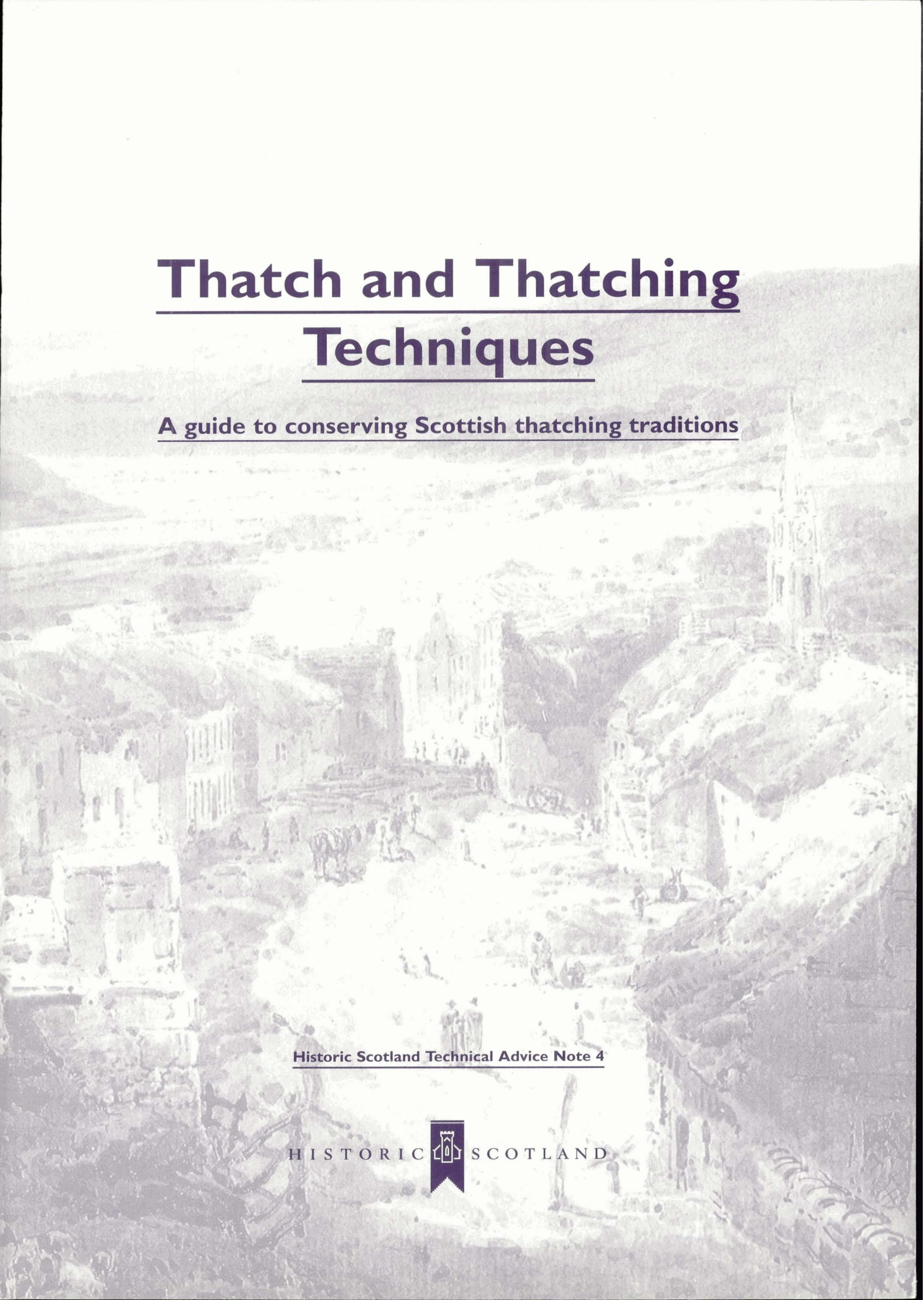
Thatch and Thatching Techniques

A guide to conserving Scottish thatching traditions



Historic Scotland Technical Advice Note 4

HISTORIC SCOTLAND

HISTORIC SCOTLAND TECHNICAL ADVICE NOTES

No. 1 ***Preparation and use of Lime Mortars***

No 2 ***Conservation of Plasterwork***

No 3 ***Performance Standards for Timber Sash and Case Windows***

No 4 ***Thatches and Thatching Techniques: A Guide to Conserving Scottish Thatching Traditions***

Available from:

