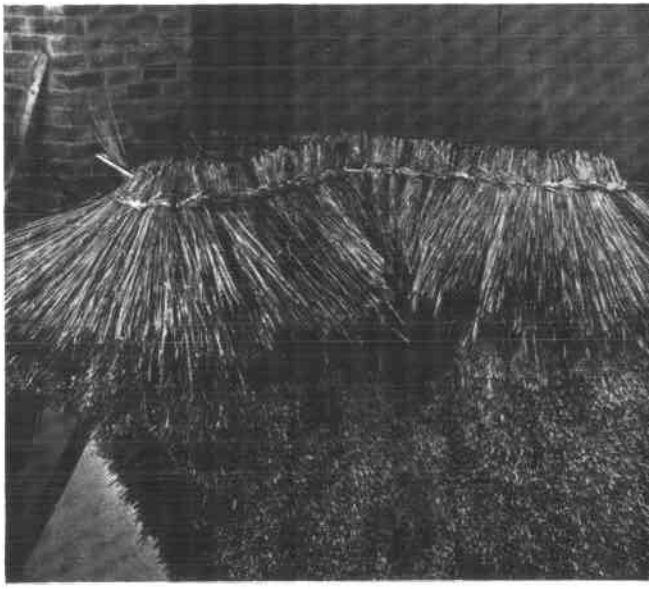
The second roll is now applied. This is fixed by driving spars through into the first roll.

The tufted end is tied in and trimmed and the work of laying the pattern course proceeds.

The pattern course is laid by taking a good handful of reed and folding over the small end.

It is then laid at the appropriate level beside the previous bunch and firmly held with the needle.





To secure this pattern course a twisted reed sway is sparred down.

An impression of the cap-end before the pattern course is laid.

The cap-end and the hip-end after the pattern course is laid.

The third and final roll is now sparred down. This not only provides a narrow top but also makes a firm, level base upon which to lay the ridge-course.

In laying the ridge-course, the needles play a special part. One needle is set centrally in the apex and against this, pressure is exerted as the course is tightly worked into shape.

One method of laying a turnover ridge is to take a good double handful of reed and part it in the middle.

Half of the reed is reversed in order to make both ends of equal thickness.

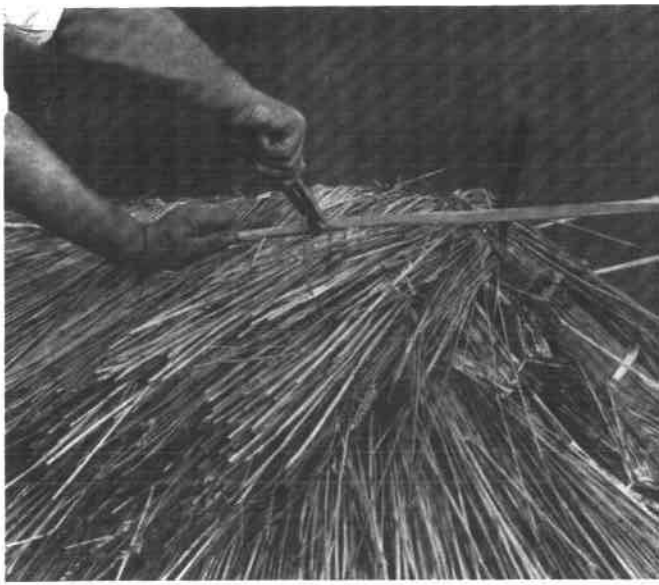
The bunch is then bent across the knee to form an angle.

It is then placed in position underneath the top ligger, which has already been started.

The needle is used as a lever to compress the bunch.

The needle resumes the vertical position and the same process is repeated throughout.

Approaching the valley the ridge-course must be kept in line with the reed of the previous course.



The ridge-course is secured and levelled by fixing down the top ligger with spars which are driven in at an angle.

We turn now to the process of sparring down the liggers. The arrangement of these is entirely dependent upon the design selected. The first ligger is sparred down.

The second ligger is fixed in place. In the event of a plain, flush finish being preferred, the part of the course extending below this ligger may be removed with the shearing-hook.

The third ligger is now sparred in. Starting from the apex and working downwards the spacings are 6″ (150 mm), 6″ (150 mm) and 12″ (300 mm) respectively.

The cap-end will have to be made up to bring it into shape. This is done by taking a handful of reed and folding part of the small end over.

This small handful of reed is worked into space and is followed by others until the required shape is achieved.

An occasional spar driven in here and there will secure the reed.

The topmost ligger is now bent over the end and sparred down tightly.

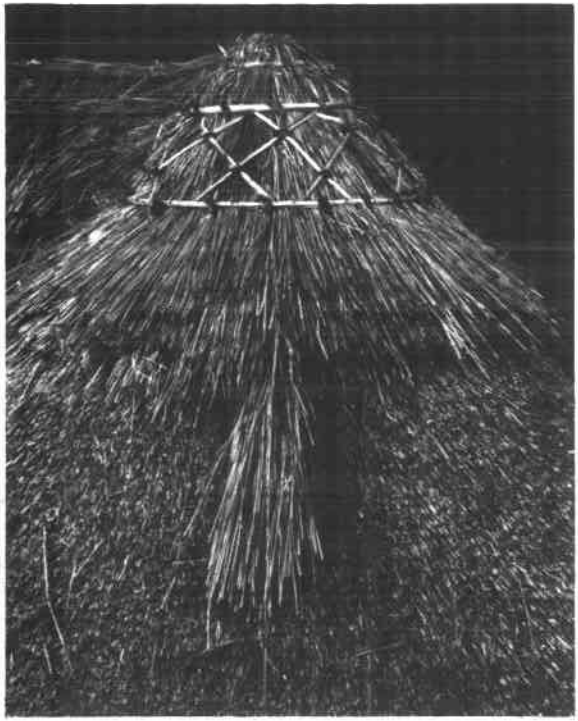
Cross-rods may be inserted 8″ (200 mm) apart, between the second and third liggers.

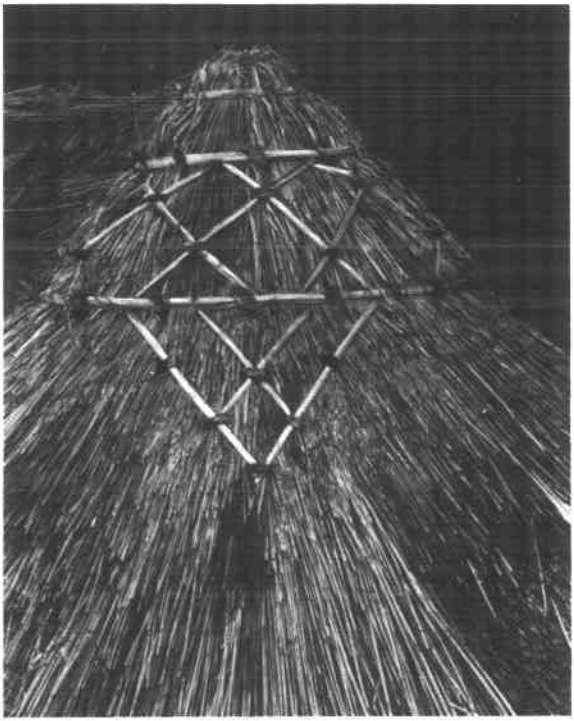
The straws in the cap-end are levelled and arranged to conform with the cone-like shape of the end.

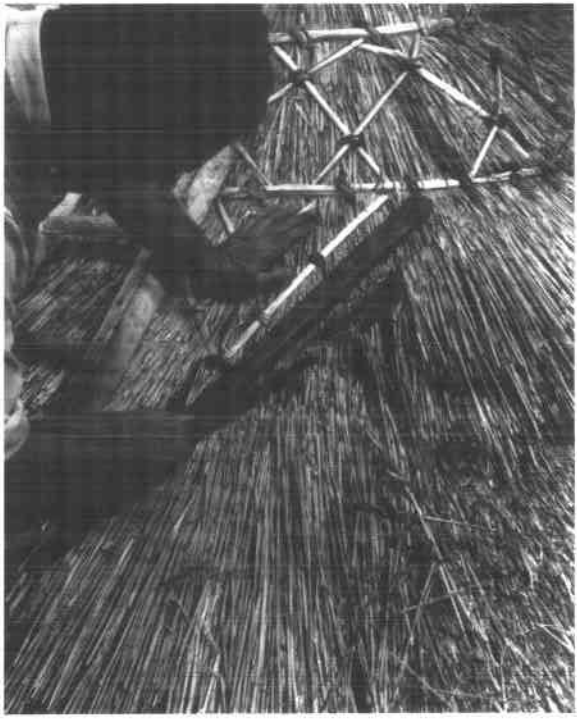
The liggers are now carried round the end and sparred into place. Joins are made by halving the ends of the liggers under one spar fixing.

The cross-rod design is continued round the cap-end and a spar is driven in firmly at each point where the rods cross.

Combed wheat reed



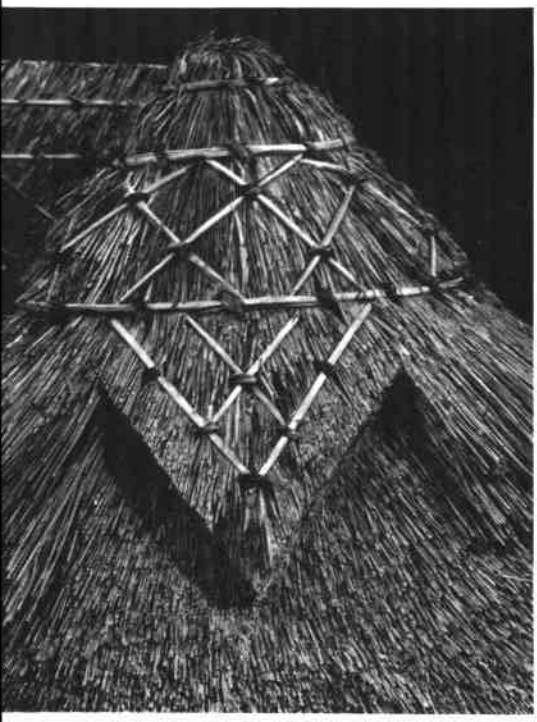




An impression of the cap-end, after the liggers have been sparred down, is illustrated. By working several handfuls of reed under the course, extra thickness is provided for the pattern.

The pattern will be cut to follow the sparred-down rods.

Here the side-rake is again useful as a straight-edge when the pattern is cut.

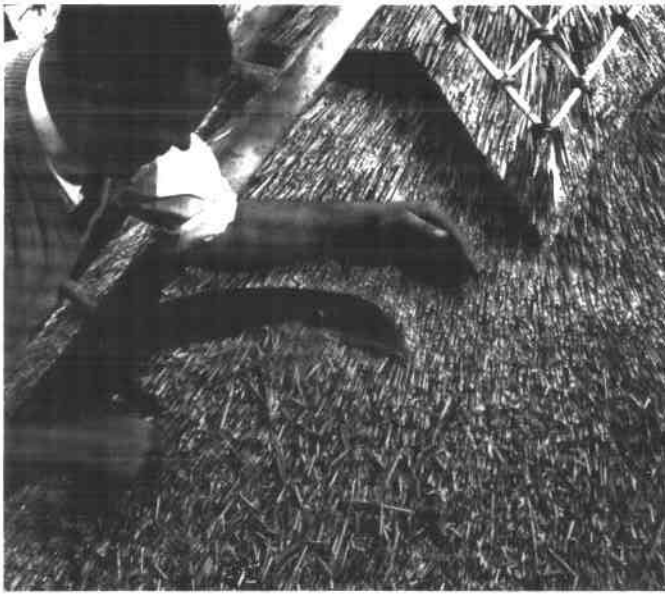


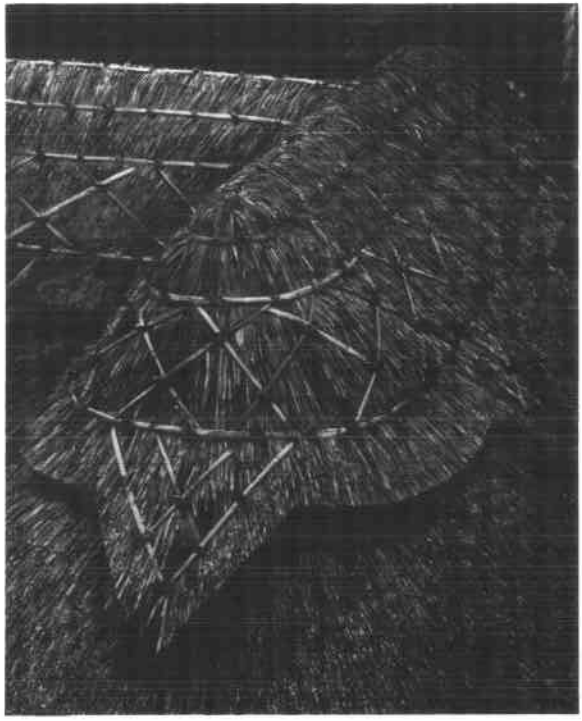
The left-hand side of the pattern is cut with the small knife.

After the pattern is cut with the knife, ragged edges are trimmed with the shears.

Further progress is made in cutting the straight part of the pattern.

Combed wheat reed

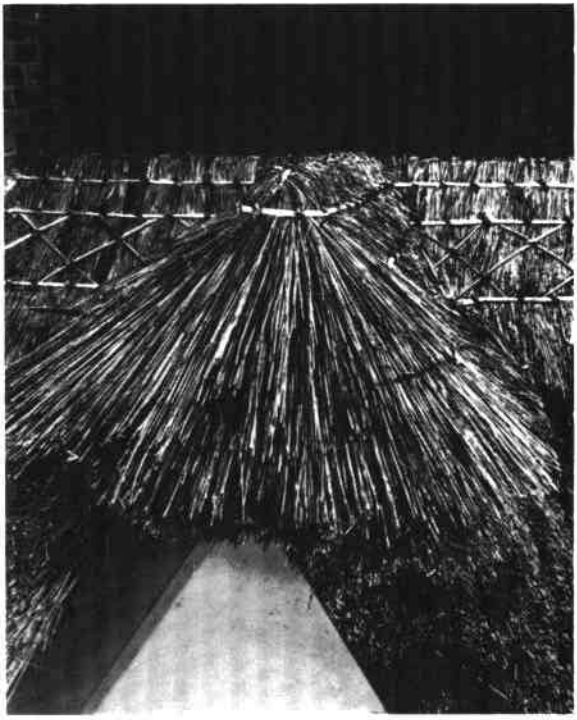




Superfluous straws between the liggers are trimmed off with the shears.

The whole surface is lightly sheared down with the shearing-hook after the pattern is cut.

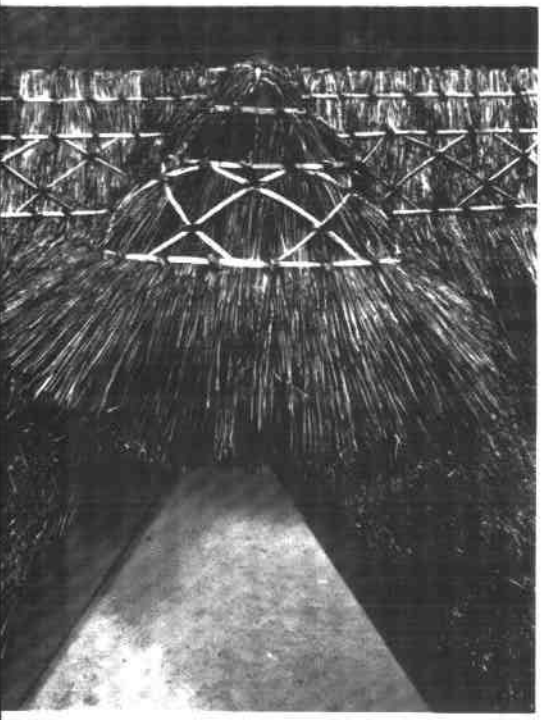
The illustration gives an impression of the finished ridge as seen from above.

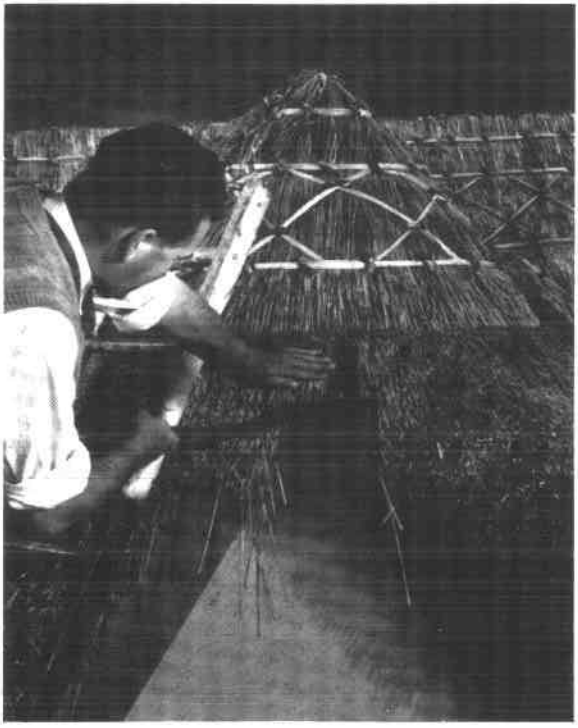


When looking in the direction of the half-hip the narrowness of the top will be clearly seen.

Special care must be taken at the top of the valley where the two ridges join. A completely watertight junction can be made provided the reed is worked tightly together at the appropriate angle.

Before the liggers are sparred down in the cap-end of the gable, the reed is carefully arranged fan-wise to ensure symmetry and neatness. The first ligger is then sparred down.

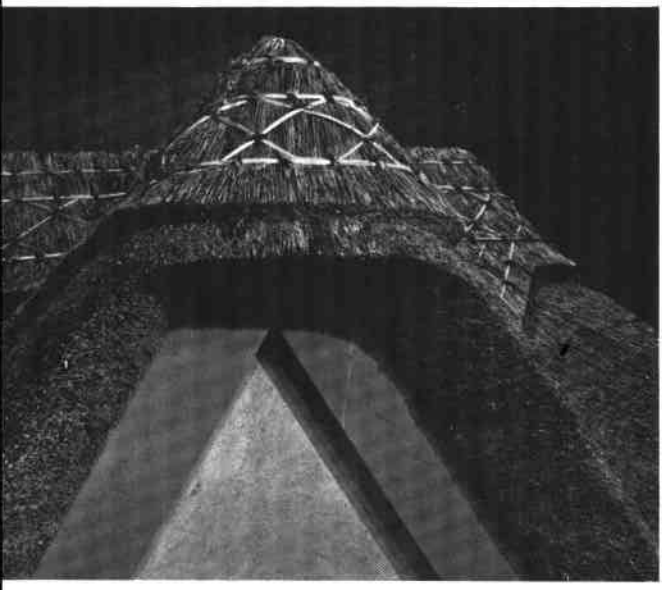


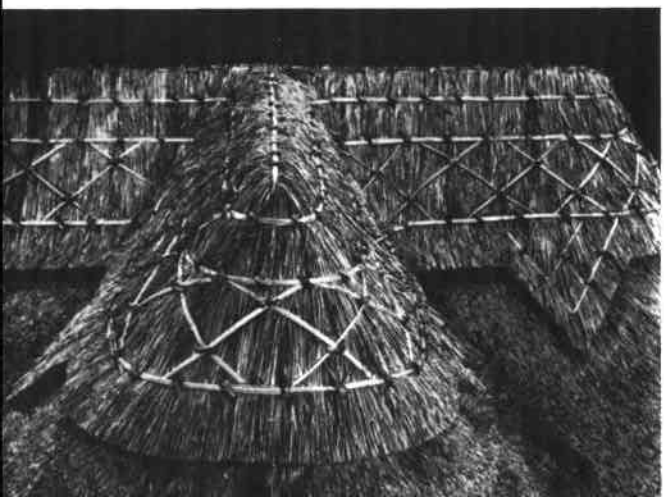


Second and third liggers are carried round and the cross-rod pattern sparred in.

Now that all the liggers on the ridges are sparred down, the cutting process is continued round the cap-end.

Applying pressure with the left hand, the horizontal cut is made with the eaves-hook.





Continuing down the left-hand barge, the point of the eaves-hook is kept close to the barge-board. The cut is made at an angle which will provide a generous overhang on the outer edge.

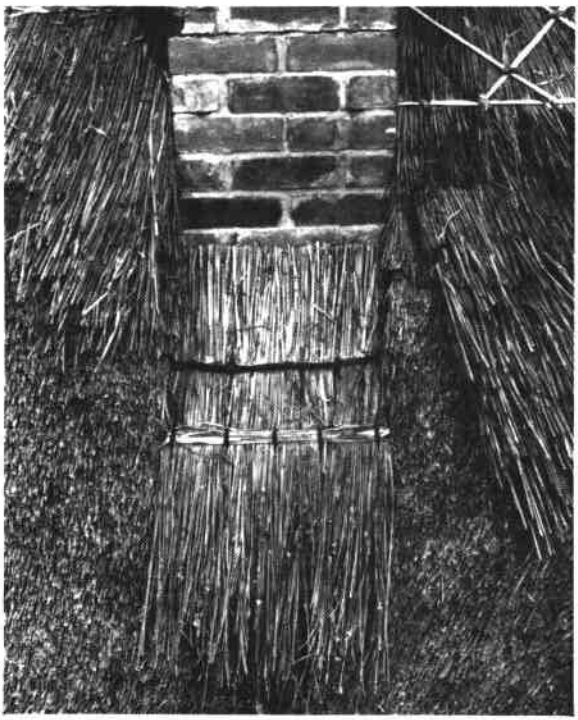
Both barges are now cut and the whole end is trimmed with the shears, making all edges sharp and clear.

The finished ridge, as seen from the cap-end of the gable, again gives emphasis to the narrowness of the apex. This is an essential quality of a good ridge.

The profile of the gable cap-end shows that there is an overhang of almost 15″ (380 mm). This can be checked by holding a rule against the face of the barge-board.

The method of finishing off round a chimney which breaks through the ridge is now shown. The tops of the course which overlap the brickwork are twisted inwards to make a firm layer against the chimney.

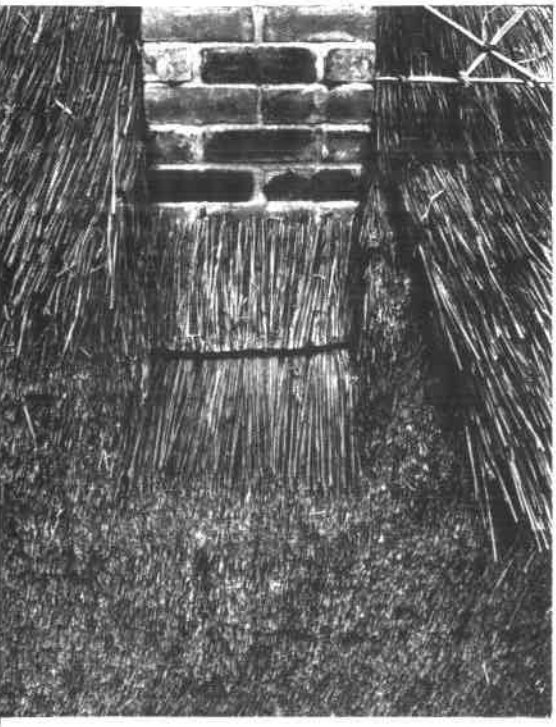
The tops of the course are neatly twisted in against the chimney.

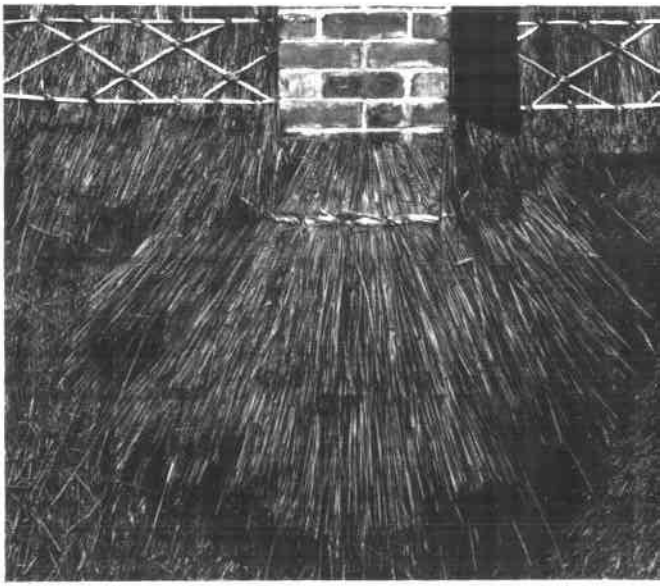


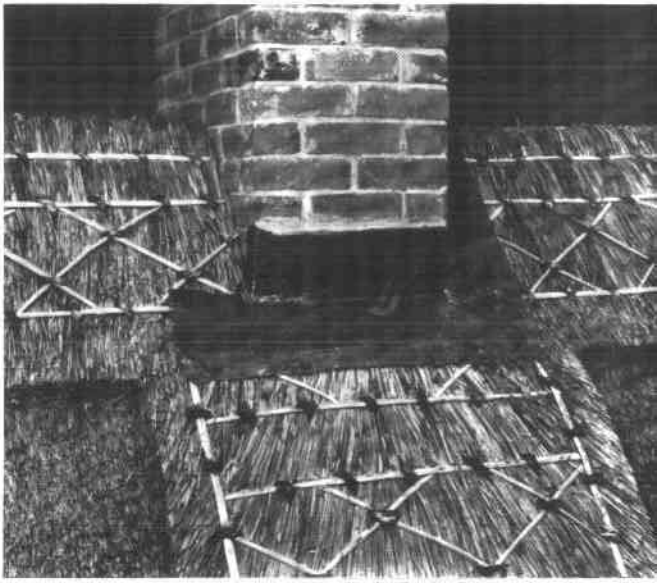
Another course is laid in front of the chimney and swayed down as high as possible. The tops are again twisted in.

A course is now started on the left-hand side of the chimney. This leaves a cavity in front of the chimney which is later filled in separately.

The cavity can be filled up by laying a course of reed against the brickwork with the butts uppermost.



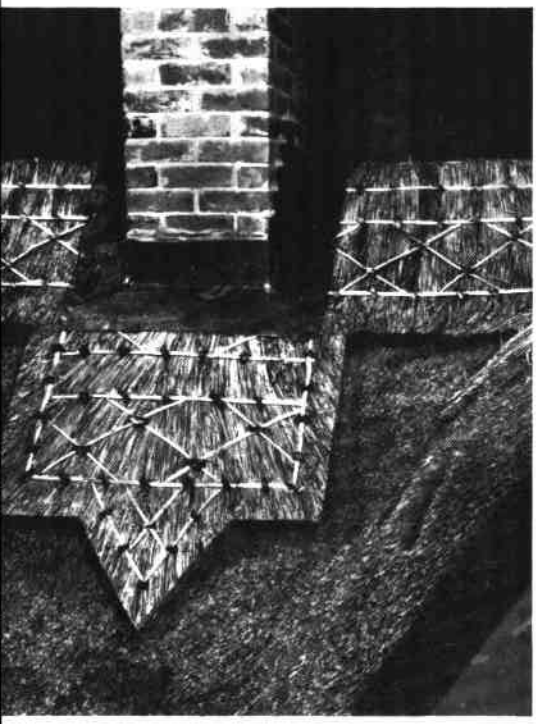


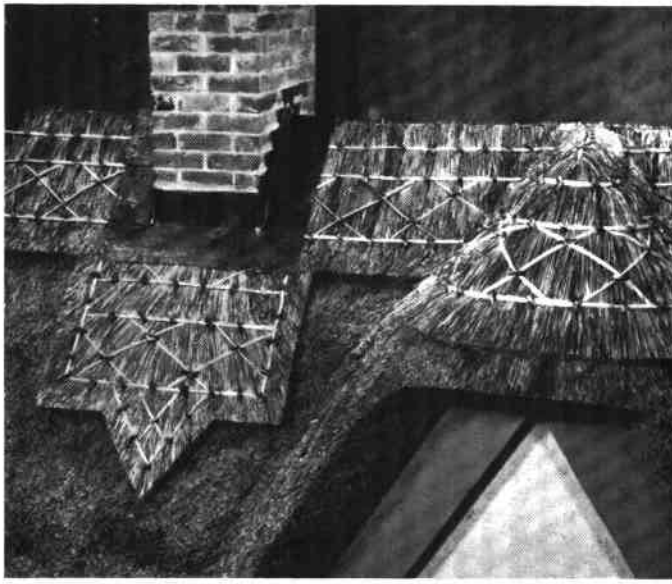


The lower ends of this course are now taken off with the shearing-hook, flush with the main coating.

The pattern course of the chimney apron is laid. The reed is laid fan-wise to enable the apron to be cut on three sides.

A further small course of reed is laid, after which the liggers are sparred down and the pattern is cut. Following this, the lead apron and the side-flashings may now be fixed and dressed down on the reed.





The work around the chimney is completed.

An inclusive view of the gable, cap-end and the finished work around the chimney.

The courses have been cut away to show the ridge as seen in section. The iron hooks hold the sways which have been sawn through. A depth of 18″ (457 mm) is indicated.

An interesting view of the construction
the courses, and also the rolls in the ridg
is shown.

RE-THATCHING

Where a roof is in need of re-thatching, it is essential that the existing thatch be stripped down, leaving a tight base 10″ to 12″ (250 mm to 300 mm) in thickness.

A far better job will result if the old eaves and barges are also stripped right down to the woodwork and completely new wadds tied in as shown on pages 55–59.

The main coating work, which in effect constitutes a new casing over the old, is fastened down by twisting a reed sway across each course or sett and sparring into the old thatch underneath. The remainder of the work is more or less the same as for new thatch.

It may be necessary to strip completely the old thatch from the roof, thereby leaving no base into which to spar the new coat. In this instance a technique known as the spar-coat method can be used. If this method is preferred, then the remedy is to sew on what is sometimes referred to as 'waistcoat'. This is an underlayer which is rough thatched on to the battens to a thickness of 8″ 10″ (200 mm to 250 mm), and for which secon grade reed or liners are used. A casing cover new reed, 8″ to 10″ (200 mm to 250 mm) thick, sparred down into this in the usual way.

4 | Water reed

ACROSS wide areas of marshland in Britain and on the Continent there grows each year a vast quantity of reed (*phragmites communis*), which is indisputably the finest thatching material available. Varying in height from 3′ to 8′ (1 m to 2·5 m), it is easily recognised by its brown feathery seed head, growing on a single stem and having broad spear-like leaves.

Growing with this 'pure' reed in some parts of the marshes and waterways, two other plants are found, described as reed mace or bulrush (*typha latifolia*) known locally as 'boulder' and the wild iris (*Iris pseudacorous*) known locally as 'gladden'.

Use of these other plants, mixed in with reed to the extent of fifteen per cent is considered by many to be more durable. This mixture, described as mixed reed is indeed often preferred because of its tapering quality and distinctive appearance.

Reed beds in the British Isles vary in size from $2\frac{1}{2}$ to 75 acres (1 to 30 hectares); on the Continent much larger areas are encountered, but whilst the smaller beds may appear insignificant they are nevertheless a potential source of valuable material. In the spring the root stock of the reed known as rhizomes produces young shoots – colts – which during the summer months steadily flourish in height and turn a green hue. With the approach of autumn the reed turns to a light brown colour, but harvesting can only commence after the frosts have stripped the leaves from the stem, normally after December. Cutting then proceeds throughout the winter into early spring until a new growth of colts appear, when harvesting must cease to avoid damaging the next season's growth. A bed which has not been harvested for many years will become clogged with lifeless reed and debris, and the periodical flooding and washing by ebb tides may fail to cleanse it. Under these conditions the rhizomes will continue to send up colts but being impeded by the debris the growth will not be straight and is unsuitable for thatching. The reed in such a bed should be burned on the spot, this should ideally be carried out in dry weather, but before doing so the Fire Authority should be notified, and its advice sought. If risks are involved it may suggest stand-by equipment whilst the burning takes place.

After burning and cleansing the bed the quality of the next year's growth will show a marked improvement and will certainly be suitable for thatch; regular cutting thereafter improves the reed and the quality should be high. Having restored the reed bed to production no further burning or cleansing should be necessary. If at any time the annual growth is 'sparse' the crop can be left to be harvested the following year.

A marshman equipped with protective clothing and often working under difficult conditions can still be seen using a scythe, gathering the reed required for a bunch, raking out the butt ends, and removing unwanted matter and tying up, but this traditional method of harvesting does not attract new marshmen. In 1950 CoSIRA carried out experiments in cutting reed with a mechanical scythe. A large gathering box was installed immediately behind the cutting blade where the reed was collected and, when full, removed and laid to one side to be cleared and bundled. This process is now widely used and approximately 400 bundles per day are produced by each machine.

In the late 1960s CoSIRA introduced the 'Seiga' Reed Harvester imported from Denmark; this can be described as a mechanical harvester on very large tyres which make it amphibious. The machine produces bunches of reed at the rate of 2-3,000 bundles per day and recently more have been operating in England and Ireland. The latest model incorporates a transporter to enable the bunches to be taken immediately to hard ground.

Water reed quantities are not calculated by weight, but by bunch. The standard size bunch of home-produced reed is 600 mm in circumference, derived by measuring around the 'tie' which should be 300 mm from the butt-end. Imported Continental reed is delivered in a metre size bunch, determined by the same method.

Many new properties are being constructed to take thatch, with a preference for water reed. Supplies of this material were inadequate from the home market but the importation of water reed from the Continent has satisfied the demand.

Sedge (*cladium mariscus*) a marsh plant bearing a three-sided rush-like leaf with a fierce serrated edge, found growing chiefly in the fens and marshes of East Anglia, is used for ridging purposes. Its length and quality may vary according to the nature of the soil where it is growing, and it may, under favourable conditions, reach 6′ (2 m) in length. Sedge may be cut all the year round and is very much better for handling when used in its green state, before it ripens and becomes difficult and even painful to handle. Using a long scythe against the lay of the sedge, the cutter often works under similar conditions to those found in a reed bed, having to contend with a certain amount of water under-foot. Having mown a swathe with his scythe, the cutter gathers the sedge together, and then because of its length, ties it with two strings into bundles which should weigh approximately 20 lb (9 kg). The method of cutting, however, may vary from place to place and occasionally one may see a sickle being used for this purpose, more especially when the sedge is much shorter in length. In this case a 'sheaf' or 'shove' – which in weight should average about 7 lb (3 kg) – is tied as the cutting operation proceeds, a few strands of sedge being twisted together to make a bond with which the sheaf is secured tightly round its girth. Bulk supplies are usually quoted at the prevailing rate for a score of sheaves.

As the sedge matures so it changes to a beautiful golden brown. Being very pliable in character, having an estimated life of twenty years, and with its pleasant colour, it is a most suitable material for ridging purposes. The finished sedge ridge with its hazel cross-sparring and clean-cut pattern is entirely complimentary to water reed, enhancing its appearance in tone and texture.

'The Reed'. A comprehensive study of the cultivation and harvesting of *Phragmites Communis* for thatching in East Anglia, by Dr S. M. Haslam of the School of Biological Sciences, University of East Anglia.
'The Reed' is obtainable from The Norfolk Reed Growers' Association, Augustine Steward House, 14 Tombland, Norwich NR3 1HF.

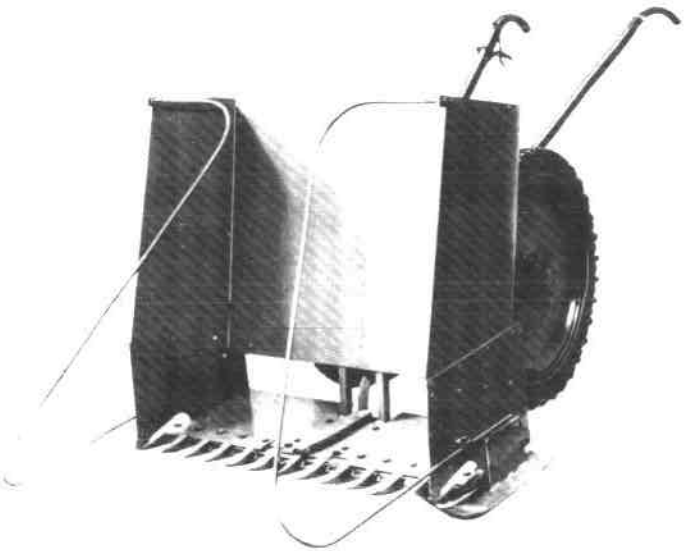
The White Lodge, Attleborough, Norfolk

The Drum Inn, Cockington, Devon

Holly Tree Cottage, Salhouse, Norfolk

The Rectory, Woodbastwick, Norfolk

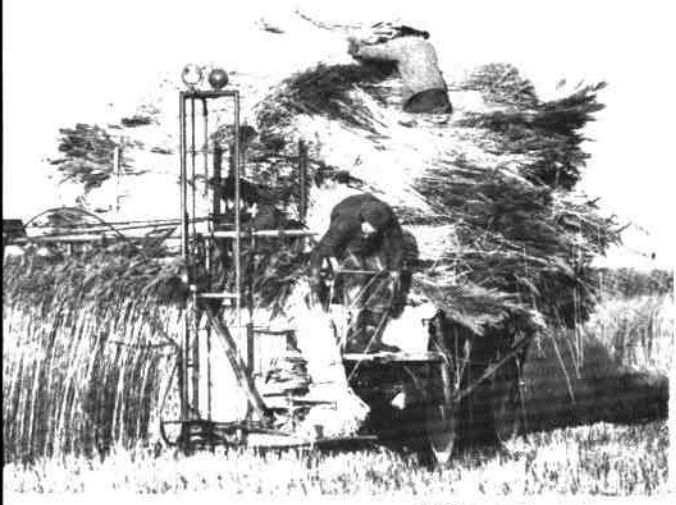
By permission of Mr John Cator



Cutting with hook

Cutting with a short scythe

A 'Mayfield' reed cutter



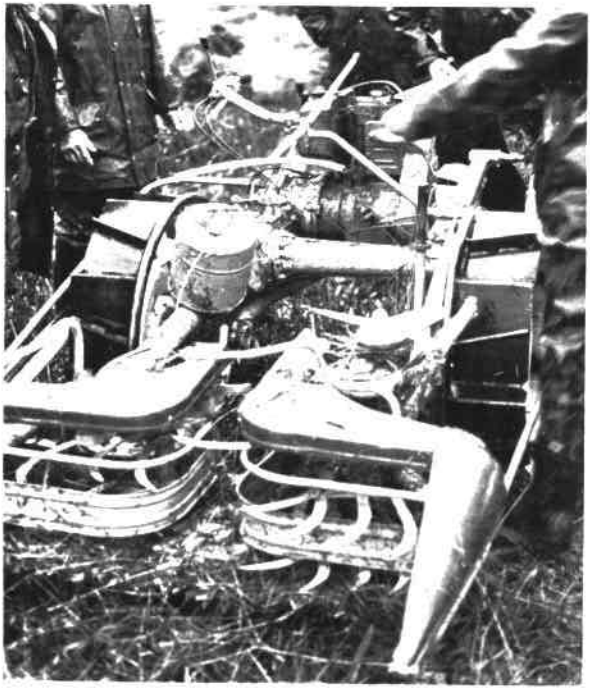
Eastern Daily Press

A 'Seiga' Reed Harvester

An Italian rice harvester imported by Thurlow Nunn & Sons used for harvesting water reed in Holland and more recently in East Anglia

Cleaning the waste from cut reed

Tying with a reed bond



The reed, when delivered to the site, is stacked as near to the job as possible, and may be covered with a tarpaulin against bad weather conditions.

Grading will considerably facilitate the work to be done, and is usually carried out at the time of delivery if time permits. If not, it can be done in stages as the work proceeds.

Each bunch is butted on a spot-board and graded according to its length and quality.

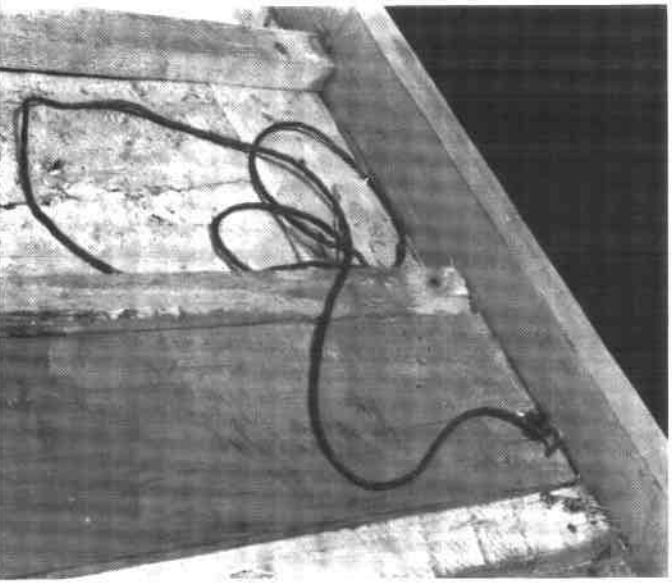
The bunches fall into three broad categories, (*a*) long, (*b*) short, and (*c*) coarse. When laid in separate groups they are then ready to hand as required.

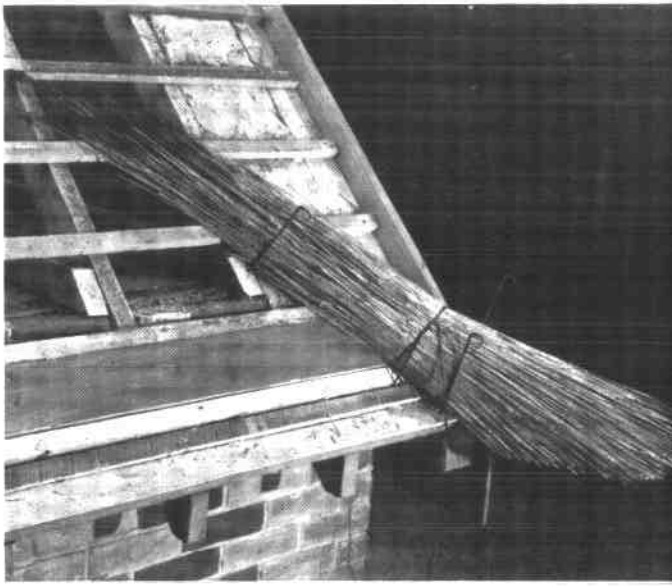
A simple method of carrying is used whereby a small handful of reed is bent forward to form a grip.

According to choice, a total of four, six or eight bunches are placed together as shown.

A load is hoisted on to the shoulder using the grip to keep the bunches together.

With the load comfortably on the shoulder, carrying is made easy. The left hand is left free to assist in scaling the ladder.

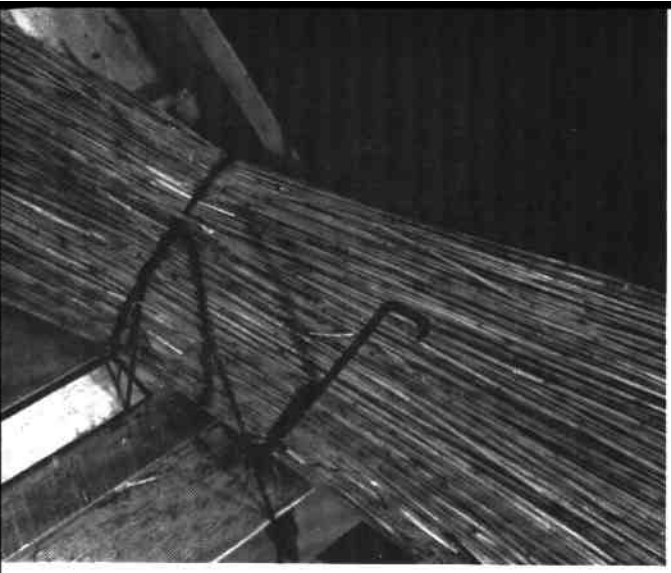




Methods of fixing eaves-bunches may vary, but when they are to be tied with tarred cord, a staple may be used to secure the string in the first instance.

A good well-tapered bunch is selected to start the corner, and the spot-board is used to set a bevel on the butt-end.

This bunch is laid at an angle of 45 deg. across the corner and is secured with the cord. The bevel shows the approximate eaves-line and the iron hooks are used as a temporary measure to keep the work firm.

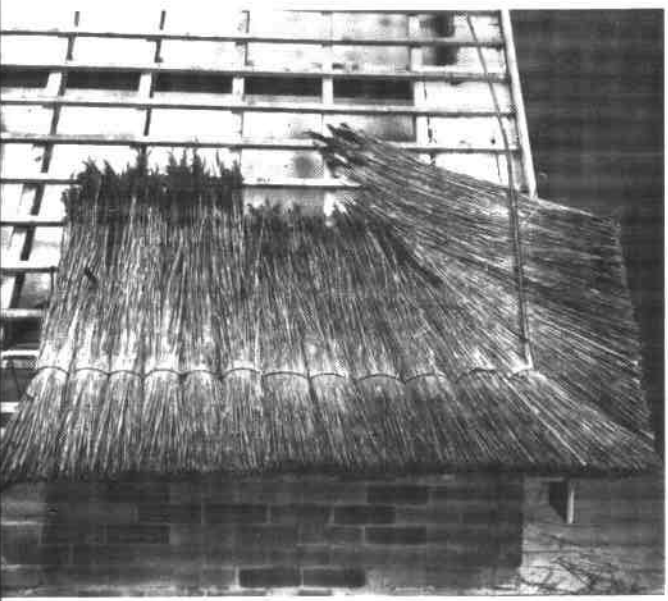


Closer inspection of the tie shows how the cord passes twice round the batten before being wrapped twice round itself. Because of its tightness, the cord is prevented from slipping and the bunch is securely held.

It is important to note the ample springing afforded by both the tilting fillet and the raised barge-board, which causes each bundle of reed to be fixed under tension.

The leggett is now used to dress the bunch to the required level of the under-eaves. A series of upward drives determines the final position and at the same time still further tightens the bunch in the cord.

More eaves-bunches are added in quick succession using the same tying method, but it will be noticed how the direction of the bunches gradually changes from the diagonal, until it corresponds with the line of the rafters.



The gable is formed by laying medium-short bunches, still at 45 deg., overhanging the barge-board. The iron hook is used to keep each bunch tight until the hazel sway is fixed.

A hazel sway is fixed in the vertical position by driving a series of iron hooks into the barge-rafter at about 18″ (450 mm) intervals. The head of the hook grips the hazel sway, thus securing the reed under tension across the raised barge-board.

By reaching round the gable, the leggett is used to dress the reed back to a square surface, giving a 6″ (150 mm) overhang.

With the eaves- and gable-bunches set, it is now necessary to carry out the operation known as back-filling. This is done by tucking the butt-ends of a small handful of coarse reed behind the tops of the fixed reed, and in the corresponding direction. This operation is continued in stages over the whole roof area and fulfils several functions. It gives additional tension to the fixed reed, and prevents the tops of subsequent courses driving between the battens, thus ensuring a neat and tidy appearance from within.

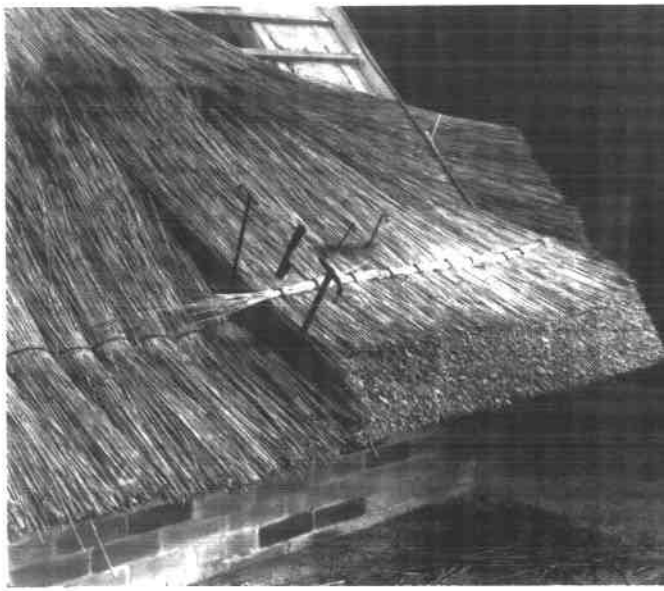
The brow-course is a single-bunch course which completes the thickness of the eaves and starts the ultimate thatch surface. As in the case of all gables and hips, a well-tapered bunch is selected and laid across the corner, following the same direction as the reed beneath it. Two reeding needles or pins are used to maintain a square edge to the course, after the bond is cut.

The ends of the bunches are dressed roughly into position with the palm of the hand, whilst the opened bunch is held in place with the left forearm.

A light fixing method is now used. A small quantity of reed is placed across the course which is firmly pinned down with iron hooks to the tight reed beneath. This is known as a temporary sway and is later removed.

The brow-course is dressed into position with the leggett, leaving a small portion at the top not dressed. This will mingle with the course above and prevent the join showing.

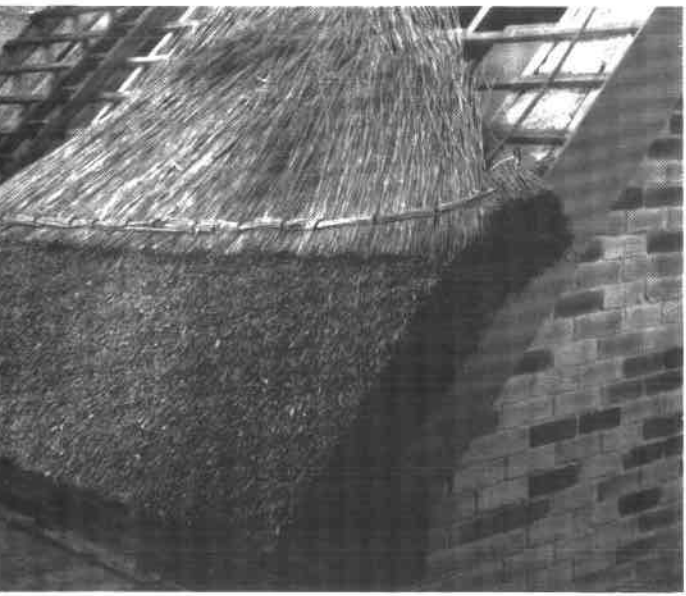
The illustration shows the brow-course partly laid. It is important to note how three measurements have been determined at this stage. They are (*a*) the distance from the external tip of the eave to the eave-board, which is 14″ (356 mm), (*b*) the thickness of thatch overhanging the barge-board, which is 10″ (254 mm), and (*c*) the thickness of the thatch coat from the surface to the batten face, 12″ (305 mm).



Brow-course fixed with hazel sway. Hooks are driven into every rafter and the portion of temporary reed sway is removed in preparation for laying the next course.

The first full course is started in the gable and is lightly dressed into position with the hand.

A full course showing the straight line to the gable emerging, which is procured by dressing with the leggett. The position of the reeding-pins should be noted as these keep the new course running in the same direction as the course underneath.



A portion of a full course is shown held in with a temporary sway. The clean, square gable takes shape as the work proceeds.

Under-eaves, looking from the corner of the gable, showing open-eaves treatment in the roof timber construction. The distance from the external tip of the eaves to the wall is of great significance, as it not only ensures that water drips well clear of the walls, but provides balance and character of design. This overhang may be increased or reduced in relation to the height of the building.

An alternative and equally effective method of fixing the hazel sway by stitching is shown. One end of a length of tarred cord is secured to the sway, whilst the other end is threaded into the stitching needle.

The needle is then inserted into the reed at a suitable point, where it appears immediately above the batten. The cord is removed from the eye of the needle by the assistant who works from inside. The needle is then withdrawn to the outside.

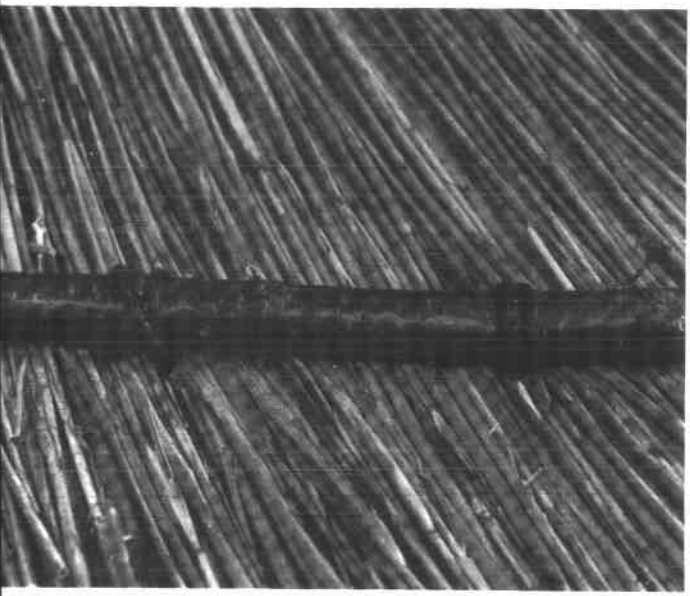
The needle is pushed through again, this time at a point just below the same batten, whereupon it is re-threaded with the cord.

The outside operator withdraws the needle, complete with the cord which has now passed round a batten.

Pressure with the knees and a pull on the cord forces the hazel sway tightly into position across the course.

The cord is passed round the sway again and the knot is made as shown.

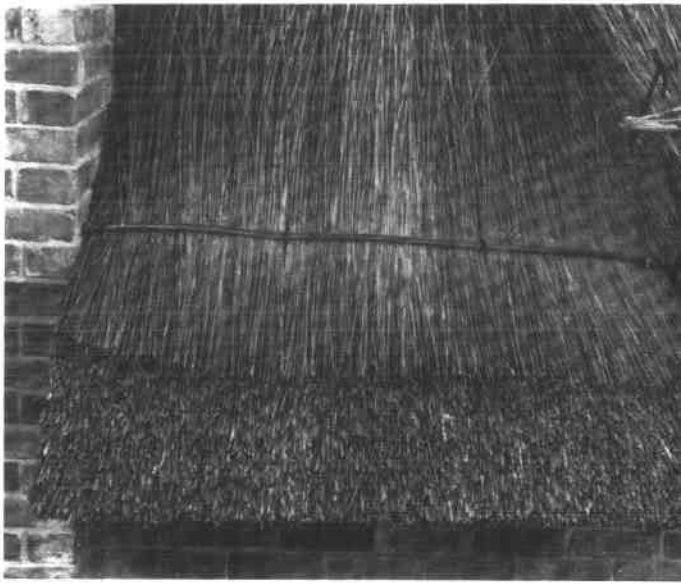
The illustration shows the tied-in eaves-bunches, the brow-course and the first full course swayed down.