Historic Scotland
Technical Conservation, Research and Education Division
Scottish Conservation Bureau
Longmore House
Salisbury Place
Edinburgh
EH9 1SH

Tel: 0131 668 8606

Fax: 0131 668 8869

Thatches and Thatching Techniques

A Guide to Conserving Scottish Thatching Traditions

Prepared by:

Bruce Walker
Christopher McGregor
Gregor Stark

Commissioned by:
Technical Conservation, Research and Education Division,
Historic Scotland

ISBN 0/9517989/7/9

EDINBURGH, 1996

HISTORIC SCOTLAND

FOREWORD

Recently, the term "thatch" has come to be used in a restricted sense which belies the wide diversity of natural materials that have in the past provided indigenous roof coverings for Scotland. This lack of vernacular sensitivity has been exacerbated by the use of alien materials and imported construction techniques. Such a combination of factors has led to considerable loss of local character and traditional building forms.

This is not a new phenomenon: it is, rather, the continuation of a process which started at the beginning of the last century when "alternative" roofing materials such as slate and tile became more readily and economically available. Consequently, many roof forms changed in appearance and now it is only with careful examination and interpretation of the remaining built evidence that these changes can be traced. Surviving examples of Scottish thatch have, therefore, a significant place in Scotland's inventory of historic buildings and should be cherished accordingly.

As part of an occasional series on practical and technical issues which arise in the care and conservation of Scottish historic buildings and monuments, this Technical Advice Note sets out to present sound guidance on the topic and is intended for use by all those likely to encounter this aspect of Scottish traditional building where information is scant. Rooted in Dr Walker's academic research the Note develops the authors' analysis and interpretation of a considerable number of Historic Scotland grant-aided thatching projects around the country. It offers, therefore, a unique insight into the variety of historic Scottish thatches and thatching techniques.

Through promoting a greater understanding of the various materials which have been used - and how they were used - owners, practitioners, planners, decision makers, education training providers and others can benefit from the guidance. Through this shared insight, it is hoped that one of Scotland's richest and most varied vernacular techniques can be more widely appreciated.

INGVAL MAXWELL

Director, Technical Conservation Research and Education Division,
Historic Scotland
December 1995, Edinburgh

ACKNOWLEDGEMENTS

The authors are indebted to a large number of individuals who have assisted with the collection of information, recording of techniques, surveying and photography particularly: Eje Aren, archaeologist and thatcher, Sweden: the late Joan Auld, former Dundee University Archivist: Anne Brundle, Tankerness House Museum, Orkney: Sandy Buie, Kockrome, Jura: Norman Campbell, Arnol, Lewis: Adam Cooper, thatcher, Montrose Angus: former students of the Department of Architecture, Duncan of Jordanstone College, University of Dundee: Isobel Gardner, Orkney: Morag Henderson, Dundee: Dr T Holden, archaeologist, Edinburgh: Dorothy Kidd, Scottish Country Life Archive, Edinburgh: Ogg Lawrence, thatcher, Rait, Perthshire: Roger Leitch, Dundee: Marwick Brothers, thatchers, West Lothian: Duncan Mathieson, thatcher, Dornie, Inverness-shire: Dr R McCulloch, archaeologist, Edinburgh: Dr Martin McGregor, Department of History, University of Glasgow: Patricia McGregor, Dundee: Catherine Meyer, Dundee: the late Alison and Paul Newman, Orkney: Ross Noble, Highland Folk Museum: Tom Oliver, Dundee: Jem Raison, thatcher, Stratford on Avon: Dorit Sapper, Milan: Robert Smart, former University Archivist, St Andrews: Patricia Walker, Dundee: Tommy Watt, Shetland Museum: the owners of all the thatched properties visited over the last thirty years: Dr David Breeze, Peter Donaldson, Dr Sally Foster, Bernadette Goslin, Ian Gray, John Hume, Dr Deborah Mays, Dr Denys Pringle, Graham Reed and Alan Weddell, Historic Scotland, Edinburgh.

Special thanks to Betsy Cann and Dorothy McBain for preparing the typescript.

CONTENTS

1
INTRODUCTION

Thatch is often perceived as a standardised material. This perception spreads far beyond the general public being found amongst architects, builders, conservation officers, surveyors and others connected with the building industry as well as archaeologists, historians and others concerned with the interpretation of the past. It is hoped that this document will change this perception.