If an obstruction such as an eaves-chimney is encountered, a break in the eaves-line is made and courses must be terminated. To ensure a strong finish next to the chimney, the staple and cord method can be used.

The bunch is tied down almost as previously described. It will be seen, however, that the bunch is laid at an angle, instead of straight, and the reason for this becomes apparent.

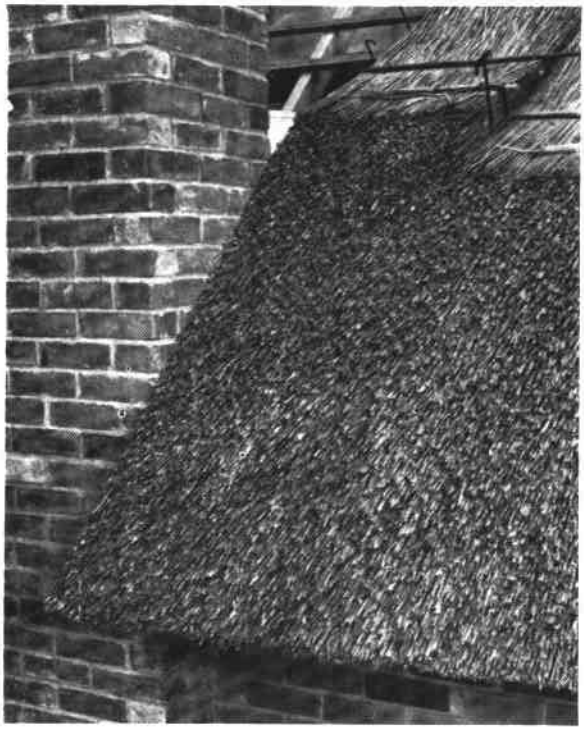
The butts of reed which overlay the angle of the chimney are dressed back square by using the leggett to obtain a uniform finish.



Eaves-bunches may now fill in the gap.

The same treatment is applied to the brow-course which follows, and a firm square angle is formed.

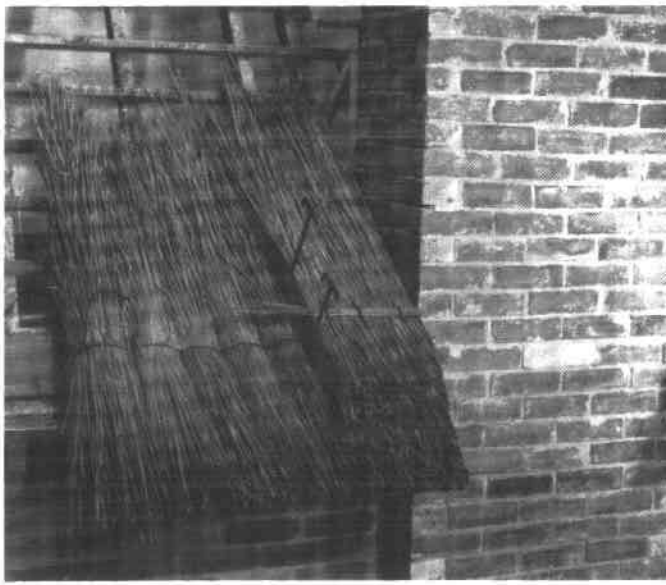
The brow-course is filled in and swayed down.



The first full course is terminated at the chimney.

Each course makes a tight junction with the chimney, and in this case a half-course is necessary, the reason for which becomes apparent from the next illustration.

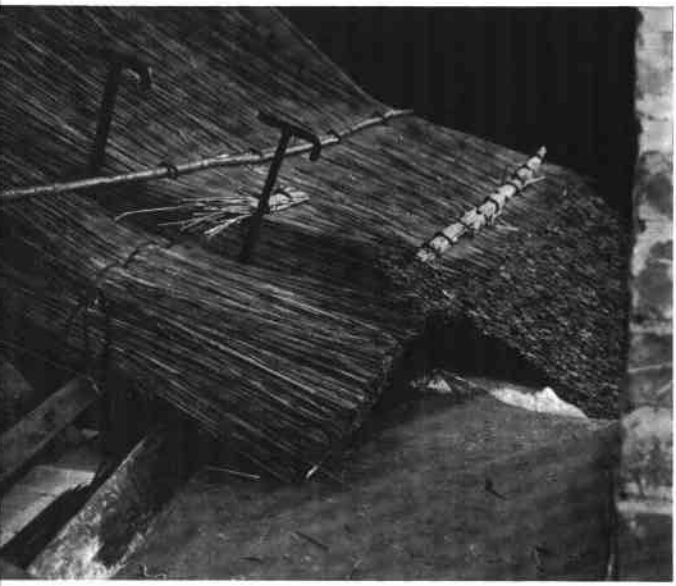
Before further courses are laid, lead stepped-flashing should be fixed to the brickwork. The top end of the lead runs on to the half-course laid at a level which will carry the water from behind the chimney.

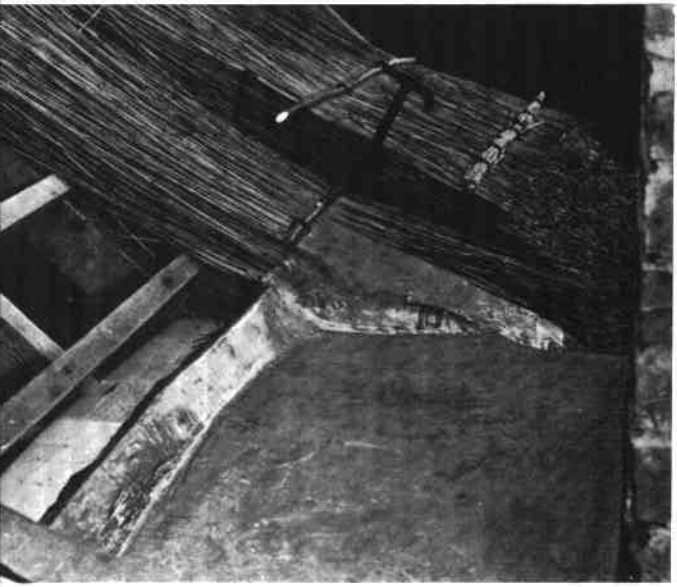


It next becomes necessary to fit the lead gutter behind the chimney. Raised in the centre, the gutter sheds the water in both directions. The sides of the lead are dressed on to the reed and the stepped-flashing on either side.

Eaves and brow-course should next be started on the other side of the chimney, where the same methods apply.

Each succeeding course is started until the required level is again reached. This is in fact the same level as the corresponding finished course on the other side. Lead stepped-flashing is then fixed to the second side.

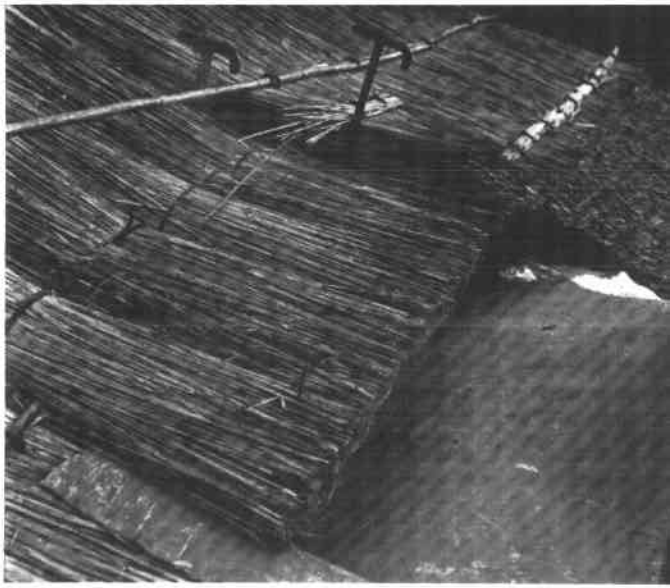


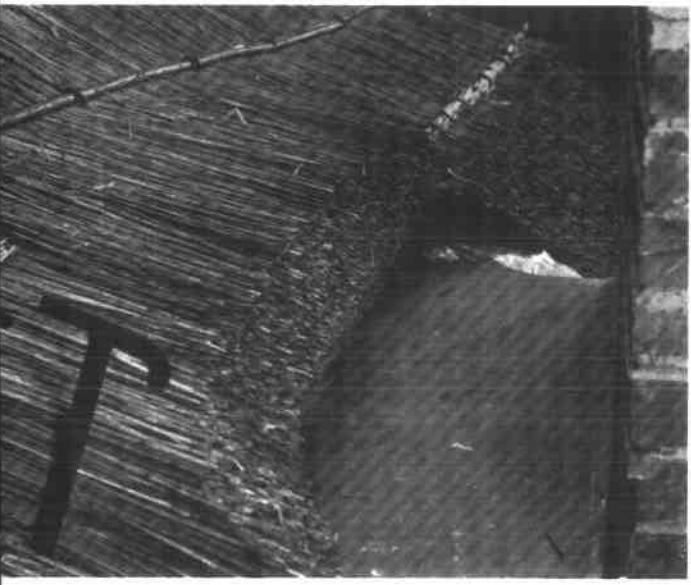


A short length of tilting fillet is fixed to take the eaves-bunches at this point. The lead is dressed over this fixture to prevent any water penetrating behind the reed.

The eaves are set by tying bunches to the first batten, as illustrated.

Seen from the first side of the chimney, a further half-course joins up to the eaves where it becomes the brow.

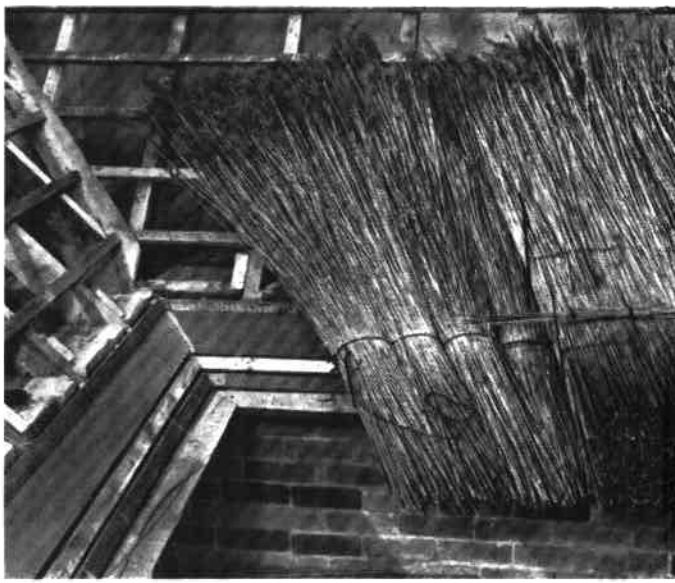




The eaves-bunches are completed.

The brow-course is carried right through and swayed down.

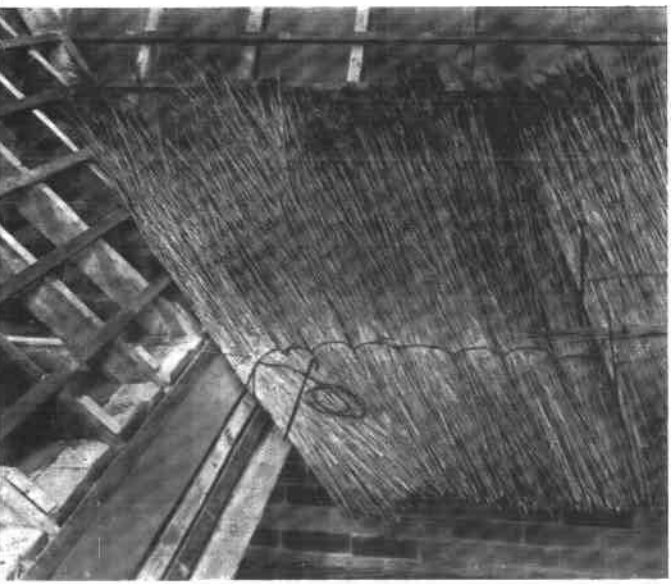
Subsequent courses may now be carried over and normal full courses are resumed.

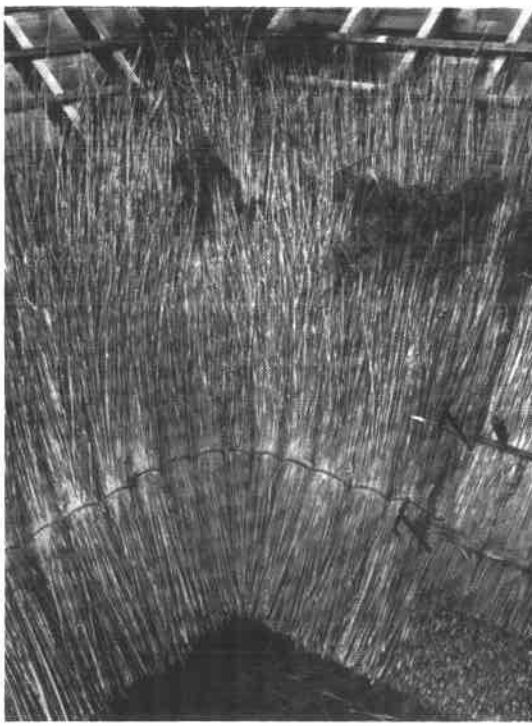


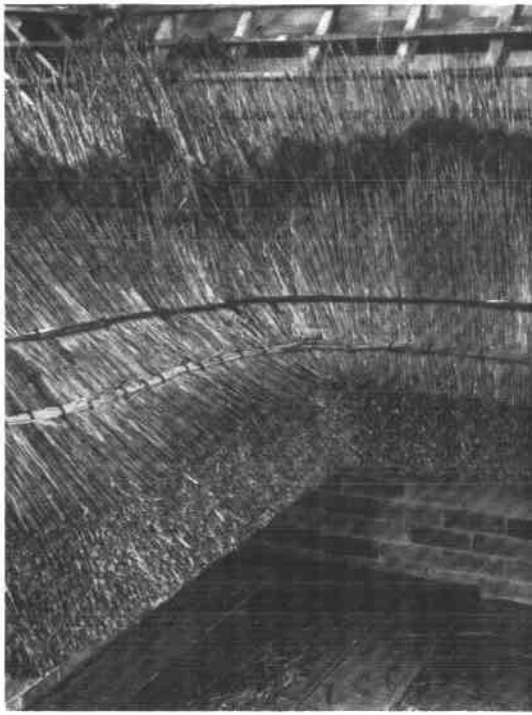
A closer view behind the chimney shows the neat, tidy finish obtained, and it is unlikely that a gutter of this construction will become blocked by falling leaves or other rubbish. There is also room for a man to stand, which in itself facilitates subsequent work on the roof.

A general view of the finished work around the chimney, presenting a practical weatherproof job.

The run of straight work is again interrupted as the valley is approached. It is imperative that the reed now ceases to follow the vertical line of the common rafters, and turns towards the angle of the valley. This change of direction must begin to take place at least 6′ (2 m) from the valley.







Bunches tied in the valley now follow the angle of the valley-rafter. It is here, in the valley, where the long, coarse bunches may be used to advantage. They invariably have tops and middles which are larger than the butts and thereby have a greater covering capacity where it is wanted.

Eaves-bunches are tied into the whole valley area and back-filling is applied, giving an extra thickness to the actual valley angle, to maintain the pitch of succeeding courses at this point.

The brow-course is completed in the valley and is swayed down. It is now ready for the subsequent courses to be brought round, but before this is done closer inspection of the valley will reveal how the sway turns the angle.

It will be seen that the sway is not bent round the angle of the valley, but instead is finished off by inserting the pointed end into the reed and fixing it down separately. A new sway, again with a pointed end, is then inserted immediately below the sway on the other return and is fixed down in the same way. This method obviates using a spike in the angle of the valley and also provides a far stronger fixture.

The first full course is now laid in the valley, the leggett being used to form the angle.

Care should be taken when forming the angle to ensure that it follows the line of the valley-board implicitly and should preferably be slightly swept or rounded, rather than sharp or square. There are two good reasons for this: (*a*) to disperse the volume of water at this point over a wider area, and (*b*) to reduce the possibility of falling leaves and other rubbish becoming lodged in the angle.

As previously stated the reed in the angle of the valley lies with less pitch than the reed on either side. To counteract this, and thereby to give the water equal discharge, a long coarse bunch is opened and laid with the butt-ends uppermost, and with the lower ends just covering the sway. This will be fixed with the succeeding course and may be repeated at intervals as required.

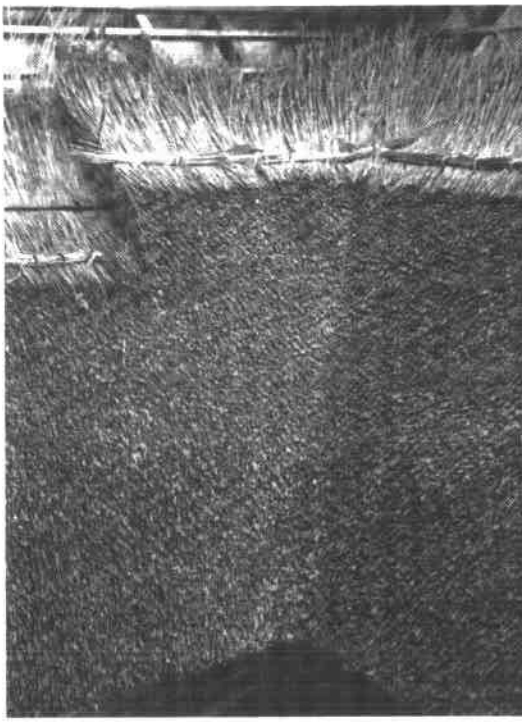
The second full course is continued round the valley. In preparation for laying the next bunch, the needle is set at the appropriate width and the temporary sway is cut through and removed.

The first bunch, representing half the course, is laid and palmed up.

The second bunch follows and the course is filled in.

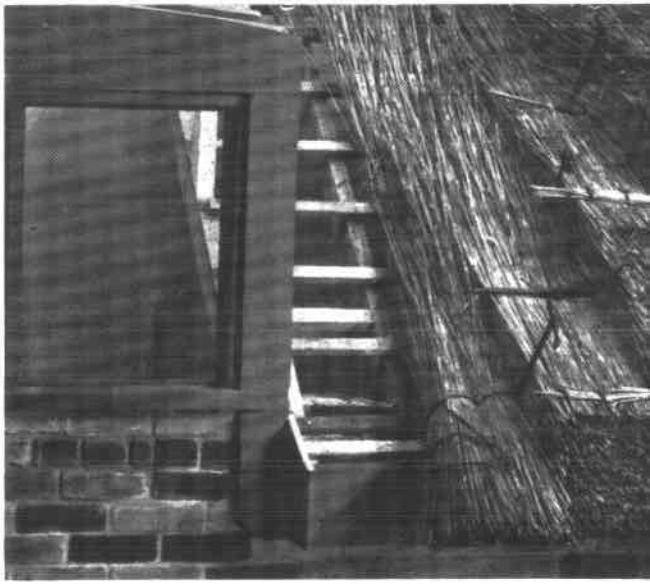
By using the end of the leggett, the reed is notched up whilst still in its loose state, although it is lightly held with the left hand.

The temporary sway is fixed and the section dressed off to bring it in pitch with the coating already laid.

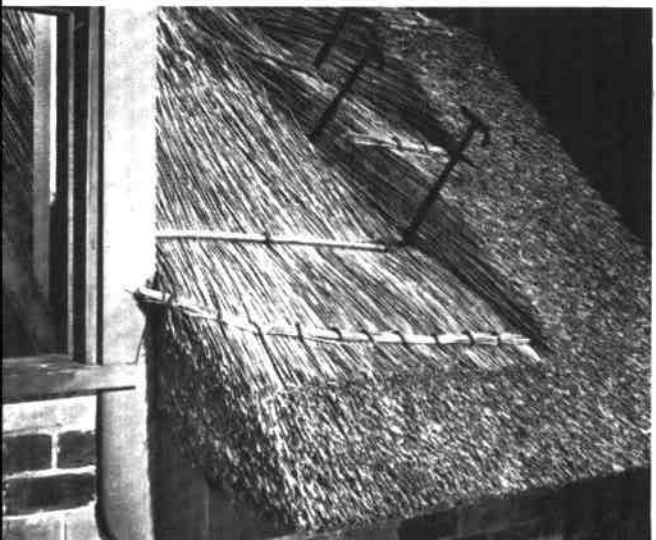


Long thatching-hooks are used to secure the temporary sway, but with certain thatchers the spar or brotch is still preferred for this purpose. The method is a survival of the days preceding the introduction of the iron hook, when stitching with grass rope or hedge briar, and later with treated cord, were the only methods of binding employed.

The valley as seen after the third course has been laid. The greater volume of water which unavoidably collects at this point sometimes gives rise to anxiety to such an extent that another material, perhaps tiles or lead, is used to turn the valley. This breaks up the thatch-line and is most unsightly. It is also unnecessary, as careful adherence to the foregoing methods will produce a durable thatched valley capable of withstanding the heaviest rainfall.



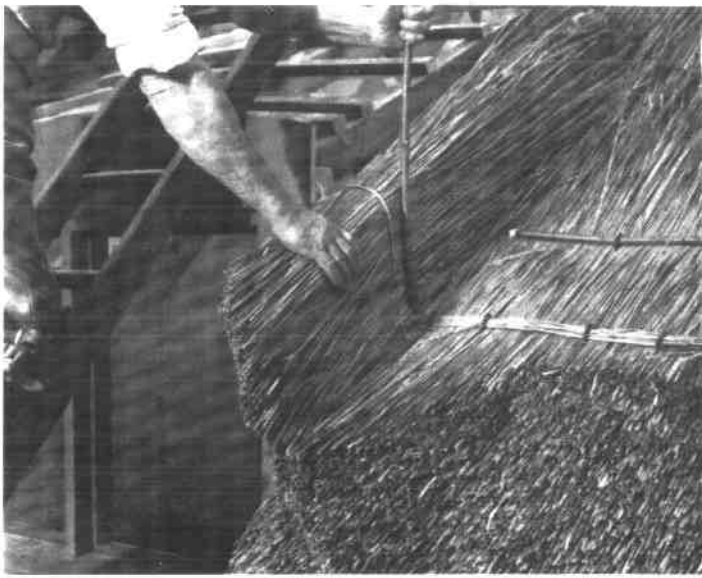
The treatment of windows, which may be located at various levels in the roof, according to design or requirement, is now described. The window illustrated is set on the wall-plate and therefore breaks up the eaves-line. Steps of the courses are shown in detail as they approach the window.



Eaves-bunches are tied in as far as the window-frame, but in order to make a stronger corner, the last two bunches are laid slightly off the vertical line, with their butt-ends pointing towards the corner.

The brow-course is started next to the window and again this is laid at an angle, which when dressed back into a cheek, not only provides a strong square corner, but is much neater in appearance.

The brow-course is filled in and the hazel sway, which finishes just inside the window-frame, is fixed.



The first full course is laid as far as the window, where it completes the dressed cheek and also starts the eaves formation.

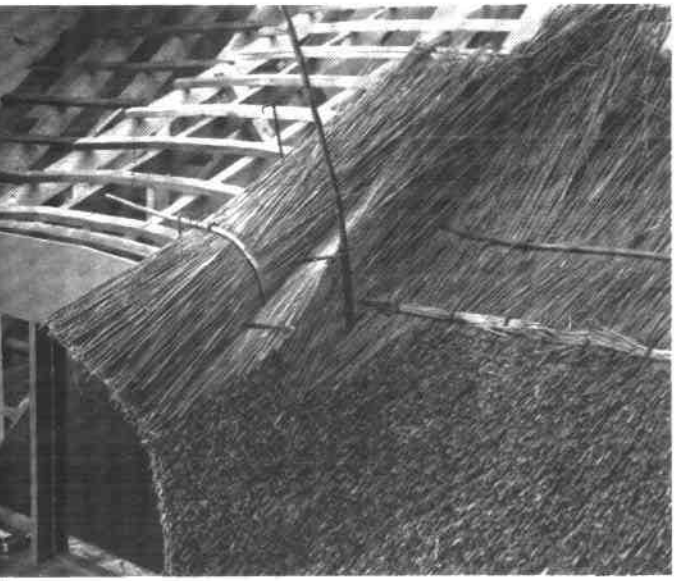
Neat appearance and strength combine to enhance the ultimate finish around a window.

A pointed hazel sway, which had been inserted into the last course, is now used to secure the eaves-bunches beside the window-frame, into which the hooks are driven.

Laying the brow-course to the window calls for extra care if a good eaves-line is to result. Selected bunches are merged together with the left hand to avoid gaps and spaces appearing after dressing.

This small section of the brow-course has been dressed into position with the leggett, and the eaves-line has thus been determined.

To fasten the brow-course another pointed hazel sway is inserted, and being pliable, will easily bend down to the required shape of the window.



Special care is needed when the eaves-bunch is laid on the angle of the window. Attention must be paid to thickness as it is very easy to run off thin at this point, losing the symmetrical appearance of the whole window.

The hazel sway has been bent down and secured with a hook, driven into the first rafter of the window construction.

The brow-course is shown turning the angle of the window after further eaves-bunches have been laid.

If it is preferred, these eaves-bunches may now be tied in, if a firmly nailed batten has been provided for this purpose approximately 3″ (100 mm) from the inside of the fascia. The fascia should have been raised above the batten face to provide the necessary tilt.

Now that the brow-course has been swayed down, the first full course over the window is started. It is important that this course and its accompanying hazel sway now become a continuation of those of the main roof.

Before any further progress is made on the window, the eaves and main courses must be set in on the opposite side.

The cheek is set and the eaves are started as previously shown, the only difference being that work proceeds in the opposite direction: from left to right.

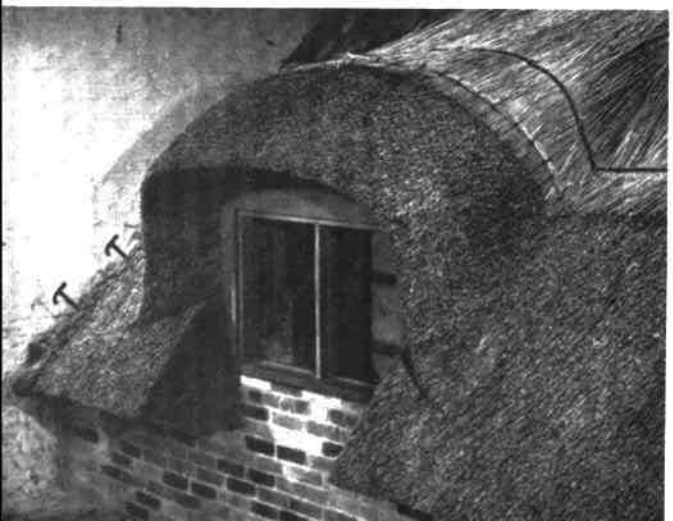
Fixing the eaves-bunches is now completed and the hazel sway is secured in readiness for the next course.

Still working from left to right, the brow-course is joined up and the eaves-line is now apparent.

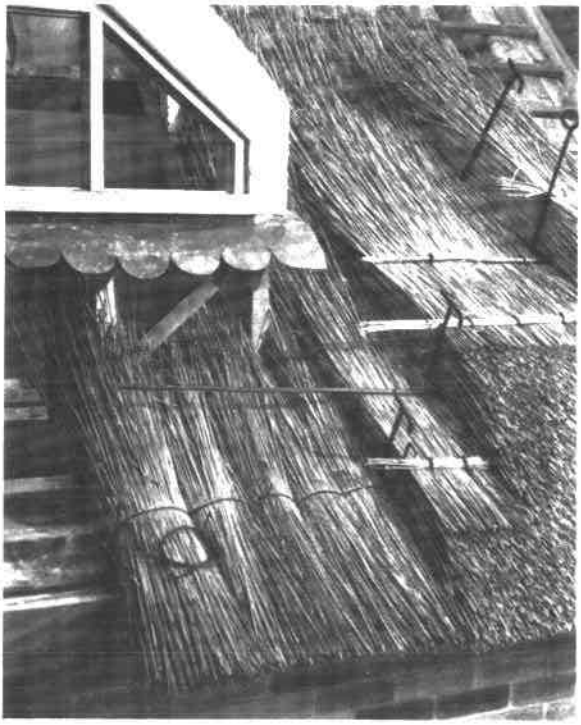
A full course is now continued from the main roof and carried half-way over the window, whilst correspondingly the same course is started on the left and works towards the centre.

The first full course over the window is completed and is ready for the sway to be fixed. A close inspection is worth while in order to see how the join is made.

A selected hazel sway is pointed at the large end, and inserted into the reed above the sway on the main course, where it is hooked down to each rafter in turn, being positioned equi-distant from the top edge of the course.



From now on the work becomes more straightforward as each course carried along the main roof, sweeps over the window without making any break, until eventually the convex shape caused by the window gradually fades into a level surface before the ridge is reached.



The open-bonnet treatment of the eaves enables the maximum amount of light to enter the room, and affords excellent protection against extreme weather conditions.

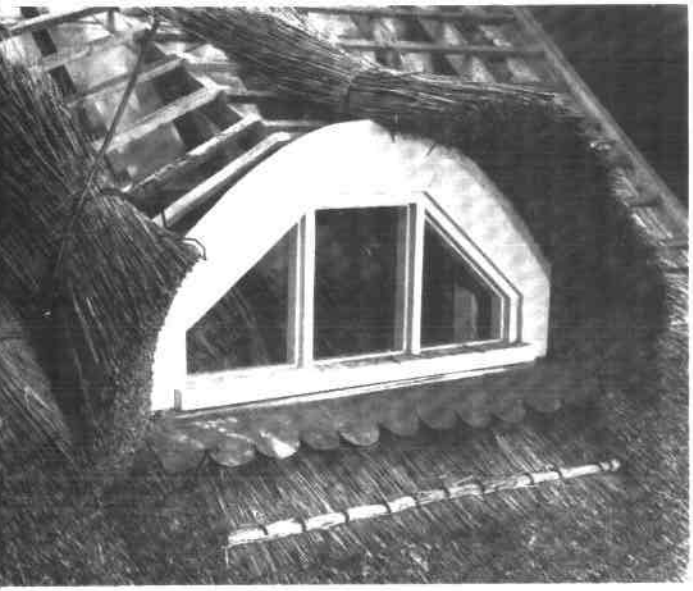
Another type of window is actually built in the roof. In its construction due regard must be paid to the thickness of the thatch. The eaves-bunches are tied in as usual across the front of the window.

The brow-course is also continued through and swayed down.

It is essential that the dressed surface of reed is carried as high as possible in front of the window, not merely to maintain the thickness, but to reduce the area to be filled in at a later stage. In the case of a new window the tops of the reed may be allowed to penetrate inside the structure. They are subsequently cut off in one operation from the inside. Where this is not possible, shorter reed, with the tops cut off to the required length before laying, is used. Alternatively the tops may be allowed to slide up in front of the window, and are then removed by cutting just below the window-sill, after the sway is fixed.

The next full course is finished beside the window although it will be started again on the other side. This will leave a gap in front of the window which will be the subject of rather special treatment at a later stage.

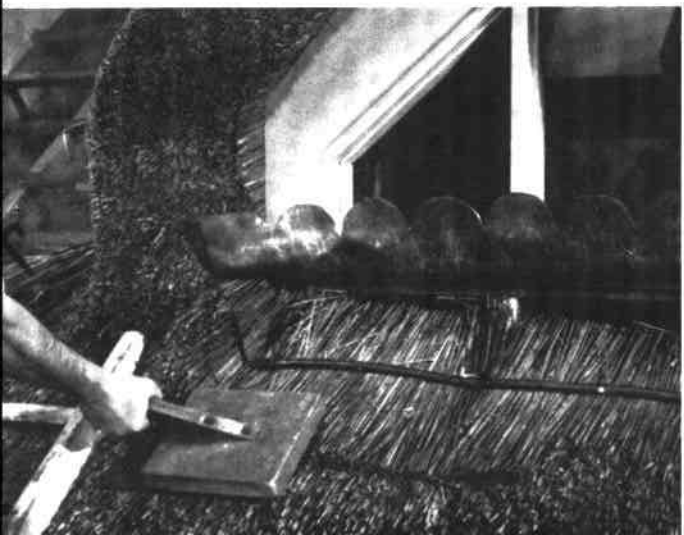
As previously described for another type of window, eaves-bunches are laid in position and fixed firmly down with a hazel sway.



These eaves-bunches are carried to the centre of the window, and at this stage the eaves are neatly dressed into line to conform with the required shape. It will be noted too that the sway is cut off and the 'tying in' method used. This is really a matter of preference, but it is suggested that with each bunch secured to the batten, there is less likelihood of any movement or slipping taking place at this point, where the reed is subject to greater wind pressure.

Having picked up the main course on the other side of the window, it is now possible to set the eaves-bunches and fix the sway.

Working from left to right towards the centre, the eaves-bunches are tied in and dressed into position. The line is determined by the arc formed by the top edge of the window-board.



The brow-course may now be laid, working from the right. This course is also carried over the window as far as the centre.

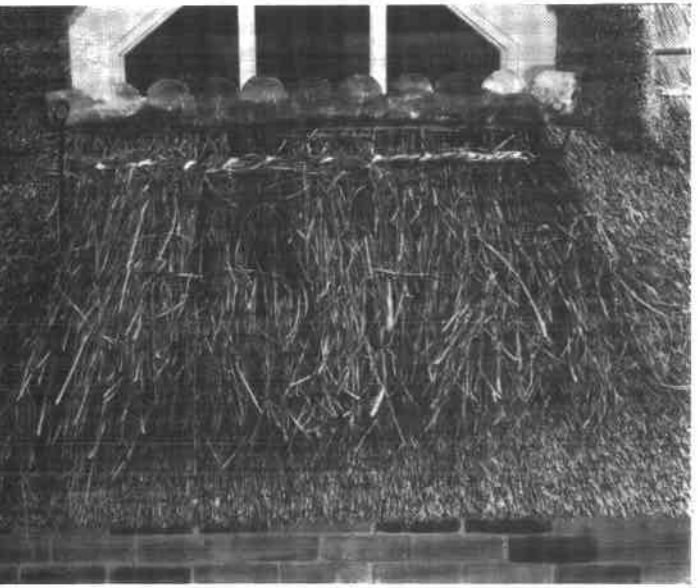
Again working from left to right, the brow-course is laid towards the centre, where it eventually joins up with that part which was carried over from the other side. This course determines the eaves-line and the final shape of the window. It is essential therefore upon completion to ensure, by sighting with the eye from every direction, that a satisfactory and symmetrical shape has been achieved. Each succeeding course may now be carried over the window in the normal way without any break.

To complete this type of window a sedge apron is required. Though out of sequence, details of the method of application are given at this stage.

Before laying the sedge however there are two essential operations to be carried out:

(*a*) The lead apron which has previously been fixed underneath the ploughed window-sill should now be lifted up out of the way.

(*b*) The shoulder, or extra thickness of reed left at the top of each course, should now be dressed off with the leggett in order to permit the layer of sedge to bed down tightly to the reed surface.

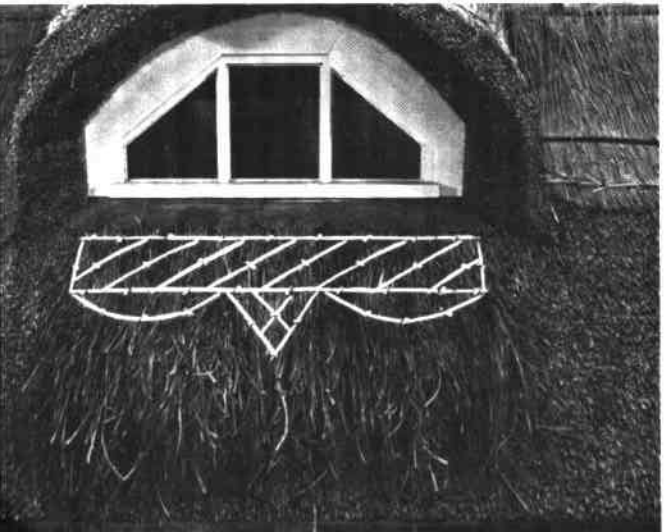


The sedge apron is laid by taking a good double handful of sedge, and after turning down the long ends at the top to make a tight bunch, it is worked firmly under the sill. The needle is inserted beside each bunch as it is laid and is used to force each section tightly together. The whole of this layer is fastened down with a 'scud' or 'bond' which consists of several pieces of sedge twisted together rope fashion, and sparred down into the course of reed underneath.

This first layer of sedge is completed to the full width of the window-frame.

The second and final layer of sedge is applied by working the bunch tightly underneath the sill, using the needle to force each portion back to the preceding bunch. The importance of this cannot be overstressed if a tight and solid finish is to be obtained.

Preparation of sedge is described on page 125.

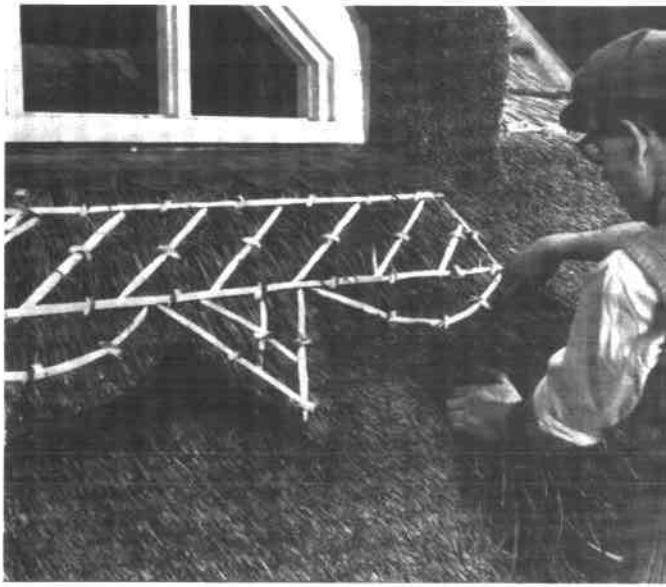


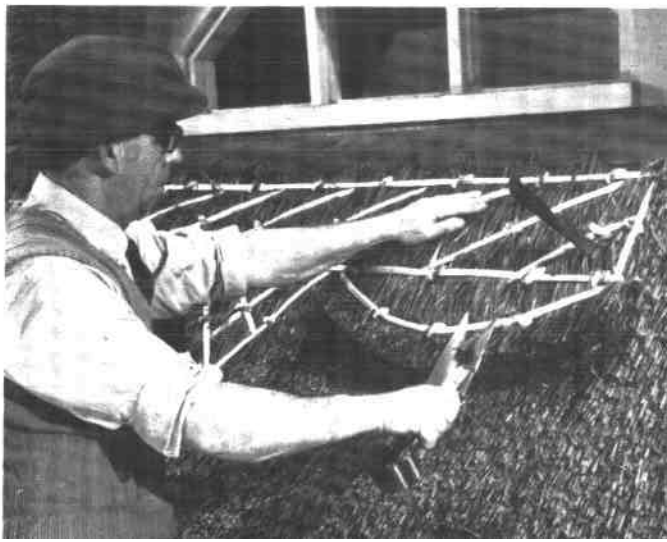
The final layer of sedge is now carried through, enabling the finishing process to begin.

First the lead apron requires dressing into position, making a weatherproof junction with the sedge. The top ligger is then fixed just below the lead. The spars are driven into the solid reed underneath.

A variety of designs can be used, but a plain straight-cut finish may be preferred.

The illustration shows two liggers set 10″ (250 mm) apart, filled in with cross-rods, forming a half herring-bone pattern. A little careful measurement will ensure that the liggers forming the design are correctly spaced.





The effect of these liggers is not merely to act as a guide when the cutting is done, but also to tighten the sedge to such an extent that a short knife will cut through it both cleanly and easily.

The design shown is not only a popular one but very pleasing to the eye. It will be noted that the point is extended below the scallop to give balance to the pattern.

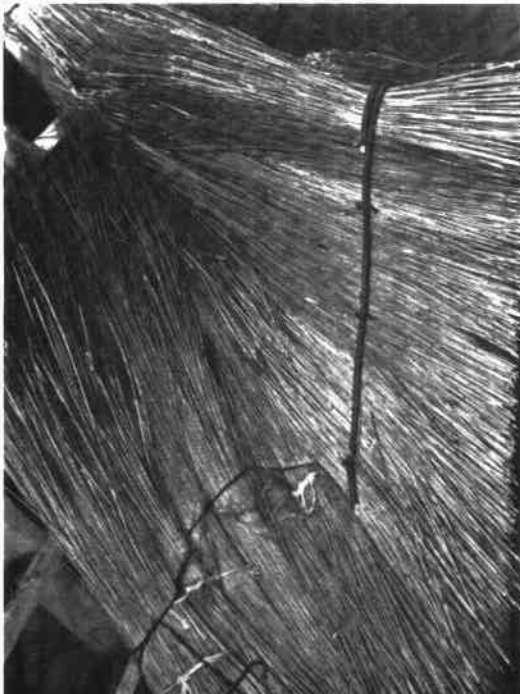
Trimming the surface with a pair of shears removes superfluous stalks and also provides a clean line, thus giving sharper definition to the finished pattern. In the case of all such aprons, care should be taken to keep the distance from the lead to the cutting-line down to a minimum, not merely for the sake of neatness, but also to reduce future maintenance.

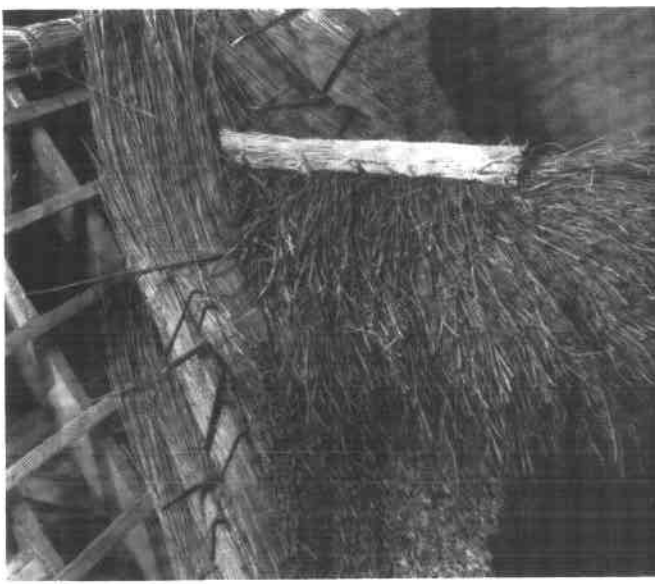
A gable dormer is the type of abutment which has a ridge to it, and makes its junction with the main roof at a point below the ridge-line. It follows therefore that very careful treatment is required at the junction to make a sound finish.

A short roll or dolly is secured to the topmost batten on either side. The method by which this roll is made is explained on page 173, and is useful for a number of reasons: (*a*) it provides extra tilt for the last course of reed, (*b*) it provides a solid base into which spars may be driven when the ridge is fixed and (*c*) it prevents the topmost gable-bunches from sloping inwards.

Bunches are laid in the right-hand gable and fixed with a sway. Superfluous tops which oversail the ridge are cut off in line with the roll.

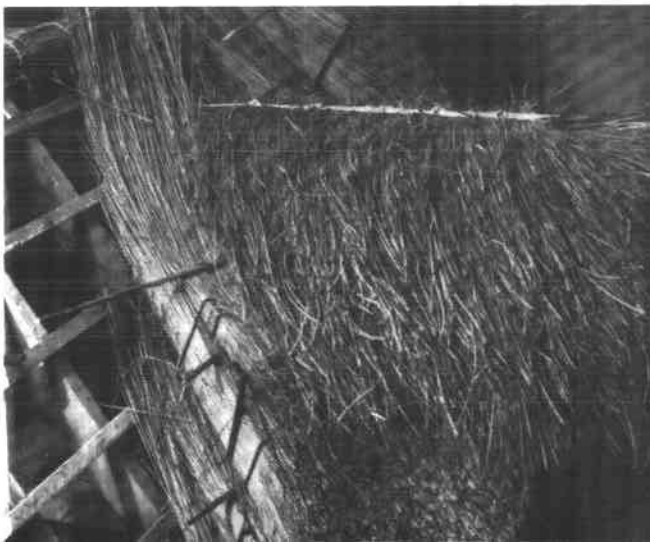
Left-hand gable-bunches are laid and fixed, the sway on both sides being carried over the apex to give additional strength at this point.



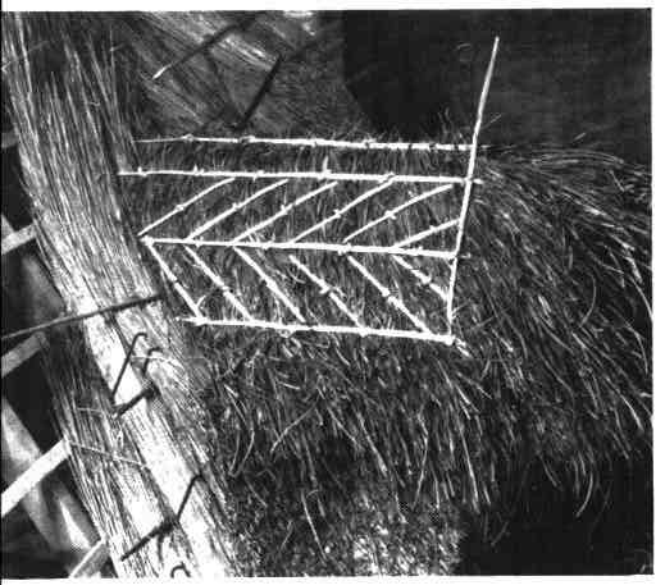


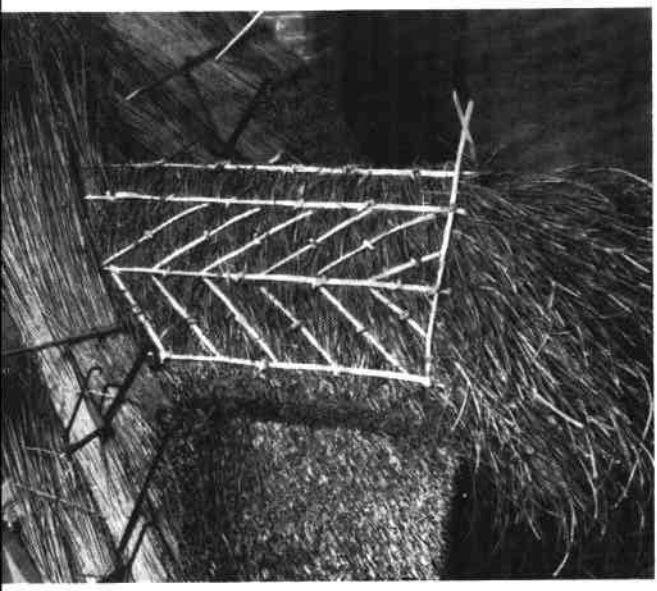
After the side courses of reed have been laid and all the tops cut off, the next job is to lay the skirts or side courses of sedge which also overhang the gable.

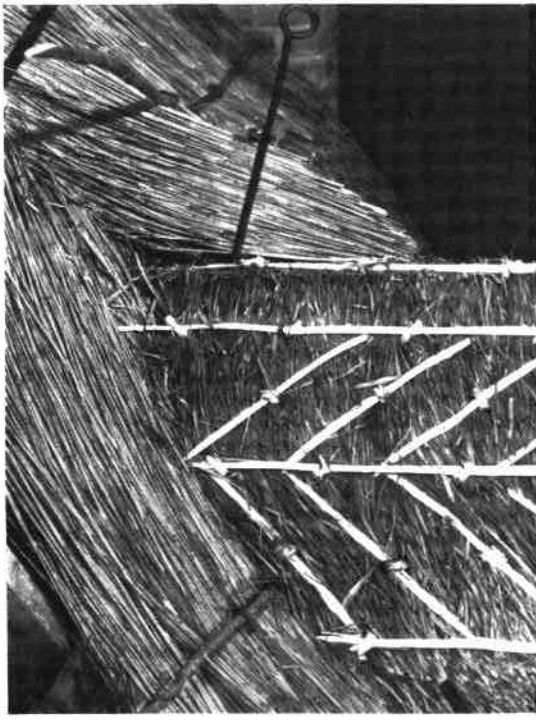
In order to build up the ridge to the narrowest possible apex, a small roll may be fixed with spars which are driven into the larger roll underneath.



The turnover ridging yealms are now laid and secured firmly with the top ligger. Although the process of laying a turnover ridge is described in more detail on page 183, the main purpose of the emphasis placed upon it is to show how important it is to ensure that the sedge ridge is worked tightly into position right back to the batten face of the main roof. It provides maximum solidarity at this most vulnerable intersection.



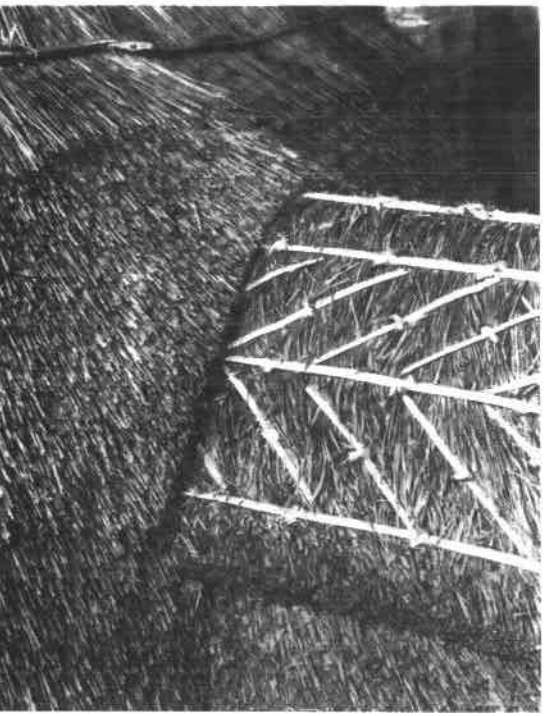




This small ridge must be sparred down and finished off as far as possible before any further reed courses are laid.

Liggers are fixed according to the appropriate design and the ridge is cut and trimmed, either straight, or with a pattern as required.

Having completed the ridge, the reed laying may continue from right to left, working the course to the apex of the ridge. It will be seen at this point just how much of the ridge is covered by this course of reed, thus emphasising the necessity of careful treatment when laying the ridge.

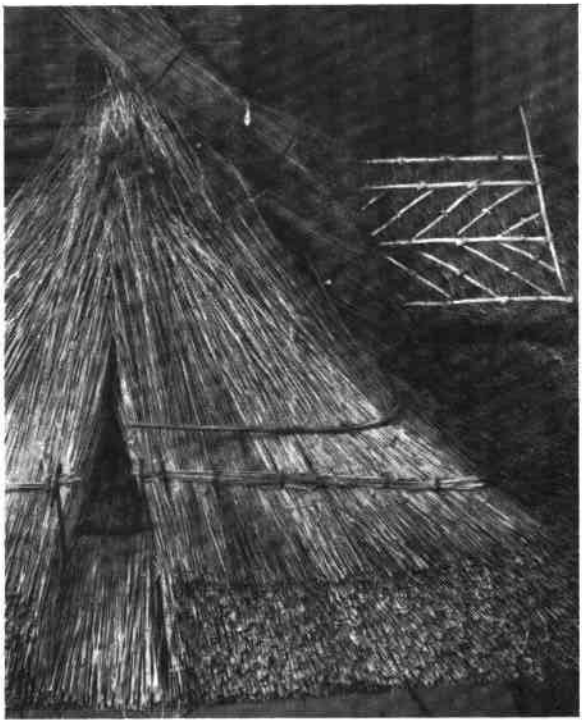


Working now from left to right the course is continued until it joins up with the course from the other side at the apex. This ridge or saddle-piece as it is sometimes called, may also be used to good effect behind a large chimney-stack, thus obviating the need for a lead gutter. The procedure would be almost the same as that required for a window, except that the gable would be dispensed with, the rafters finishing against the brickwork as closely as is permissible.

A half-hip can be a distinctive feature of a building and a worth-while feature when designing a roof.

Turning the hips presents no great difficulty, providing certain principles are observed. Assuming the two barges have been completed up to eaves-board level, the eaves-bunches may now be tied in, or alternatively hooked down with a hazel sway, whichever method is preferred. Care should be taken to ensure that the tops of each bunch point towards the apex.

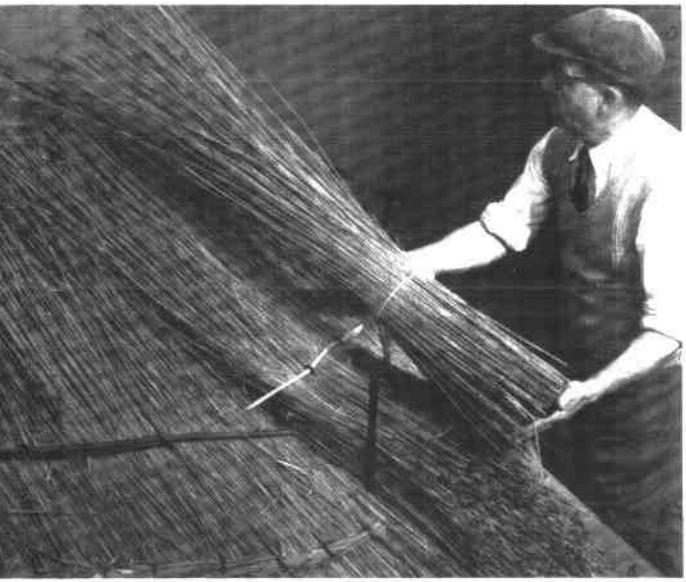
The brow-course may be laid next, but it is suggested that the work will be greatly assisted if the hip-bunches are laid first on both angles as shown in the illustration.



As the brow-course turns the angle of the hip on the second side, it gradually merges into a full course in the main roof.

The section between the hips may now be filled in. This work can be simplified if the hip is of medium size, by placing the ladder in the centre and working towards it from either side.

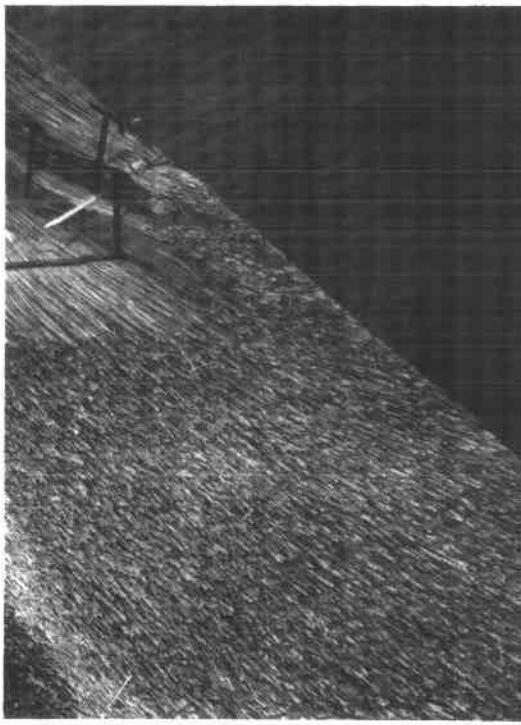
A simple join is all that is now required to complete this course, one full bunch filling the space which was occupied by the ladder. The sway turns the angle of the hip and the whole course is fastened down securely.

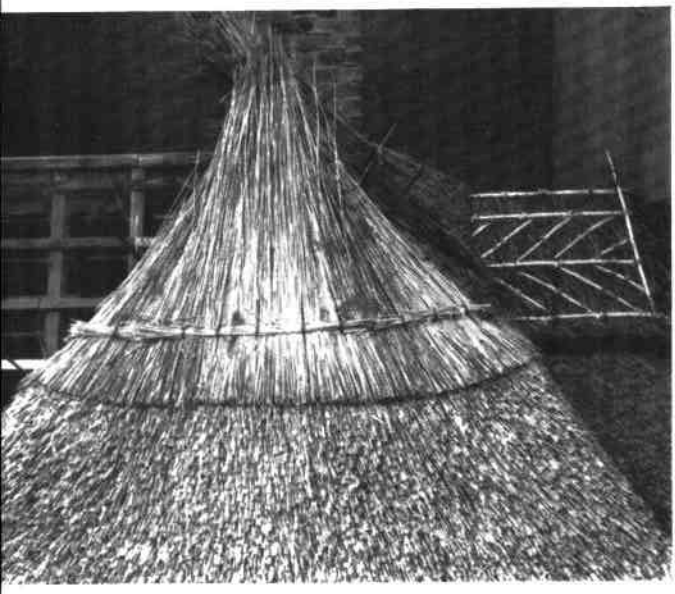


The next full course is once again started by setting the hip-bunches. It is recommended that this is done by laying two half-courses, the first being fastened before the second half is laid. By this method a very much stronger hip angle will result and the face of the finished coating will be tighter and closer together.

The two half-courses, together with the temporary reed sway uppermost, are shown. The end of the sway which holds the first half-course will be cut off, and after the whole course is filled in, a strong hazel sway is continued round from the main roof, firmly securing the course. This is repeated with each succeeding course.

Special care must be taken when forming the angle of the hip. Careful use of the leggett when dressing will produce a clean, sharp line, which is not only true to pitch, but also follows closely the direction of the hip-rafter.





The courses naturally become shorter as the apex is reached, making it even more essential for the tops of each bunch to be carefully directed towards the point, avoiding congestion as the space becomes smaller.

Using a short cutting-knife kept for the purpose, those tops which oversail the ridge are cut off. The knife is held at the appropriate angle bringing it in pitch with the rafters on the opposite side. The blade itself travels just above the roll in order to avoid cutting the strings.

Though the roll may vary in size according to requirements, it is normally approximately 4″ (100 mm) in diameter. It is made by tying a small bunch of long, course reed with two or three strings. Further handfuls of reed are then fed, butt-ends first, into the loose tops of the bunch.

As the length of the roll increases, more strings are firmly tied at intervals of about 12″ (300 mm).

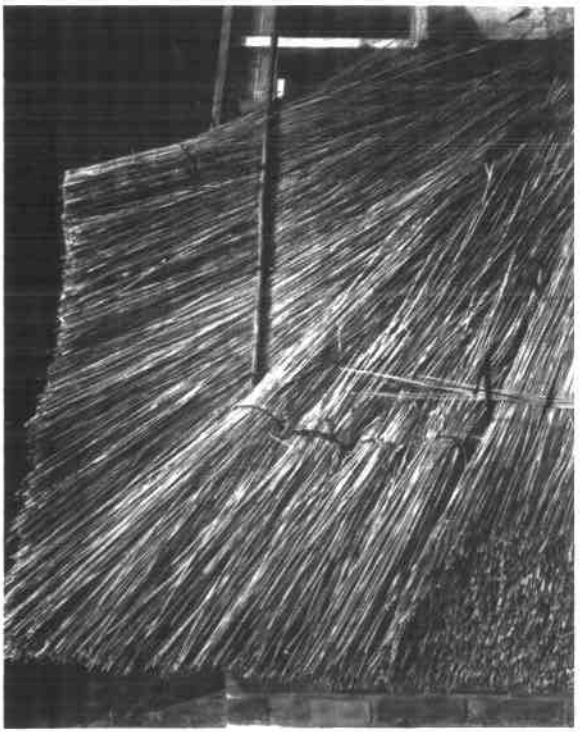
By this method a very strong roll of equal dimensions may be tied. The length is determined by the length of ridge.

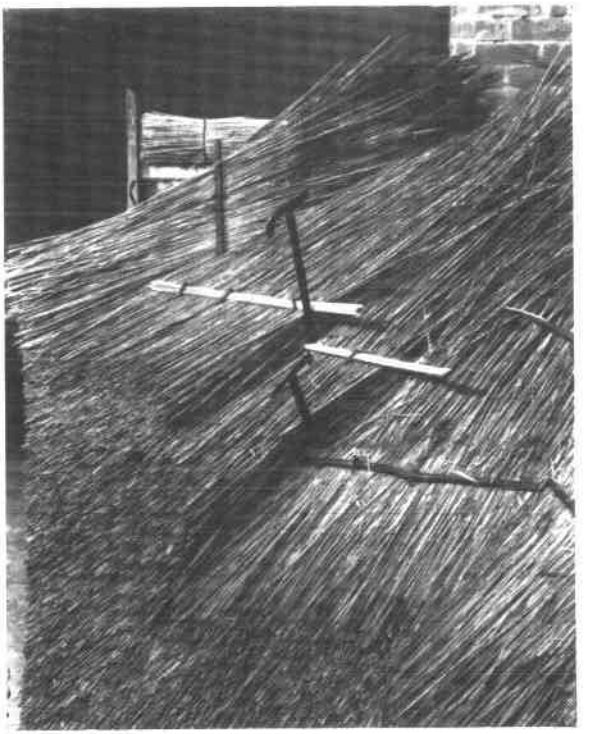
Approaching the left-hand barge, the eaves-bunches are turned well before the corner is reached. The corner bunch is tied in and the remaining space filled in afterwards.

A very useful method by which the final bunch can be tied when filling in the gap, is illustrated. A loop is made in the end of the string which holds the corner bunch.

The loose end of the string from the preceding tie is passed through the loop and drawn down tightly, whilst the reed is worked into position with the free hand.

The knot is finished off and the loose end of the string removed, thus completing a quick and efficient method of joining up.

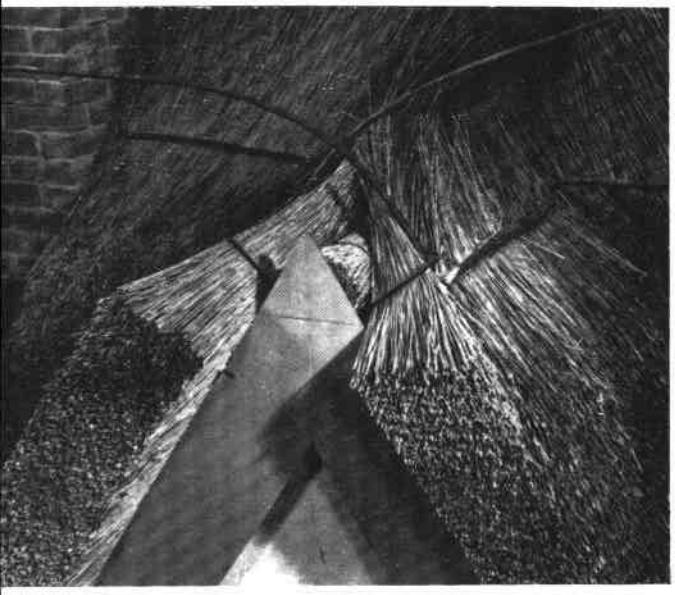




Work on the left-hand gable is often regarded with some misgivings, but it should always be remembered that it is merely right-hand work in reverse, and that all courses must therefore start on the extreme left, and then be carried towards the right, where they join up with the main work. The bunches of part of the left-hand barge have been laid and the sway started.

Approaching the apex of the gable a full course has been joined up and swayed down.

The next full course is started on the extreme left, and like all barge-courses, it is laid in two halves, each half being fixed separately with a sway.



These half-courses now merge into one and will be ready to join up with the main work, after which the hazel sway can be fixed.

With the two barges almost completed, the method of turning the apex is shown. The two sways seen are a continuation of those which secure the bunches in the barge.

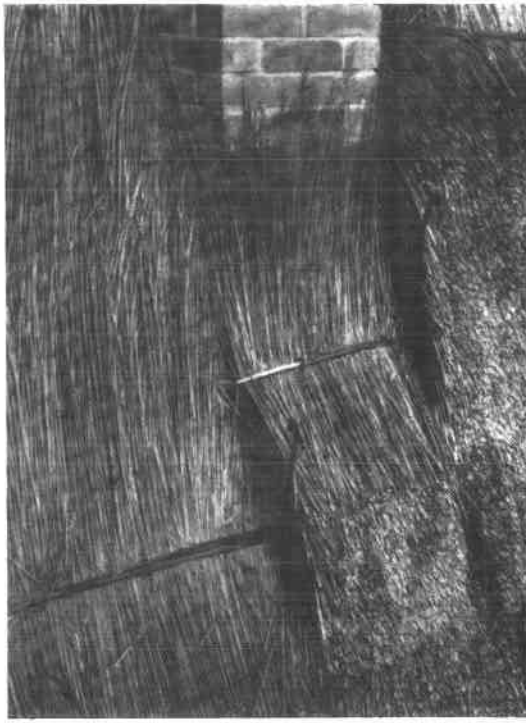
Bunches of reed are laid right over the apex and the two hazel sways are bent down and cut off to the required length.

It will be noted that these two sways do not finish at the apex but instead each overlaps the top by 12″ (300 mm), where a secure fixing can be made.

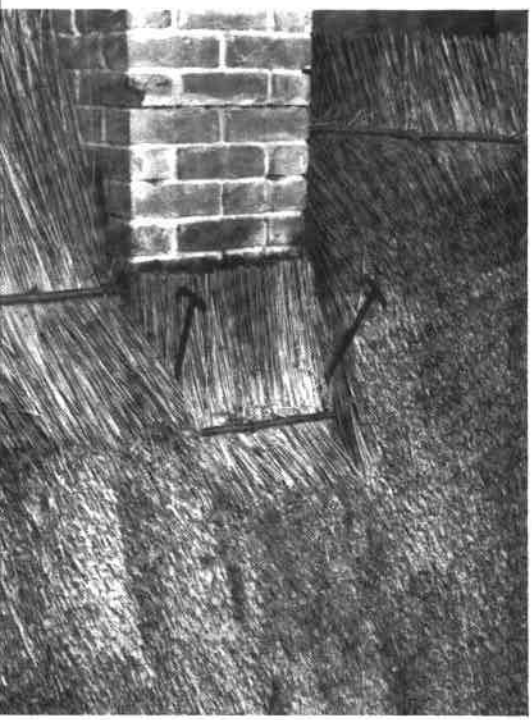
It is convenient to show at this stage how the courses abutting the ridge-chimney are arranged. Although these last courses are interrupted by the chimney, the strength of the finished work need not be affected.

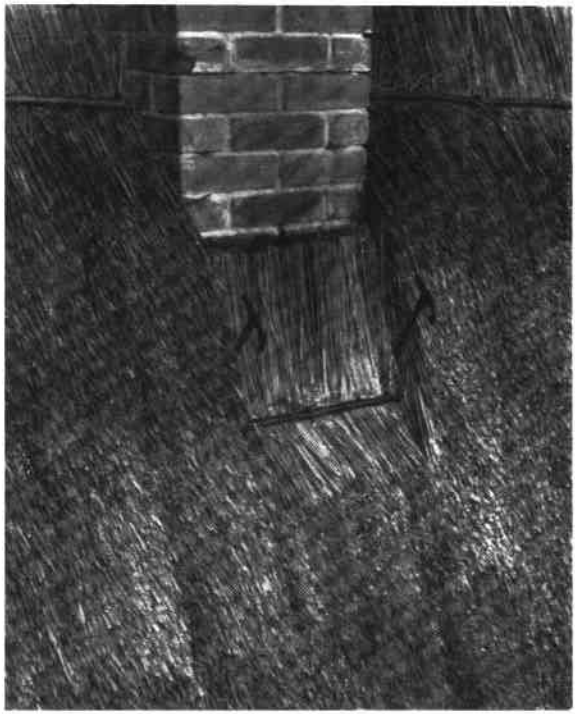
The illustration shows three courses which have finished on the right-hand side of the chimney, and the last hazel sway to pass uninterrupted in front of the chimney.

A useful addition at this point is the small roll cut to the width of the brickwork and tied to the top batten in front of the chimney. This roll makes a solid base into which spars are driven later on.



It is essential that ample thickness of reed is carried through in front of the brickwork and it is therefore suggested that two small courses are fixed at this point. Selecting medium-length reed the first small course is laid and fixed with a short sway, allowing the tops of the reed to run up the brickwork when dressing.

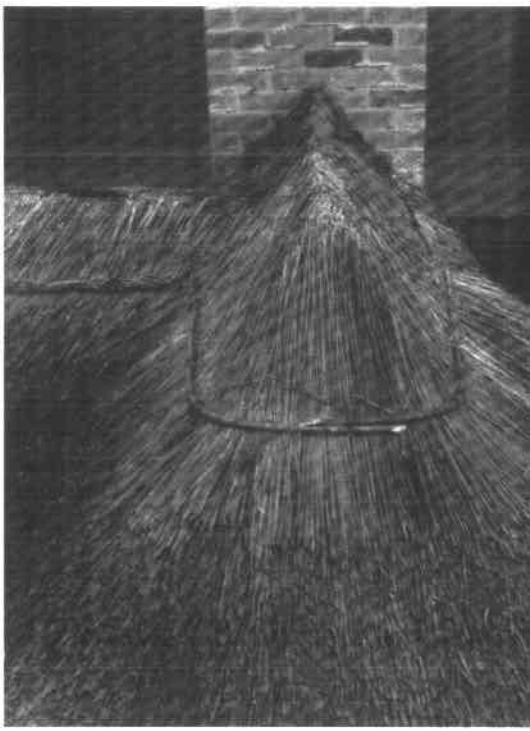




In continuation another full course is laid on the left-hand side of the chimney, and after this has been swayed down, the second small course is laid in front of the brickwork. This is also fixed with a short sway, but 12″ (300 mm) hooks may be necessary for fixing in order to reach the rafters.

Another full course may now be started on the left-hand side of the chimney and the hazel sway fixed. Superfluous tops of the chimney-course are now cut off at a point below the level of the finished thatch surface, using the brick joint as a guide to straightness.

The topmost course of all is finally laid beside the chimney, care being taken to maintain the same level as the opposite side. The cavity between the two needles will be dealt with under the heading of ridging, at a later stage.

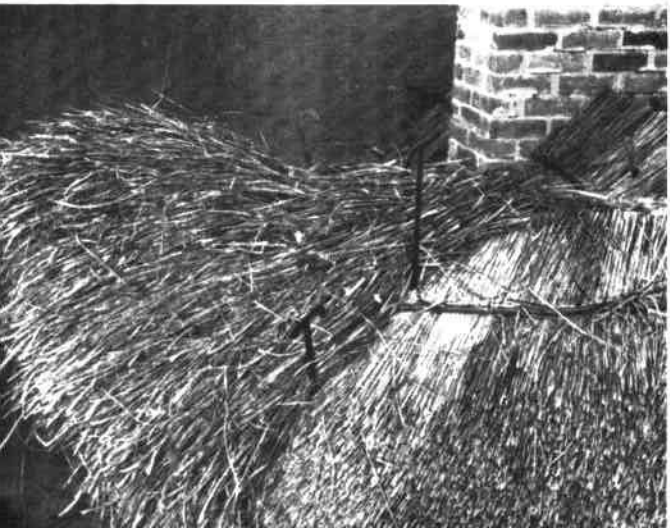


Now that all the courses are completed on the second side, the remaining tops are the next to be cut off. The knife is held at the appropriate angle whereby it is in pitch with the reed on the first side.

This method of cutting the superfluous reed produces a very narrow top, whilst at the same time a gradual build-up has been taking place, which now provides more than 12″ (300 mm) of material above the ridge-board.

The roof has now reached the stage when the sedge skirts can be laid. The sedge is applied to the ridge in 'yealms', which can be taken direct from the bunch as delivered, provided it is still green. If the sedge has become dry and hard it should be treated in the same way as long straw, by shaking it into a bed and at the same time applying the required amount of water. Ideally the sedge should be left to soak for twenty-four hours after which it can then be drawn and yealmed for use.

The illustration shows the first yealm being laid on the gable and having sufficient overhang to allow for cutting.



Each yealm is fastened with spars which are driven into the reed.

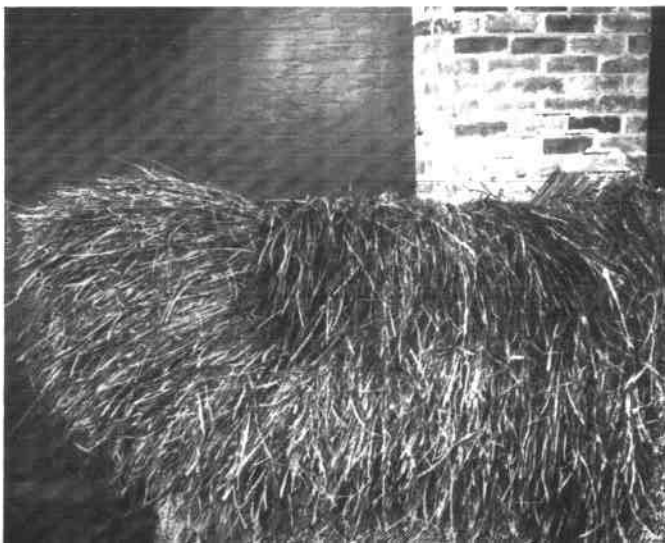
Further yealms are laid on both sides of the gable. Emphasis is placed on the way the needles are used to keep the sedge tightly together.

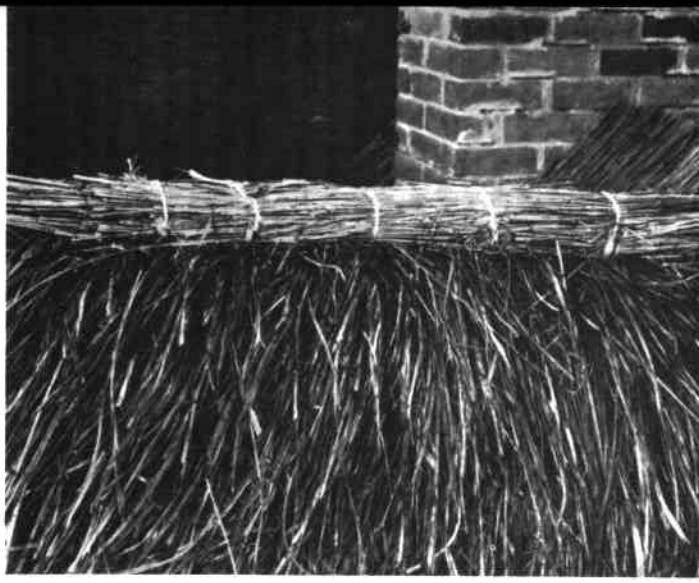
The layer of sedge is continued right over the apex, in equal thickness.

Care is taken when laying the skirts or side courses, to ensure that the sedge is positioned sufficiently low if an ornamental pattern is desired, as it is from this course that it is cut.

A portion of the skirt-course is laid.

This lining course is recommended as an optional extra by which to reinforce the ridge and thereby increase its wearing qualities. It also levels up the hollow on either side after the skirt-course is laid.





This small roll, fixed with spars which are driven firmly into the larger roll beneath, has the effect of reducing the apex to a very narrow line, and simultaneously provides a solid base upon which to lay the final ridge-course.

There are several methods used in laying a ridge but the 'turnover' type described is considered to be the best. The ring-headed needle has been inserted in the centre of the ridge, approximately 2′ (600 mm) from the edge of the sedge overhanging the gable. Straddling the ridge the thatcher takes an ample yealm of sedge which he places centrally across the apex.

This yealm will undoubtedly have a thick end and also a thin end. To counteract this, half of the yealm is reversed, thus making both ends equal.

Both ends of the yealm are then drawn out in order to make the course longer.

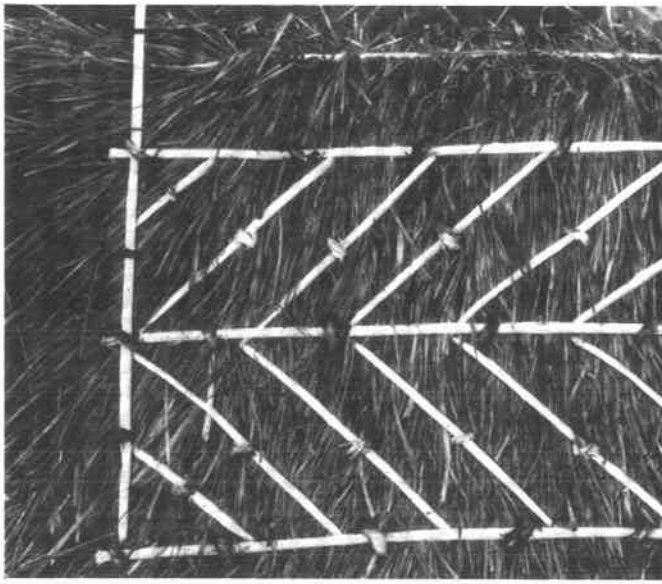
A good double handful is gripped firmly on both sides and bent across the roll by forcing the hands together. This is repeated throughout the whole yealm and each portion is pushed forward as tightly as possible.

A second needle is inserted centrally in the roll and used as a lever with which to force back the whole yealm into its tightest position.

The lower ends of the course are then worked into line with the sedge overhanging the gable.

It is now necessary to start the top ligger. This is placed centrally on the ridge and is fastened by driving spars into the roll beneath. Notice how the spars enter at an angle rather than vertically, in order to avoid making a gap.

The operation previously described is repeated with each yealm until the whole ridge is laid, the topmost ligger being fixed as the work proceeds. This tightens and levels the ridge.

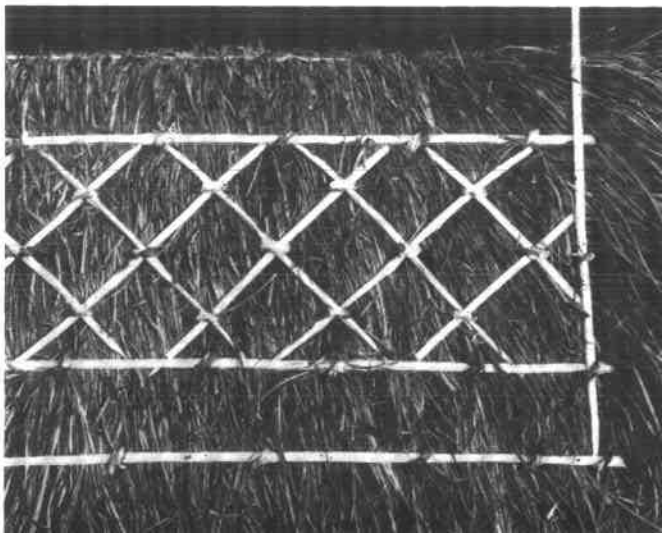


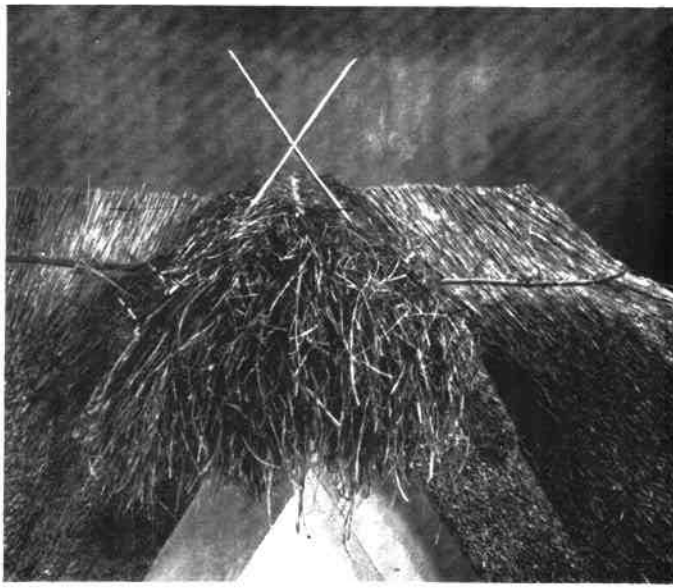
It is usual to complete all the sedge laying in one operation, but for the purpose of this manual the method of finishing off the ridge and gable is described next.

There are various patterns which can be created with the careful use of liggers and cross-rods, but if the herring-bone design is required then three liggers are fixed in position, usually about 12″ (300 mm) apart. This may vary according to the type of roof.

A vertical ligger is fixed immediately above the barge-board, which will be approximately 6″ (150 mm) from the finished cut-edge. Cross-rods are then inserted under the horizontal liggers at 6″ (150 mm) intervals, each rod being fastened down tightly with a spar.

An equally pleasant design is the triple-diamond pattern, which also requires three horizontal liggers, but in this case the spacings are 18″ (450 mm) and 6″ (150 mm) respectively. Cross-roads are also spaced 6″ (150 mm) apart.

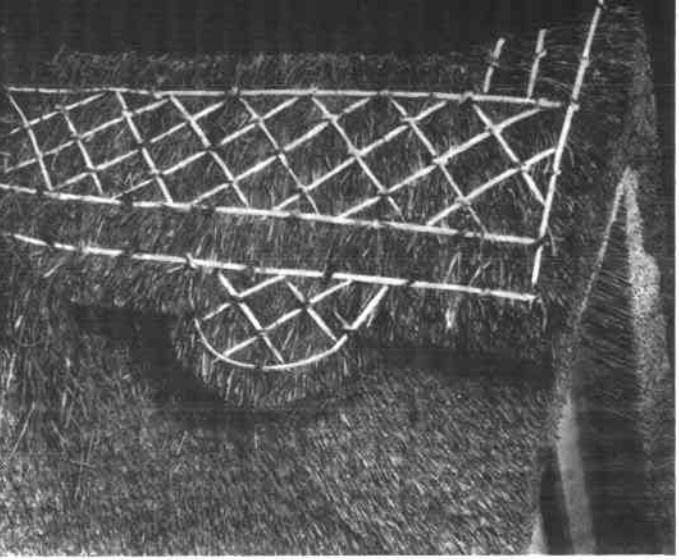


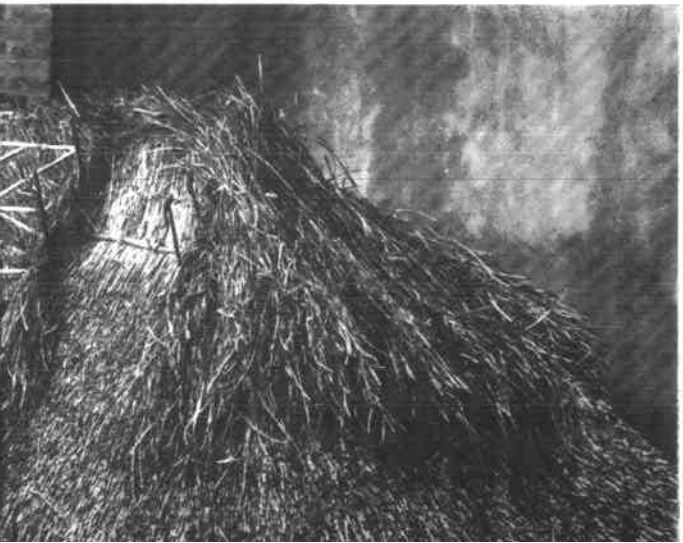


The long knife is used in an upward direction to cut off the lower portion of sedge which overhangs the gable on both sides.

Raising the gable-end or pinnacle is next to be shown. This is the lower triangular portion between the two liggers which must be filled up with sedge.

After the liggers have been sparred down the top ends are cut off to the required length. The sedge at this point is now tight and firm and may be cut off cleanly with the long knife.





The small knife is used to cut the straight portion and the scallop, after which any ragged stalks may be trimmed off with the shears.

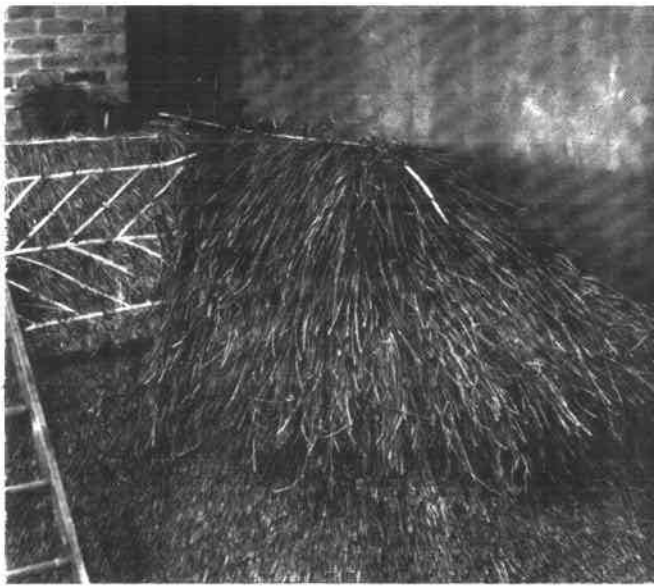
A method of turning the ridge at the hipped end is now described. Starting with the skirt or pattern course again, a full yealm is laid, thick end down, each side of the angle, always using the needles to keep the work tight.

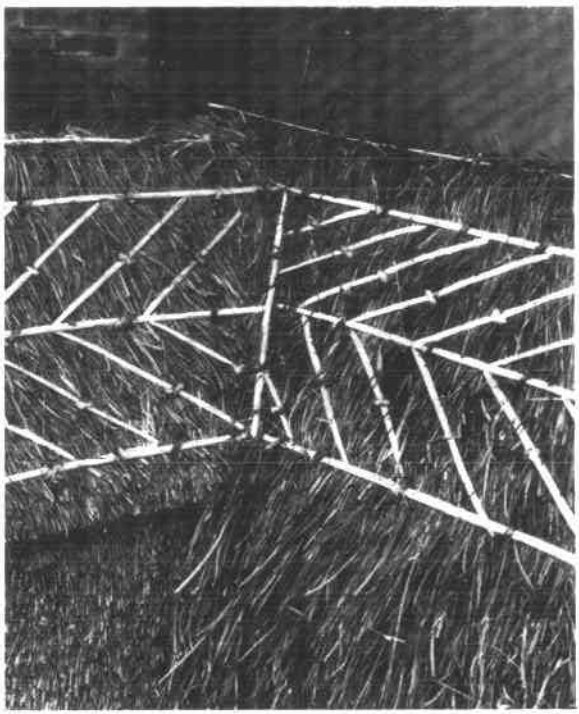
The opposite hip angle is treated in the same way and the small remaining portion is filled in.

The skirt-course is laid as far as the valley. An occasional spar holds the course at this stage.

A thin lining course and a small roll bring the ridge to the point where it is ready for the final course.

The centre of the roof is again marked with the ring-headed needle. From the straddle position the thatcher works a yealm of sedge to make both ends equal.

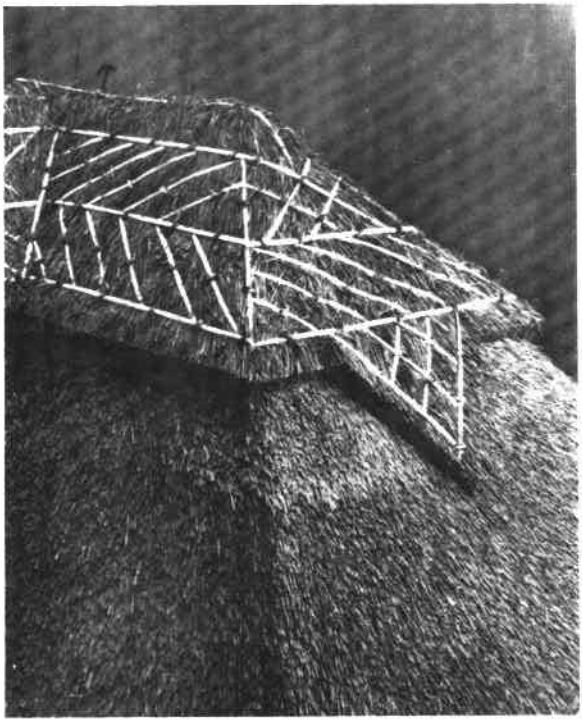


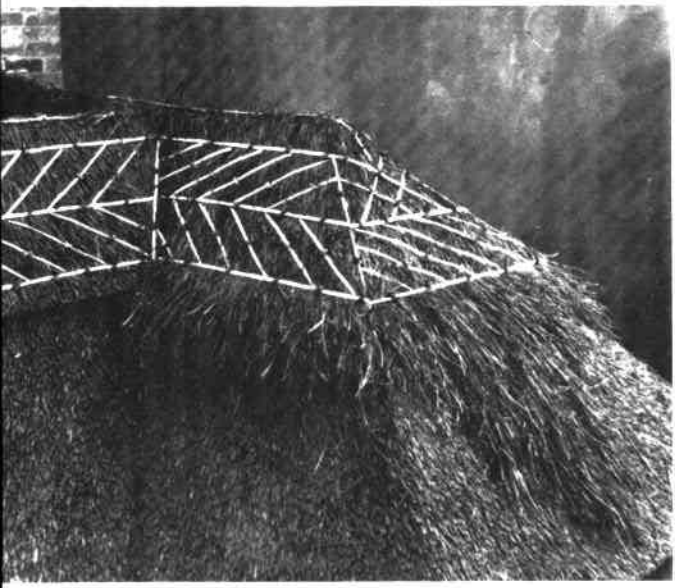


By bending the sedge round the needle, it is brought into line with the hip angle on both sides.

The ridge-course is laid in the manner described previously. By fixing the topmost ligger the apex is levelled out.

The herring-bone pattern is completed to the valley.

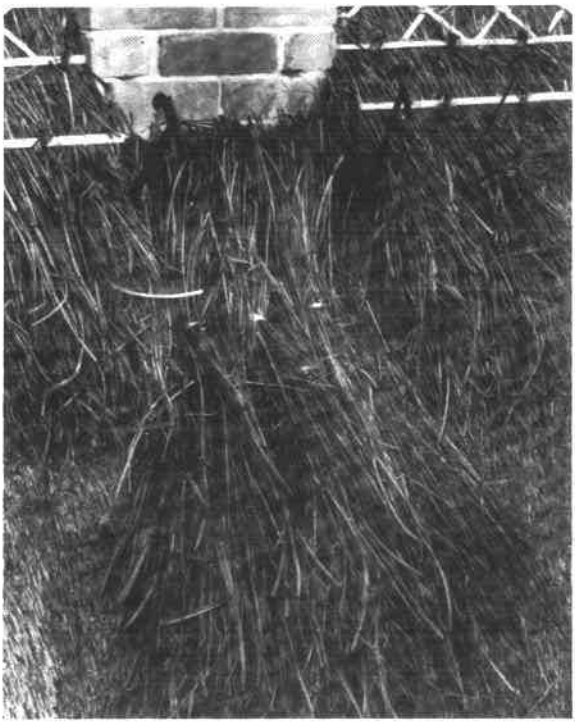


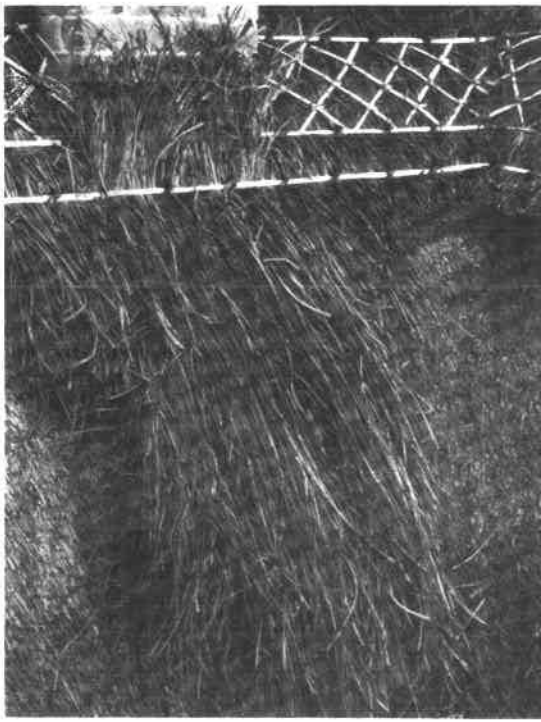


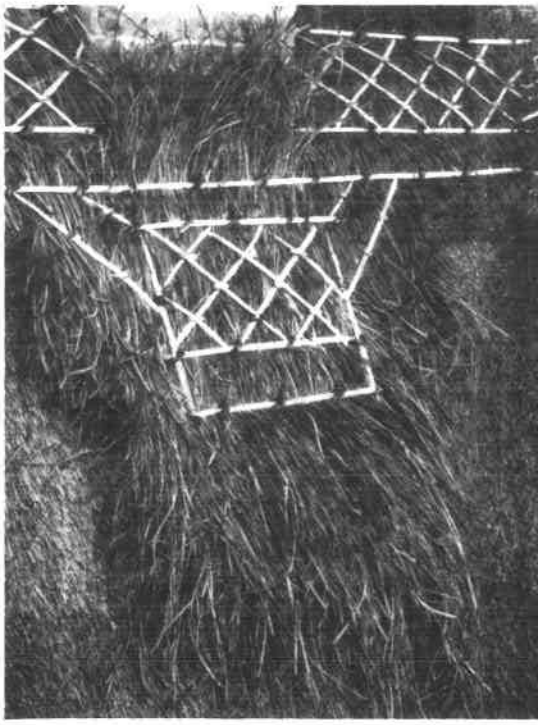
The hip-end is sparred down and ready for cutting. In the event of a single point being required to improve the appearance of a hipped end, an extra layer of sedge can be worked under the skirt-course to suit the shape required.

After the liggers have been sparred down, the point can then be cut as shown on page 166. It is of particular interest to note how the sharp angles formed in the sedge ridge correspond with those in the reed on the main roof.

With this ridge liggered and sparred down on both sides of the chimney-stack, the next task is to complete the portion between the two needles indicated, usually referred to as a chimney piece or apron.



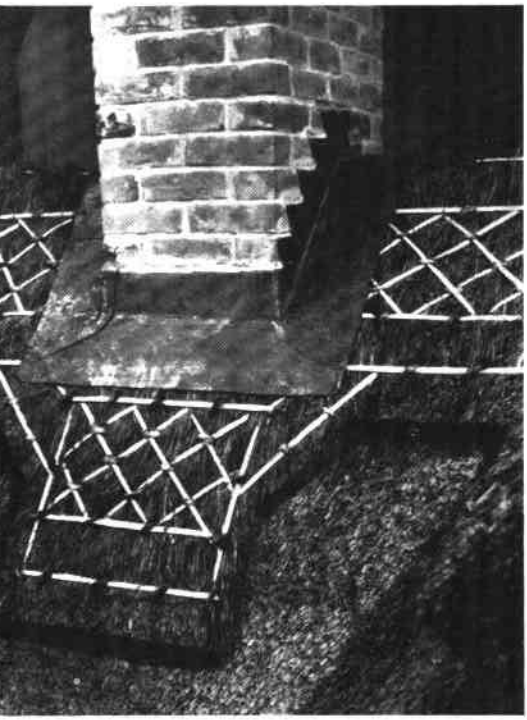


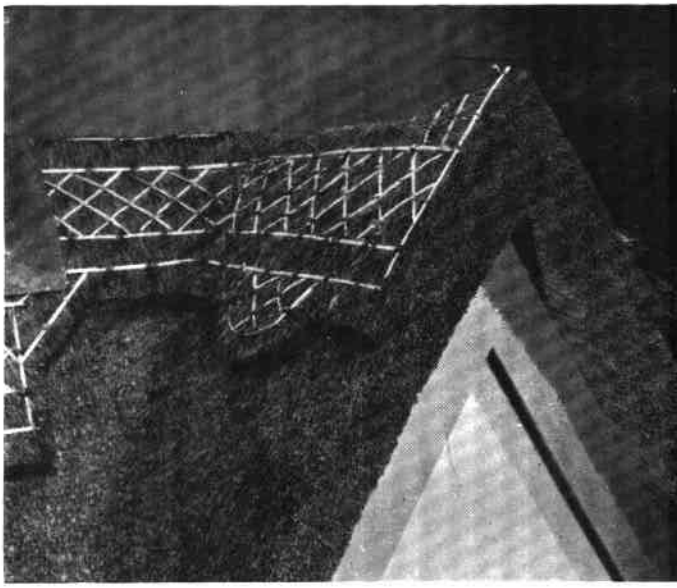


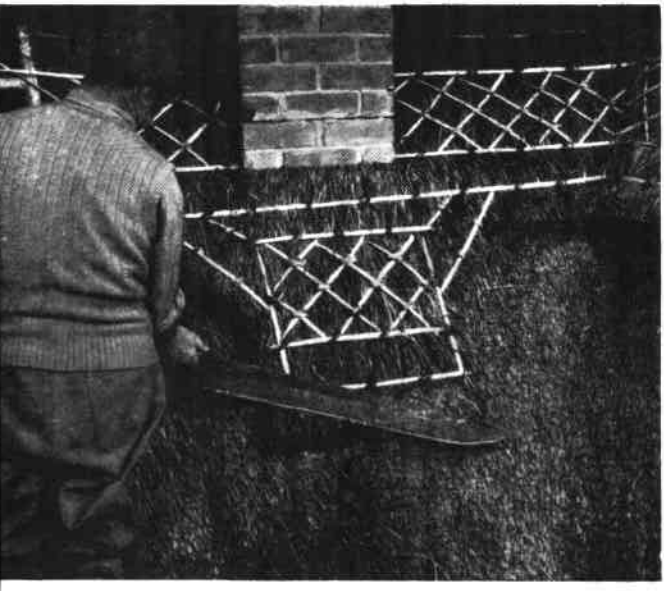
The first layer of sedge is worked into the cavity and held in position by several spars driven into the reed.

A second layer of sedge is applied to such a thickness as will bring it up to the level of the course on either side. Sufficient sedge should be allowed against the chimney. The lowest ligger in the ridge formation is continued right through, the spars being driven into the tight roll beneath.

The triple-diamond pattern shown in the ridge finish is repeated in this chimney apron, which is now ready for cutting out to the required shape.



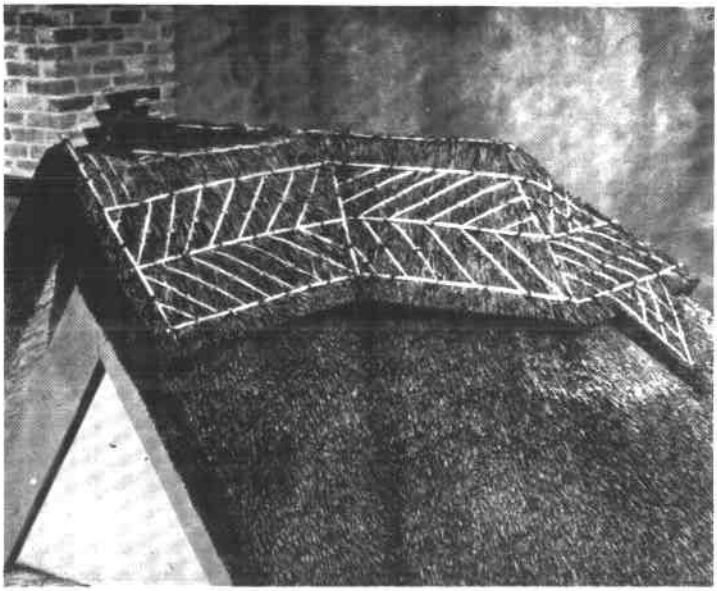


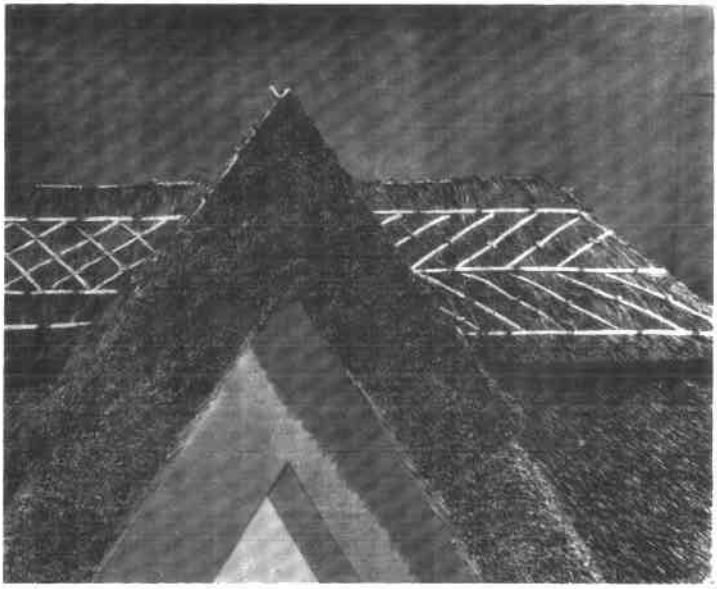


Having used the small knife with which to cut out the pattern, the work is often improved by slicing off with the long knife the ragged surface which may occur below the bottom ligger. This produces a sharp, clean line, adding greater definition to the finished ridge.

Although it is possible to make a water-tight junction between the thatch and the chimney where oversailing courses are provided in the brickwork, lead flashing undoubtedly presents a sound, trouble-free finish and also reduces wear caused by the weather.

Now that all the work on the ridge is finished, the main reed thatch is re-dressed and cleaned down with the leggett.





The finished work, showing the top of the hipped end, valley and gable.

The top of the gable when completed.

REPAIRING WATER REED

When a roof has been newly thatched, an arrangement can be made with the thatcher, whereby he inspects the roof every two or three years. Any slight defects appearing can then be corrected with the minimum trouble and outlay. The time will come, however, when a completely new ridge is required.

After stripping off the remaining portion of the old ridge, the entire roof area is dressed and cleaned down with the leggett, removing any moss which may have grown on that part of the roof which has a northerly aspect. Any holes in the main reed coating can be repaired by drawing down the reeds around the affected parts, and inserting small bunches of new reed which have been shortened to the appropriate length. The old and new reed is then dressed in together, level with the main coating.

It will be necessary to fix a new reed roll to the apex of the roof, after which the ridge can be applied, using sedge or good quality wheat straw. The whole roof area should then be lightly dressed and all eaves and barges levelled.

Extra protection can be given to a new ridge by covering it with $\frac{3}{4}$" (19 mm) mesh wire netting.

A garden entrance and wall thatched with reed grown in Glamorganshire. Sutton Manor Estate, Sutton Scotney, Winchester, Hants.

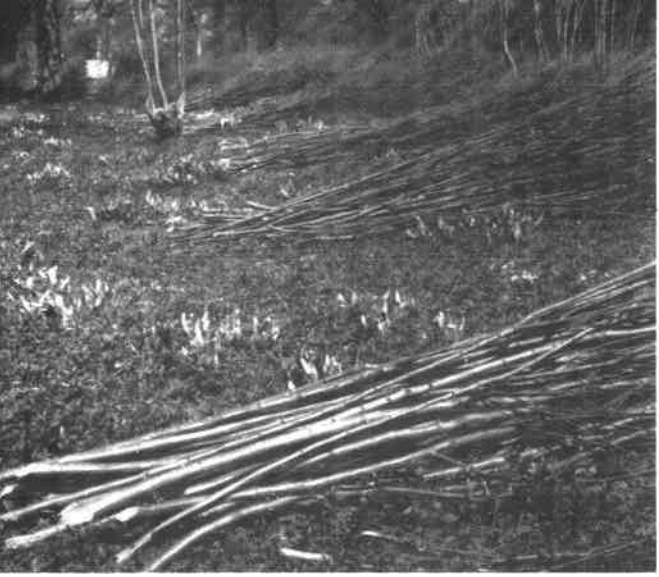
5 | Spar-making

Hazel growing on the stool.

THE term 'spar-making' is a general term used to describe the preparation of hazel or willow used in the process of thatching a roof, whichever material is used. It includes spars which are the twisted lengths used as pegs, liggers which are runners fixed to the exterior of the thatch, and sways which are the long rods used for binding each course of thatch.

Whilst a considerable amount of willow is undoubtedly used in some counties, owing to its local preponderance, there is nothing to equal nut hazel in both quality and durability. The output of many acres (hectares) of hazel coppice goes to the making of spars, and in some counties it has developed into a definite industry ancillary to that of the thatcher. The coppice should be well cultivated and maintained and growth of some six or ten years is best suited to this purpose.

Spar-making is an art which needs considerable practice before proficiency is obtained. A number of alternative methods, varying from county to county, are used in their making.



Hazel rods ready for trimming and cutting into lengths.

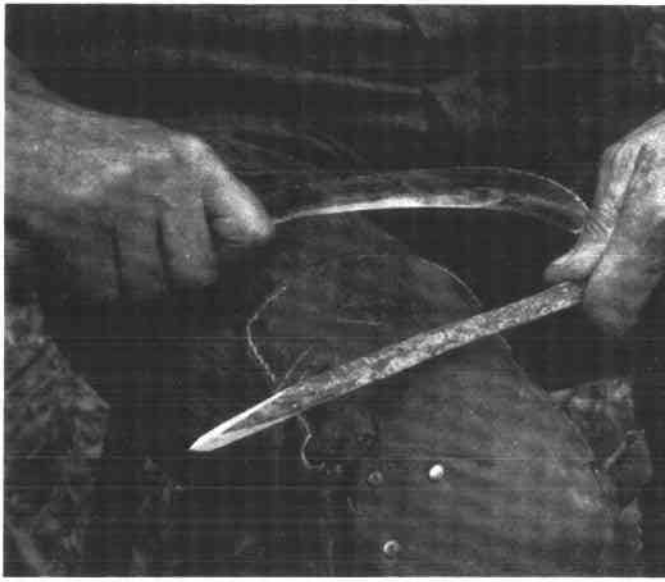
The long lengths of hazel are cut into pieces 28″ (700 mm) or 30″ (800 mm) in length and are then referred to as spar-gadds. One is shown being trimmed with the spar-hook, in preparation for splitting.

This method of splitting shows the gadd resting on a small block, whilst the spar-hook is inserted centrally at the thinner end.

Applying pressure on the spar-hook in a leverage motion the gadd is split down the centre with a gentle well regulated cleaving action. The thumb of the left hand will indicate if the split is running true.

A gadd is split into two halves.

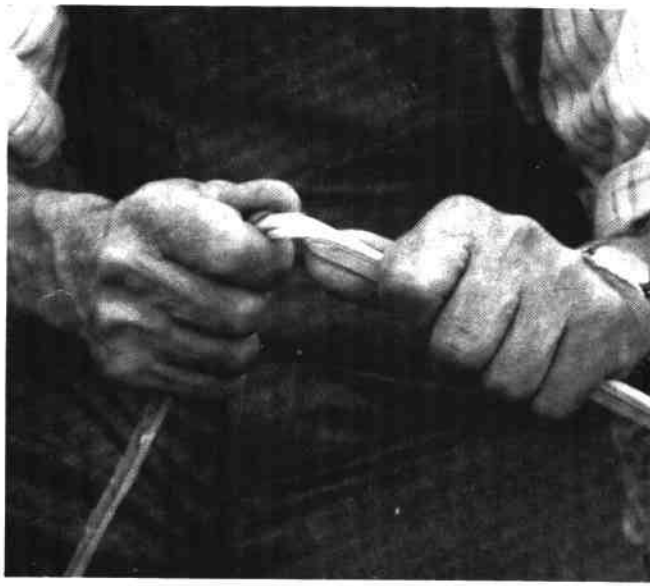
The spar-hook is inserted, this time splitting off a triangular section equal to one-third of the half-gadd. This means that a gadd with a 2″ (50 mm) diameter butt will make six strong spars.



Laying the spar across the padded knee, the spar-hook is used to remove the rough edges.

Each spar is pointed at both ends whilst it is still firmly held on the knee. Three clean cuts are usually sufficient to produce a good point.

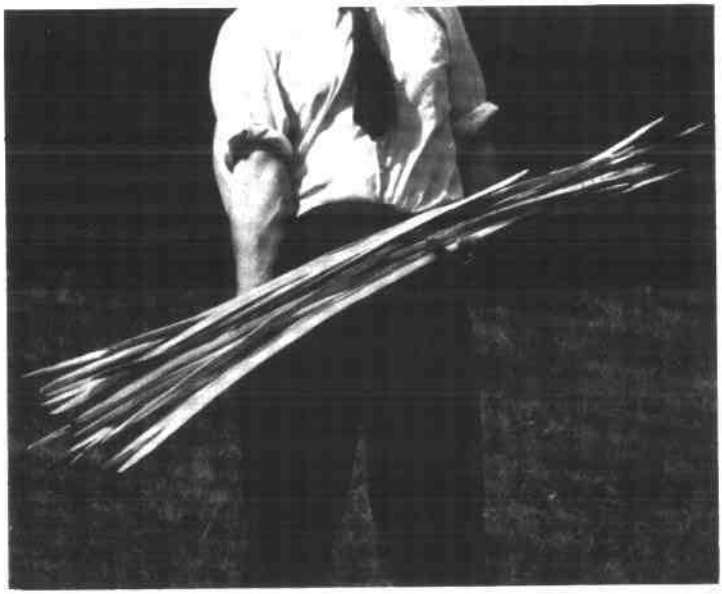
The completed spars are tied into bundles usually of about 250. It should be emphasised, however, that when spars are made in large quantities and kept in stock, is it not usual to point them until they are required for use.



Before the pointed spars are used they are twisted to form a staple. This is done by placing the two thumbs together in the centre, and with a firm grip, revolving the hands in opposite directions.

This results in a neat, firm twist.

Pointed spars, twisted and ready for use. Both single and double twists are shown.



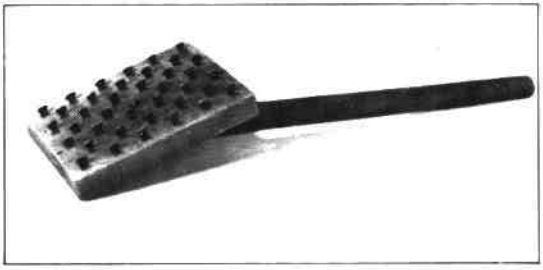
These liggers are split in the same way as spars, but instead of being pointed, the ends are bevelled off to form a chisel-shaped finish for easy joining.

Sways or binders are usually selected from round wood of 1″ (25 mm) or more butt diameter. As shown here they can also be split from thicker hazel and trimmed neatly with the spar-hook.

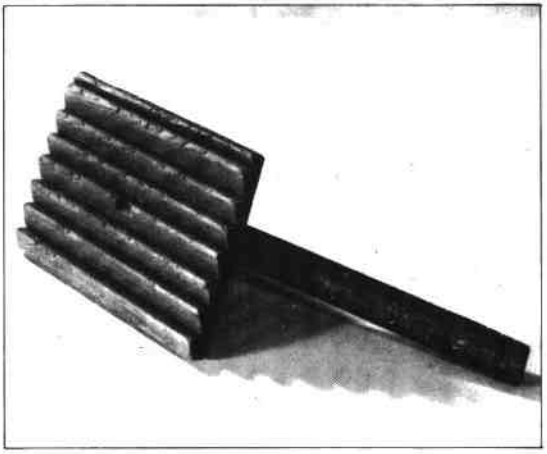
6 | Thatching tools and materials

THE tools the thatcher uses are many and varied. Many of them are hand-made to the thatcher's own specification and vary from county to county.

A skilled thatcher will always ensure that he has a complete set of tools on the job to cover every stage of his work.

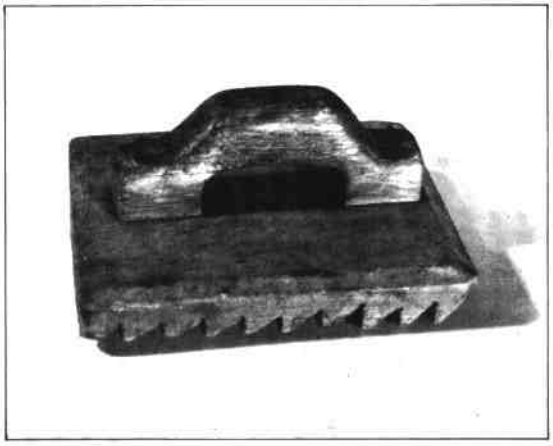


Water reed leggett used for dressing reed into position.

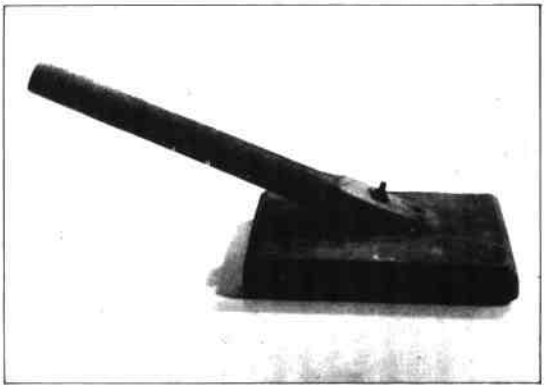


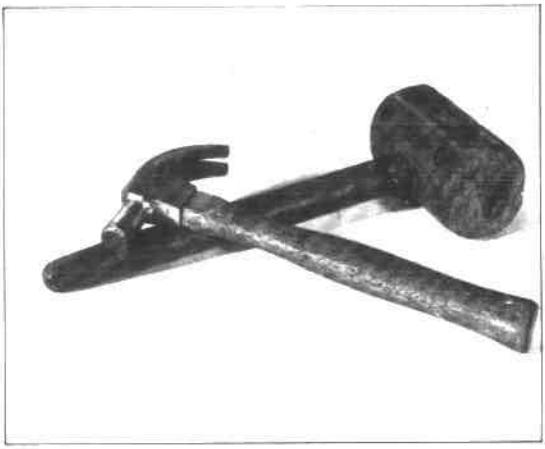
Combed wheat reed leggett showing grooves.

Combed wheat reed leggett showing fixing and angle of handle.



Combed wheat reed leggett of special shape as used in difficult places, e.g. between windows, valleys, etc.

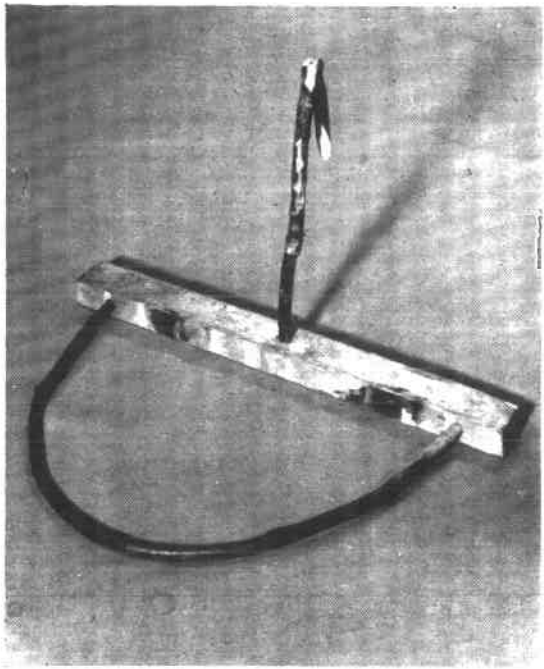




Wooden mallet used for driving spars and claw hammer used for driving iron spikes.

Shearing-hook used for cleaning down face of finished work.

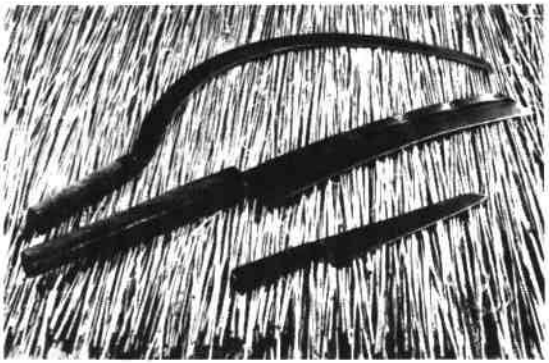
Collection of needles, three stitching needles and two pairs of reeding-needles.



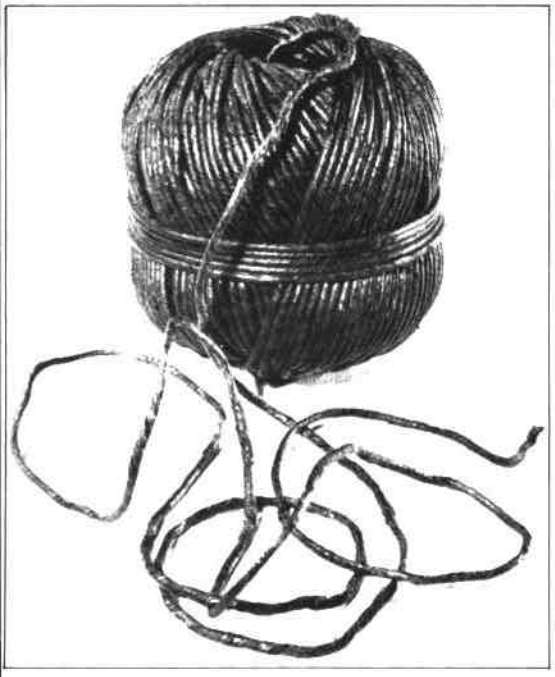
Reed-holder. This hooks on to the batten and the reed is held in the bow.

Yoke. A holder which is laid on the roof after being packed with yealms of long straw.

Spar-hook as used for splitting and pointing hazel spars.



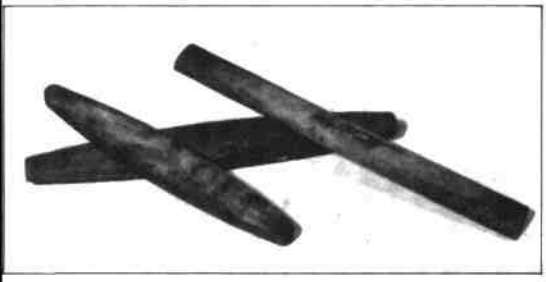
Cutting tools. An eaves-hook, used chiefly in wheat reed work, short-handled knife used for cutting tops of water reed where they protrude over the apex, and a small knife used for cutting reed bonds prior to laying, and sometimes for cutting the pattern in ornamental ridges.



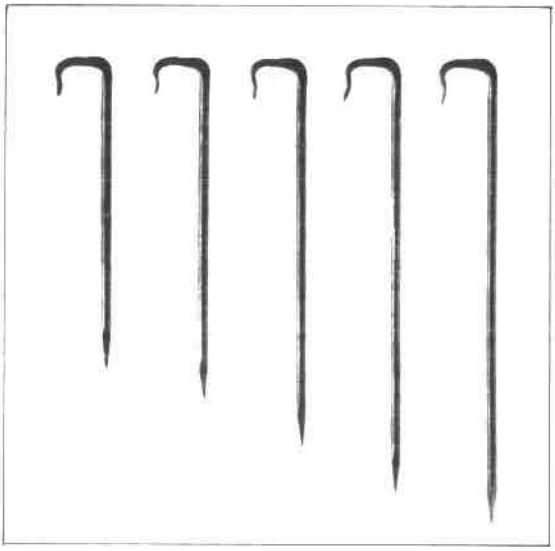
Ball of tarred cord, usually a mixture of jute and sisal, used in conjunction with the stitching needle, to fix the thatch to the battens.

Knee-pads as worn by thatchers for protection.

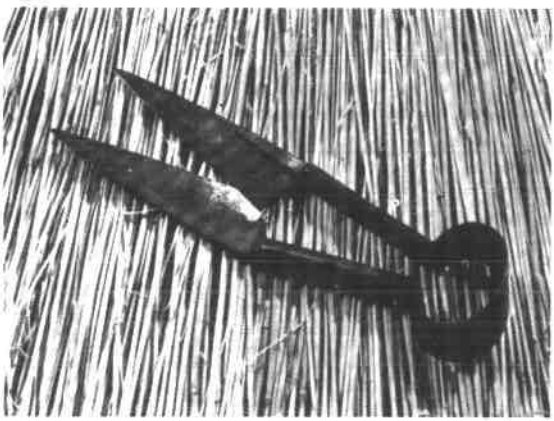
Long eaves-knife used chiefly in long straw work.



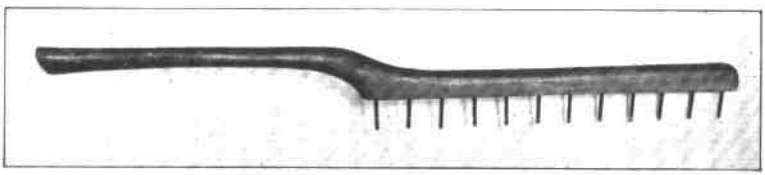
Three types of whetstones, coarse, medium and smooth, for sharpening edged tools.



Iron thatching-hooks varying in length from 7″ to 12″ (170 mm to 300 mm), used in conjunction with hazel sways, to fix the thatch to the rafters.



Hand-shears used for trimming purposes when finishing off.



Side-rake (for long straw only) used for dressing down work and raking out waste.

TOOLS AND MATERIALS

There are a number of essential tools used in various parts of the country which are not illustrated here. Some of them are as follows:

1. Two-tined hay or straw fork used mainly for long straw work, but also of general use in carrying waste for disposal.

2. Tape-measure – required for measuring the area of a roof when preparing an estimate, minimum 66′ (20 m) in length.

3. Several strong scaffold cords – necessary for splicing ladders, or securing the ladder foot.

4. Bucket for carrying water.

5. Spiked ladder of six or eight rungs with two long spikes at one end which anchor it to the roof.

6. Thatcher's horse – a wooden frame having two spikes which penetrate the thatch, used mainly in the west country in place of a long ladder.

7. Spot-board – a wooden board placed on the ground and used for butting water reed and wheat reed. This is about 39″ (1 m) square, or if circular 39″ (1 m) diameter.

8. Danger signs and red warning flags to be used when ladders are placed on a public highway.

9. Leather palm – used in some counties to protect the hand when pushing home spars or 'palming' the butts of reed.

10. Wire-cutting shears, used for cutting wire netting.

WIRE NETTING. It is considered an advantage, particularly where sparrows, starlings, and woodpeckers are numerous, to cover long straw thatch and sometimes wheat reed with $\frac{3}{4}$" (19 mm) galvanised netting.

In the case of water reed, it is normal to cover only the ridges and barges. When a thatched roof is situated immediately beneath overhanging trees it should not be covered with wire netting as falling leaves and twigs would collect in the mesh.

For details of fixing see Chapter 7, 'Fire Precautions', page 210.

7 | Fire precautions

WHILST there are many thousands of thatched properties in the British Isles, very few are damaged or destroyed by fire. However, since such buildings are very often several miles from a fire station, it is inevitable that there will be some delay in appliances reaching the scene. Adequate supplies of water to enable the firemen to fight the fire with all speed is vital. It is essential that firemen have easy access to the roof space and that they have adequate room in which to work.

The following will affect the outcome of any fire:

Time taken to discover it.
Time taken to call the fire service and for the firemen to arrive.
Accessibility for fire appliances and men.
Adequate supply of water.

Electrical Cables

Where the supply cables for electricity are above the ceiling joists and under the rafters in the loft they should comply with BS 6207 Part 1 'Wiring System using Mineral Insulated Cables' or, alternatively, BS 31 or BS 4568 Parts 1 and 2 'Wiring System using PVC Insulated Cables enclosed in Conduit'.

If the thatched roof is covered with protective wire netting this must not come within 12″ (300 mm) of an electrical cable unless adequate insulation is provided.

Electrical Fittings

Electric light fittings in the roof space should be enclosed in a bulkhead or well-glass fitting.

Television Aerials

Television aerial leads should not pass over or under the thatch. Aerials should be fitted to a free-standing pole at least 20′ (7 m) from the roof. Where this is not possible, aerials can be fixed to a gable end chimney and the lead taken down the wall, avoiding any contact with the thatch.

Draughts

Close all gaps from inside the loft, at eaves, wall plate, gable ends and chimneys with a cement/lime/sand fillet mix in the proportion of one of cement, two of lime and four of sand by volume. Make the trapdoor to the loft as airtight as possible.

Open Fires and Chimneys

The height of the chimney should conform to local council recommendations and be fitted with a spark arrester suitable for the type of fuel used.

Avoid fuels which emit sparks and those which make a lot of soot. Have the chimney swept regularly, especially if burning wood in a coal-burning grate. Chimney breasts and flues should conform to the Building Regulations, particularly with regard to the proximity of combustible or conducting materials. As a general principle these materials should not be within 2″ (50 mm) of a chimney breast. In the case of flue pipes the distances are much greater and expert advice should be sought.

Storage

Do not store combustible materials in the roof space.

Smoking

No naked lights or smoking should be permitted in the roof space.

Restricting the Spread of Fire

All thatched roofs should be completely underdrawn with Asbestolux insulation board not less than ½″ (12 mm) thick. Cement asbestos sheeting which rapidly disintegrates when subjected to high temperatures is *not* suitable.

The Asbestolux insulation board is fixed under rafters and made as airtight as possible by sealing all joints between it and adjacent surfaces with good-quality plaster. The sealing of the Asbestolux insulation board lining, and the rendering at the edges of the thatched roof, must be maintained in good condition.

To ensure that roof supports hold for the maximum amount of time in the event of fire, all timbers should be treated with fire-retardant paint or solution in accordance with the manufacturer's instructions.

Structural Aid to Fire Fighting

Ceilings beneath a thatched roof need to be sufficiently strong to support firemen and their equipment (approximately 500 lb (227 kg)). A large roof would require appropriately greater support. Access to the roof should be from inside with a hatch of not less than 3′ × 2′ (900 mm × 600 mm) serving each space. The hatch should have a cover or doors which would resist fire for at least half an hour.

Should Fire Occur

Call the Fire Brigade immediately, give the precise address and nearest main thoroughfare or landmark and tell them that the property is thatched.

A garden hose connected to a water supply of sufficient pressure can be used to damped the thatch if it is on fire externally and can be reached without endangering personal safety. An adequate length of non-kink hose permanently attached to an outside supply is a wise precaution.

If possible remove furniture from the upper floors, as this will help arrest the spread of fire.

Do nothing which will increase draught inside the roof space or the building. Keep all doors and hatches closed. *On no account remove thatch from the roof* as this will create an aperture through which draught will rush to fan the fire.

Fixing Methods for Wire-netting on Thatch

Main roof

Netting is laid vertically from ridge to eaves, with seams side by side and not overlapping, using a metal hook designed for the purpose, the two edges are twisted together at 9″ (228 mm) intervals.

Apex

Netting is joined at the apex where it meets at the centre of the ridge.

Under eaves

The netting is secured to the eaves timber with clenched 1½″ (approximately 40 mm) galvanised wire nails (not staples).

Gables

Netting is carried round thatched gables or secured to gable boards or galvanised rafters with clenched 1½″ (approximately 40 mm) galvanised wire nails.

Hips/Valleys

Netting is cut to fit and closely joined along the angle of the hip or valley.

Windows

Netting is secured to the window frame with clenched $1\frac{1}{2}''$ (approximately 40 mm) galvanised wire nails.

Chimneys

Fixing is made by plugging mortar joints in brickwork or stonework to enable the netting to be nailed to the stack. Finally, weak mortar fillet can be applied to the stack, which further secures the netting. Netting is secured under lead flashing.

Removal of Wire Netting

If the above recommendations are carried out, wire netting can be easily stripped from a thatched roof.

First, pull the netting apart at the point where it is joined at the apex, the vertical seams are then separated by pulling each section apart. Finally, the netting will be released by pulling it away from the nails at gables and under-eaves.

9 | Roof construction

BEFORE thatch is applied to a roof it is necessary to provide a properly constructed framework to which it will be fastened. Experience has shown that thatchers quite often arrive on a site to start thatching, only to find that the structure provided, whilst being suitable for other materials, does not include certain features of construction which are essential for thatch. This invariably means that carpenters have to be recalled, extra expenditure is incurred and valuable time is lost. It is hoped that by the inclusion of this chapter, this state of affairs may be avoided.

Sizes of members etc. are not shown on the plates, as these plates are an indication of the methods of construction. The sizes of the main members are governed by bye-laws which should always be consulted.

SMALL SPAN ROOFS

Construction is shown for spans of approximately 11′ 0″ (3·5 m) and 16′ 6″ (5 m) together with a layer board valley.

11′ 0″ (3·5 m) span roof

A simple collar is adequate for spans up to 11′ 0″ (3·5 m). The sizes of roof members should conform with bye-laws. Rafters may be 4″ × 1½″ (100 mm × 38 mm) or 4″ × 2″ (100 mm × 50 mm) according to load. The 4″ × 2″ (100 mm × 50 mm) ceiling joists may act as collars. These sizes conform with normal bye-laws for a 11′ 0″ (3·5 m) span and a 50° pitch. The collar should be kept within the bottom third of the overall height of the roof for stability and should be securely spiked to the rafters or fixed with timber connectors. All the rafters should be 'Bird-mouthed' over the wall-plates. The depth of the 'Bird-mouth' should be approximately 1″ (25 mm).

16′ 6″ (5 m) span roof

If the span is a clear span a simple form of truss is necessary and may consist of two 4″ × 1½″ (100 mm × 38 mm) or two 4″ × 2″ (100 mm × 50 mm) rafters, a 4″ × 2″ (100 mm × 50 mm) tie and 4″ × 2″ (100 mm × 50 mm) collar, with 4″ × 2″ (100 mm × 50 mm) placed members secured to the rafters, collars and tie as shown. These members should be notched to take purlins in such a fashion as to seat the purlins at right angles to the rafters. A small collar should also be provided under the ridge. These trusses may be at between 6′ 0″ (2 m) and 8′ 0″ (2·5 m) centres and purlins and binders will vary accordingly, the purlins between 5″ × 2″ (125 mm × 50 mm) and 7″ × 2″ (175 mm × 50 mm) and the binder between 5″ × 2″ (125 mm × 50 mm) and 6″ × 2″ (150 mm × 50 mm). The remainder of

8 | Measurement and specifications

THATCH

Measurement, Cost Calculations and Specifications

The measurements and specifications detailed emanate from many years of practical experience. They relate to good craftsmanship and to recognised standards of thatching in water reed, combed wheat reed and long straw. Thatching styles, which impart character and individuality, do however vary from district to district, inhibiting the risk of uniformity. Measurements and calculations are based on square metres (M^2) of roof area and metric lineal measure.

MEASUREMENT

Area

The traditional methods of measuring thatch vary in detail but all yield approximately the same result. Thatchers, and builders using other roofing materials, calculate superficial roof area in square metres (M^2). In thatch, however, the thickness or depth of the thatch has also to be taken into consideration and this is done by adding the thickness dimension to both the length and breadth roof measurements. The superficial area of dormer and eyebrow windows, hips and valleys, including the thickness dimension is also added to produce the total superficial area.

Lineal measure

All eaves, gables, ridges, hips and valleys are measured in lineal metres.

The totals: (1) superficial roof area and (2) lineal measure, are converted to costs, (i) per square metre and (ii) per lineal metre and the results used in the preparation of an estimate of total cost.

NEW ROOFS

Area

Where the length of wallplate and the length of rafter are known, the superficial roof area is obtained (*a*) by multiplying these dimensions together and the result by two, and (*b*) by estimating the superficial area of dormer and eyebrow windows, hip and valleys. Together these figures represent the total superficial roof area, 10% of which is added to take account of the thickness of the thatch.

Lineal measure

It is often necessary to acquire this measurement for quotations or estimates, particularly when providing information for architects. The standard quote is for a metre run, the cost of which would be determined by the thatcher in his usual estimating procedure, i.e. materials, labour, etc. This method of measurement would include such

work as (1) *ridging* which would incorporate the type, i.e. flush, block, turnover, butt-up and ornamental finish. (2) *repair work*, i.e. gables, eaves, valleys, coating, ligger and spar-work. (3) *netting* – when applying netting to thatch and the width of a roll is known, by measuring the surface of the roof as previously described the amount of netting required can be ascertained. (4) *labour costs* when materials are supplied by client.

OLD ROOFS

Area

In the preparation of a reliable estimate careful attention is necessary to ensure that measurements are taken at the correct points, bearing in mind the considerable variation in the amount of stripping necessary to reach the desired sound foundation.

1. If the existing thatch is badly worn, and is measured as it stands, an under-estimate of the roof area will result.
2. If the roof carries a very thick thatch, hanging low at the eaves, and is measured as it stands an over-estimation will result.

In both cases, therefore, the measurement has to be adjusted.

Generally, the procedure is to measure the distance over the roof from eaves to eaves, including the thickness of the thatch at both eaves. The horizontal measurement of length is taken at eaves level, including the finished thicknesses of both barges. These dimensions multiplied together produce the superficial area of the roof. To this must be added the superficial area of dormer and eyebrow windows, hips and valleys.

Although the above method may appear to apply only to roofs with regular rectangular surfaces, it can be demonstrated that the method also produces a correct result when applied to hipped and half-hipped roofs.

CIRCULAR ROOF

Area

To determine the area of a circular roof: the distance from the apex down over the eaves to the wall, to include the thickness of thatch, is measured and this dimension multiplied by half the circumference.

SPECIFICATIONS

Quantities per Square Metre (m^2)

Water Reed

	Thickness of Coat	No. of Bundles	Crooked or Tarred Twine	Sways
New Work	300 mm			
	250 mm at barges	9–11	400 mm centres rafters; 4–6 crooks or 100g of tarred twine	Three 2 m
	300–350 mm in eaves according to pitch			

RIDGE: Per lineal metre: 100–120 spars, 11 liggers. The pattern course should be of sedge; a roll of reed should be fixed on the apex of the ridge and covered with a sedge turnover, 150 mm thick.
Both sides of the ridge are finished with rods in herring-bone or diamond cross sparring and cut to the required pattern.

Combed Wheat Reed

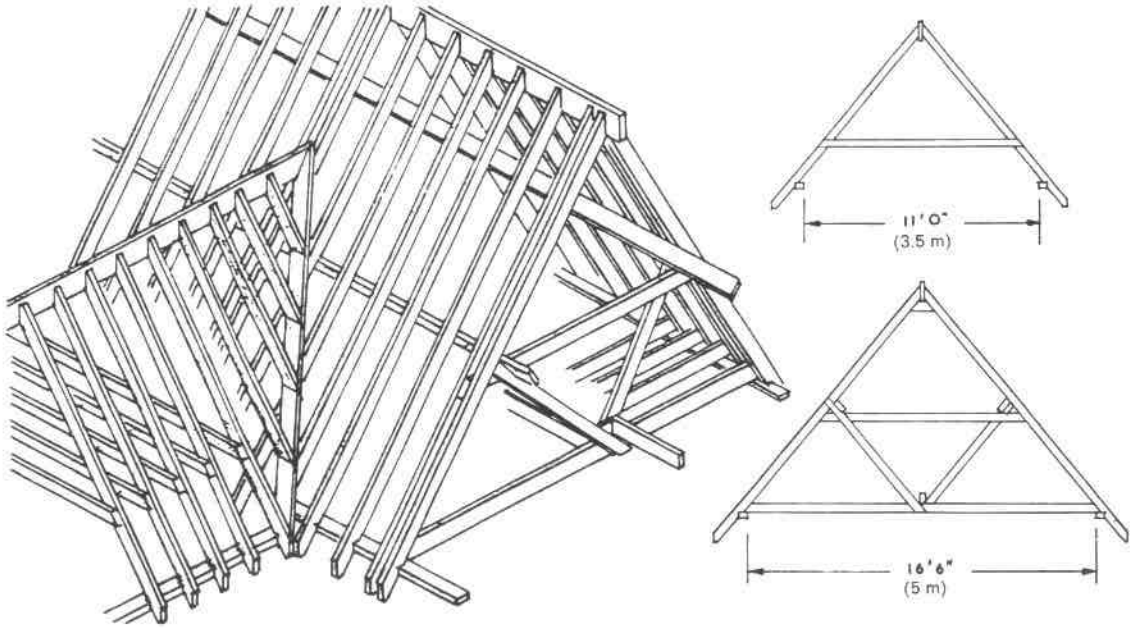
	Thickness of Coat	No. of nitches 13 kg per nitch	Tarred Twine	Sways or Binders	Spars	Crooks
New Work	300–450 mm	2·25	70g	3	3–5	5–7
Undercoat or Waistcoat*	200–250 mm	1·5	70g	3		
Re-coating	200–250 mm	1·5	18g		22–28	

*An undercoat or waistcoat is used in some areas as a base, to which a top or finishing coat of thatch is sparred (fixed).

Threshed Long Wheat Straw

	Thickness of Coat	Amount	Tarred Twine or Crooks		Sways or Binders	Spars
New Work	400 mm	28 kg	70g	5–7	3	3–5
Re-coating*	250–300 mm	21 kg				22–28

*The roof, including all eaves and gables, should be stripped of superfluous and decayed thatch down to a sound foundation of original coat.



SMALL SPAN ROOFS

the ceiling joists between the spans should be securely spiked to the binder to prevent sagging. If there is a convenient structural wall in or near the centre of the span the binders may be omitted and the 4″×2″ (100 mm×50 mm) diagonal members previously mentioned could form simple struts. Intermediate rafters and ceiling joists, between the trusses, should be 4″×2″ (100 mm×50 mm).

Valley

The valley is constructed with a 7″×1½″ (175 mm×38 mm) layer board, laid over the rafters of the main roof, the jack-rafters of the small roof being spiked to these. With this form of construction, it is not necessary for the abutments of the jack-rafters to coincide with the position of the rafters in the main roof. A ridge of the smaller roof can be conveniently housed between the twin rafter members of the truss.

MEDIUM SPAN ROOFS

This truss is suitable for 24′ 0″ (7 m) spans and incorporates 4″×2″ (100 mm×50 mm) ridge collars, 4″×2″ (100 mm×50 mm) diagonal and bottom ties, 3″×1″ (75 mm×25 mm) hangers. The purlin sizes and binder sizes will vary according to the spacing of the trusses as previously described. At such spans it is necessary to provide support for the ceiling joists in three positions, in order that the ceiling joists may remain at 4″×2″ (100 mm×50 mm). This truss provides for three binders, some of which may be omitted if a convenient structural support is available on or near the positions of these binders; particular attention should be paid to the joisting of members where toothed timber connectors or nailed galvanised angle connectors could be usefully employed.

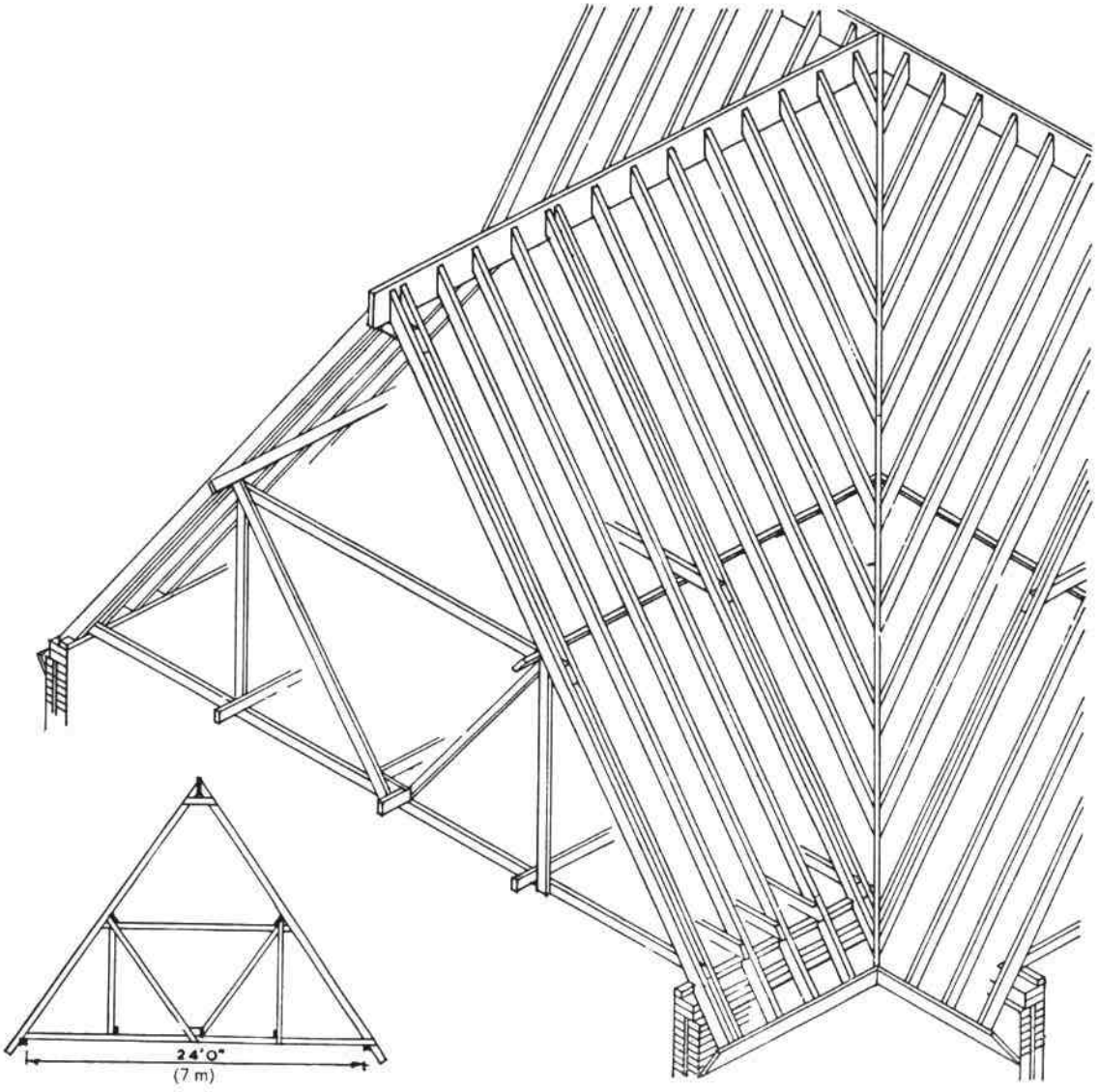
Valley

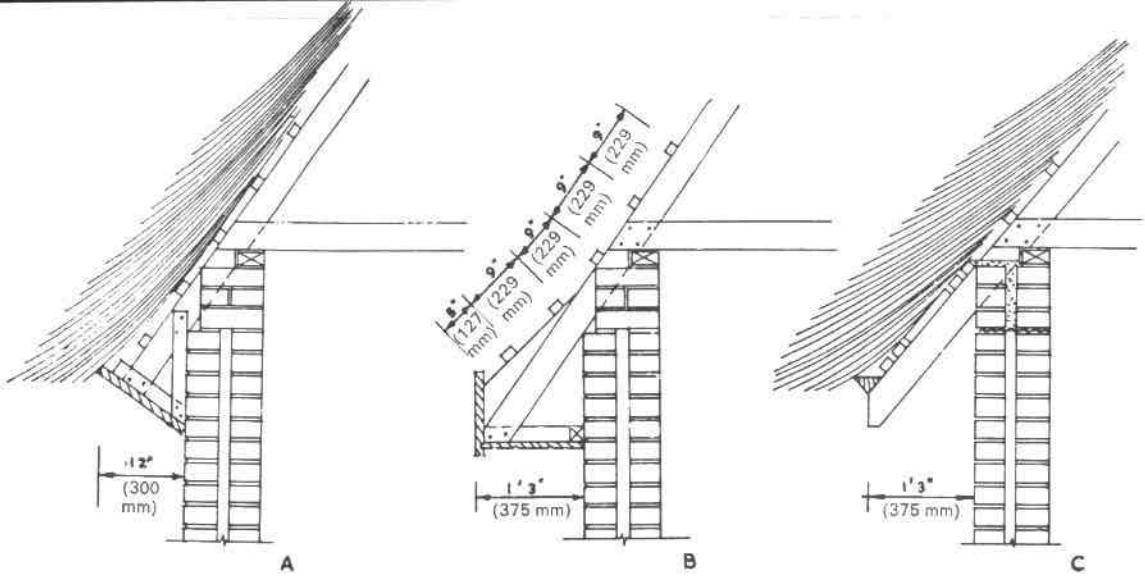
Where the spans are large and equal, and where the rafter spacings are equal, a conventional valley-rafter should be employed. This should be 7″×1¼″ (175 mm×38 mm). Jack-rafters should then coincide as far as possible.

EAVES TREATMENTS

A. *Close board raking type.* Bearers and hangers are constructed of 2″ × 1½″ (50 mm × 38 mm) timbers, with a 15″ (380 mm) fascia board. Timber work should overhang 12″ (300 mm). The hangers are spiked to the rafters.

B. *Eaves with vertical fascia and close boarded soffite.* Soffite bearers 2″ × 1½″ (50 mm × 38 mm) are fixed to 2″ × 1½″ (50 mm × 38 mm) plates which are plugged to the wall. 4″ × 2″ (100 mm × 50 mm) sprockets carry two 1½″ × 1″ (38 mm × 25 mm) battens, the distance of the first batten is 5″ (125 mm) from the edge of the fascia. The gauge of the remaining battens is 9″ (225 mm). The cavity is





EAVES TREATMENTS

closed by three courses of brickwork. Pitches from 47° to 60° are suitable for all types. A fascia ex. $1\frac{1}{2}$″ × 12″ (38 mm × 300 mm) should be grooved to take the tongue of a 1″ (25 mm) tongued and grooved boarded soffite. The wallplate may be 4″ × 2″ (100 mm × 50 mm) or 3″ × 2″ (75 mm × 50 mm).

C. *Open eaves type. Foot of rafter as shown.* This roof is finished with a 3″ × 3″ (75 mm × 75 mm) tilting fillet. The spacings of the first fixing batten and subsequent battens are 5″ (125 mm) and 9″ (225 mm) as shown for the type B eaves. The remaining portion of the overhang to the eaves is filled with 1″ (25 mm) eaves-boards and battens, allowing sufficient room to tie the thatch. The top of the cavity should be closed with expanded metal and cement mortar. Cement mortar is finished against the infil batten to prevent ingress of vermin. The projection to the edge of the timberwork is 15″ (375 mm).

RIDGE AND VERGES

Ridge

Assuming the rafters are 4″ × 2″ (100 mm × 50 mm) at a pitch of approximately 50° a 9″ × 1″ (225 mm × 25 mm) ridge would be necessary. The top batten should be 2″ (50 mm) from the ridge, the upstand of the ridge should also be 2″ (50 mm).

Type X Verge

4″ × 2″ (100 mm × 50 mm) sprockets run from the last rafter inside the building, to the verge which is fixed to a rafter 10″ (250 mm) from the face of the external brickwork. The barge-board should be approximately 9″ (225 mm) or of a size to suit the eaves detail. The upstand of the barge-board above the battens should be $1\frac{1}{2}$″ (38 mm). The top of the cavity may be closed by slate bedded in mortar with the batten passing over.

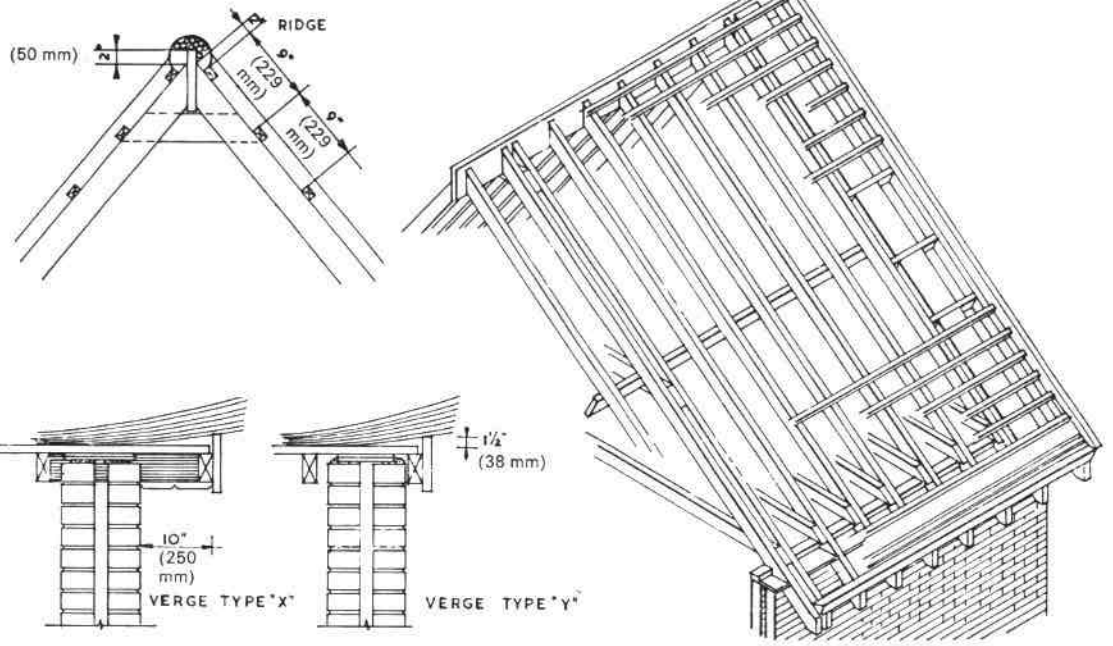
Type Y Verge

4″ × 2″ (100 mm × 50 mm) verge rafters are spiked to the brickwork and the barge-board is spiked to the verge rafter. Other details are shown for the type X verge.

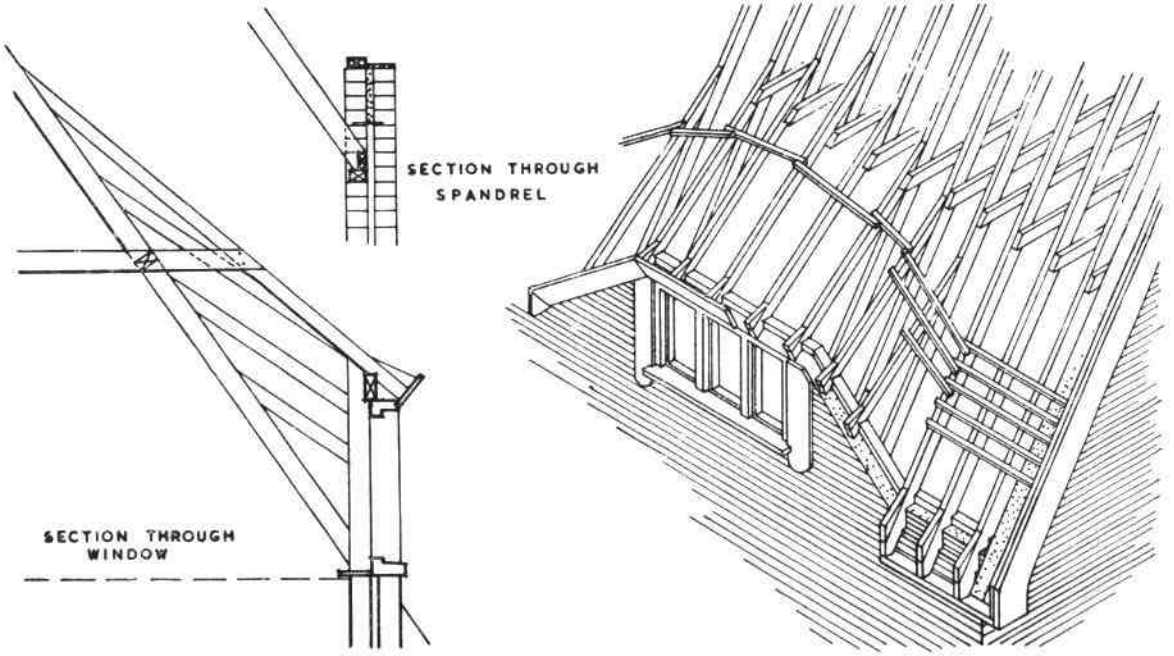
Type C eaves treatment is shown in conjunction with a type X verge. Typical purlin and truss roof arrangements suitable for spans of 16′ 0″ (5 m) are also shown. Note that built-in purlins do not project into the cavity at the verge. Note also that the last rafter is approximately 1″ (25 mm) from the inside edge of the brickwork.

EAVES-WINDOWS

As the 50° pitch and the necessary eaves overhang produces a fascia in many cases considerably lower than the internal ceiling joist, an eaves-



RIDGES AND VERGES



EAVES-WINDOW

window is frequently necessary. To provide this window the brickwork can be carried up above the normal wallplate level, the wallplate continuing into these brick spandrels to provide a seating for the untrimmed rafters as shown in the small section. Over the wallplate 3″ × 1½″ (75 mm × 38 mm) spacers are shown to further secure the foot of the rafters. The cavity to this triangular piece of brickwork is shown closed with expanded metal and cement mortar. A further 3″ × 2″ (75 mm × 50 mm) wallplate is shown on top of these sections of brickwork and continuing across the head of the window. Common rafters opposite the window opening may be trimmed, or, as shown here, securely nailed to an adjacent purlin. The ceiling joists, which are also acting as collars, can be extended past the trimmed rafters and nailed to small 3″ × 2″ (75 mm × 50 mm) rafters forming the roof over the window opening. These small rafters are shown splayed and nailed to the common rafters in a staggered formation to provide a curved seating for the thatch. In a similar fashion the sprockets at the foot of the small rafters may be increased in size towards the centre of the window to provide a fixing for the curved fascia, which can be continued down the spandrel brickwork from which a normal eaves treatment will continue either of type A or B. That shown is of type B, and the end of type B fascia has been boxed in where it meets the fascia to the raking spandrel brickwork; 1½″ × 1″ (38 mm × 25 mm) battens can be laid in short lengths to follow the curve of the roof over the eaves-window.

DORMER-WINDOWS

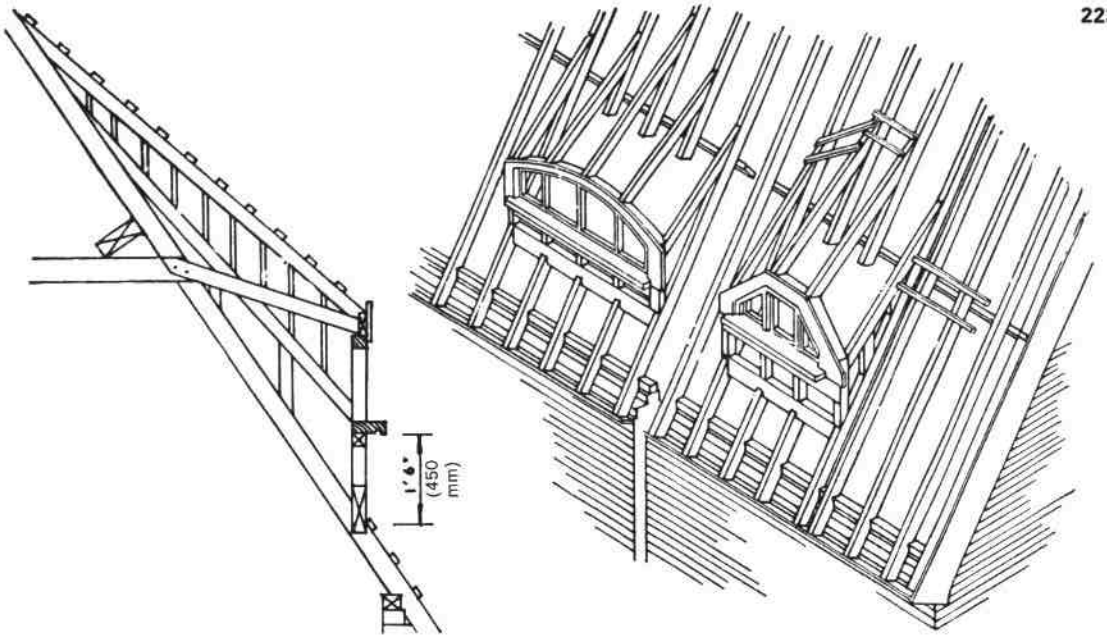
Two designs are shown, each of similar construction. The construction of the roof to the dormers is similar in most respects to that of the eaves-window but separate 3″ × 2″ (75 mm × 50 mm) ceiling joists have been inserted as an alternative to carrying through the ceiling joists or collars. This has the advantage of providing a flat instead of a curved ceiling over the window opening. Again the rafters projecting into the dormer may be trimmed or secured to a suitable purlin as shown. At the foot of the dormer-window the rafters have been trimmed by a 8″ × 2″ (200 mm × 50 mm) trimmer or upstand, and should extend a minimum of 1′ 6″ (450 mm) above the structural roof level in 2″ × 2″ (50 mm × 50 mm) noggin, in order that the lead flashing under the sill should fully weather the thatching. A fascia should be provided, continuing on all three sides of the dormer-window and providing a projection or tilt of 1½″ (38 mm). It is important that the pitch of the dormer-roof and of the eaves-window roof should be at least 45° and on no account less than 40°.

CHIMNEY-FLASHING

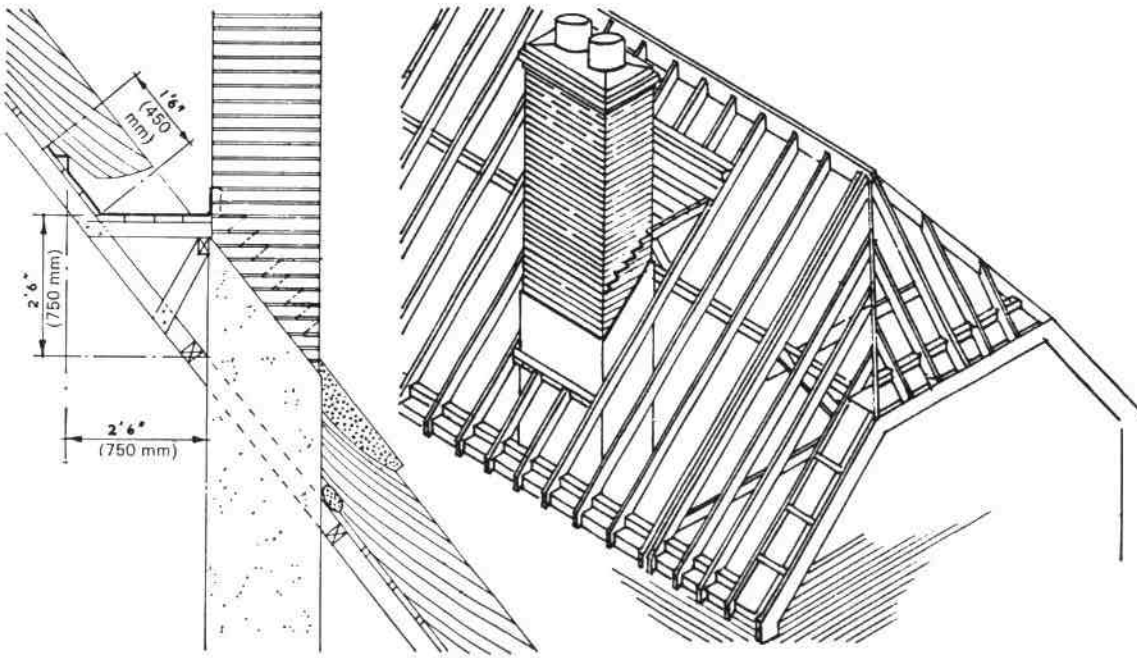
Particular attention should be paid to the dimensions shown on the section to provide adequate guttering for the thatched roof. The distance from the tilting fillet from the face of the chimney should be 2′ 6″ (750 mm) and the tilting fillet should be at least 12″ (300 mm) above the bed of the gutter. This tilting fillet should be ex. 2″ × 3″ (50 mm × 75 mm) tongued and grooved boarding. The structure composed of bearers, struts and plates may be 3″ × 2″ (75 mm × 50 mm) timber. The rafters below and above the chimney should be trimmed and the size of the trimmers may be 4″ × 2″ (100 mm × 50 mm) or 4″ × 3″ (100 mm × 75 mm) according to the loads which they are required to take (this will depend on the lengths and numbers of the rafters which they receive). Care should be taken that the gutter discharges above the level of the thatching and that the pargetting to the lower portion of the chimney is not lower than the level of the thatch.

Half-hip

In the half-hip either types of verge treatment could be used, and it should be noted that a wallplate will only be necessary along the top portion of the hip. Sprockets from 4″ × 2″ (100 mm × 50 mm) may or may not be necessary along the raking brickwork of the half-hip according to the type of verge treatment.



DORMER-WINDOWS



CHIMNEY-FLASHING AND HALF-HIP

Glossary of thatching terms

Bed: A prepared heap of long straw, sedge or rye from which a yealm is drawn.

Bottle: A yealm of straw tied at the small end, used for setting eaves and gables.

Brow Course: The first course of reed – after eave setting, which sets the pitch of the roof.

Bunch: Bundle of water reed approximately 24″ (600 mm) or 39″ (1 m) in circumference.

Butt: The lower end of a bundle of straw or reed.

Butting: Dressing the butt ends by dropping on to a hard clean surface.

Combed Wheat Reed: Wheat straw which has been passed through a reed comber.

Course: A horizontal layer of reed or straw thatch.

Crooks or Hooks: Made from $\frac{1}{4}$″–$\frac{3}{8}$″ (6–10 mm) iron rod varying from 8″–12″ (200–300 mm) in length, pointed at one end, with a turned head at the other. Used in securing thatch to roof by driving into rafters in conjunction with a sway.

Cross Rods: Hazel or willow rods fixed for ornamentation between liggers.

Fleeking: A woven mat of water reed used as an alternative to battens. Imparts an attractive finished appearance to the underside of thatch in buildings with open rafters, such as barns and pavilions.

Flashing: Sheet lead fixed over the thatch and into the brickwork at junction with chimney.

Gable: Alternatively known as 'flue', 'verge', or 'barge', the finished edge of thatch overhanging the gable.

Gadd: Length of hazel or willow before splitting.

Liggers or Rods: Split hazel or willow, 4′–5′ (1–1$\frac{1}{2}$ m) in length, used on outside surface of ridges and in the case of long straw to eaves and gables also.

Long Wheat Straw: Threshed wheat straw, wetted and prepared by hand.

Nib: Portion of thatch beside a window or chimney.

Nitch: A bundle of combed wheat reed weighing approximately 28 lb (13 kg).

Pinnacle: A raised end of the ridge, surmounting gable or top point of hip.

Ridge: Capping or top-most portion of roof.

Types:

(*a*) Plain: ridge finished off flush with surface.

(*b*) Decorated: cross sparring or herring-bone pattern.

(*c*) Straight cut: block ridge 3″–4″ (80–100 mm) thick cut in straight line below bottom ligger.

(*d*) Ornamental: bottom edge of ridge cut to any desired pattern.

Roll or Dolly: Bundle of reed or straw 4″–8″ (100–200 mm) in diameter and of any suitable length used for building up ridge prior to capping.

Rye Straw: Threshed and used for ridging.

Saddle: The junction of a ridge with a main coat.

Sedge: Used for ridge capping on water reed thatch.

Skirt: The side courses of a ridge.

Spars: Sometimes referred to as broaches. Split hazel or willow rods 30″ ($\frac{3}{4}$ m) in length pointed at each end and twisted in the centre to form a staple. Used for securing new coat of thatch to existing coat, also to secure liggers on ridges.

Spot Board: Board for butting reed.

Stulch: A strip of thatch approximately 30″ ($\frac{3}{4}$ m) wide running from eaves to ridge, laid as work proceeds.

Sways, Ledgers or Binders: Split round rods 3′–10′ (1–3 m) in length used to secure thatch to the roof by being placed horizontally across each course of thatch. They are fixed by stitching with tarred cord or by crooks driven into each rafter at intervals. They are covered by each succeeding course.

Sweep: The forming of a valley.

Tarred Twine or Cord: Strong cord, treated with Stockholm tar, and used for stitching thatch to rafters or battens.

Tilting, Fillett or Arris: Timber used in eaves and gable treatment to provide tension in the material.

Wadd: Small bunch of combed wheat reed tied at the top for setting eaves and gables.

Water Reed: Grows on British and Continental marshes and riverside marshland; sometimes contains a small amount of mace reed and boulder.

Yealm: A prepared drawn layer of long straw or sedge 14″–18″ (350–450 mm) wide and 4″ (100 mm) thick.