This Advice Note is addressed to four distinct groups of readers: those who own or occupy thatched properties; those involved in the maintenance, repair and renewal of thatch; those who grow, prepare or supply thatching materials; and those concerned with historical accuracy, regional distribution patterns, archaeological, historical and conservation issues.

It is essential that the members of each group understand the problems and constraints under which each of the other groups is operating. Each group will have its own priorities and these will change as the groups change. One groups priorities may be at odds with one or more of the other groups priorities and there may even be disputes within individual groups. It is hoped that the information set out in this publication will assist in balanced communication between groups through a better understanding of their interests and motives.

Unfortunately, much of the basic research required to establish historical change, distribution patterns related to geographic situation, climatic conditions and local economic and social factors has still to be completed. At the same time the stock of traditionally thatched buildings is declining. A policy is required that will protect the existing stock of thatched buildings whilst the information is being collected at the same time allowing maintenance and renewal. The Advice Note does not provide a collection of patterns, each to be applied in a given situation but a series of topics that should be addressed in arriving at a decision regarding each thatch that is being considered. Where thatches are a family or community responsibility and the materials are taken from a traditional source using traditional methods, there may be little need for guidance. However, where there are breaks in tradition, it is hoped that sufficient guidance is given within the Advice Note to allow an acceptable solution to be reached.

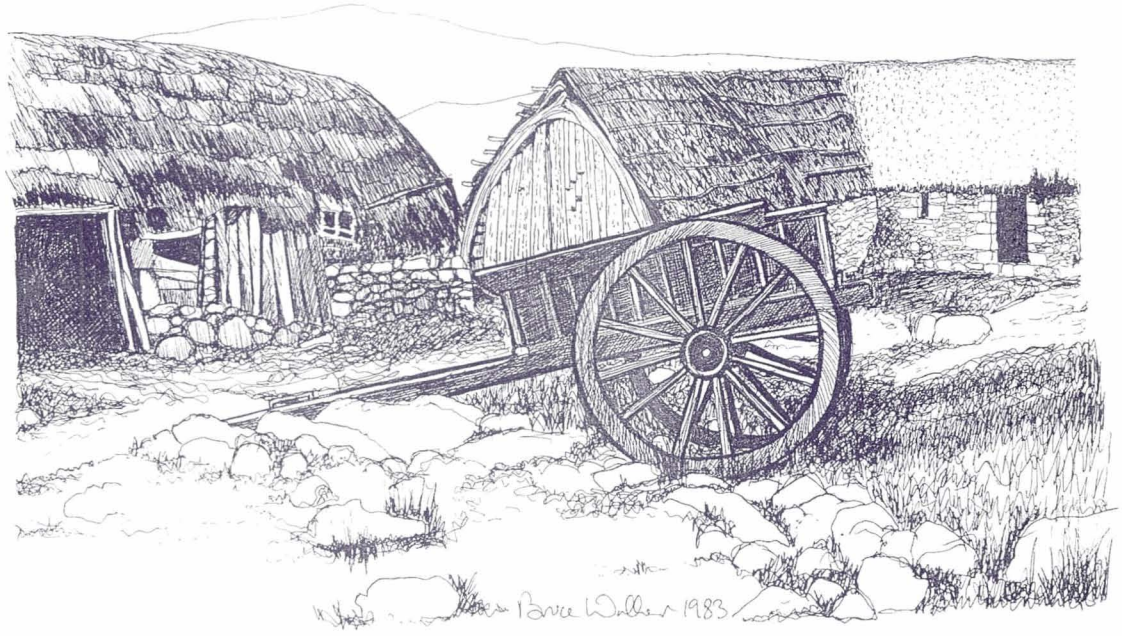
At present the thatchers are the dominant group having technical expertise derived from previous experience. Unfortunately much of this experience stems from outwith the areas in which they are thatching. They may therefore find it complicated, unnecessary or even stupid to produce what they consider to be a "bad" roof to comply with local traditions. They may also find it impracticable to try to replicate the necessary additional materials such as ropes, weights, fixings or unorthodox methods of restraint. Here it is up to the other groups to persuade the thatcher of the desirability of continuing the original traditions whilst at the same time providing practical assistance in obtaining the correct specification and properly prepared materials. Suppliers of materials, both for thatching and for the sub-strata or restraints must also be given assistance by ensuring that areas are set aside where they can husband the materials in the traditional ways and by ensuring that present day changes do not affect traditional sources of natural material.

Communication and co-operation will be the key-words to a successful effort to protect and conserve our historic thatches.

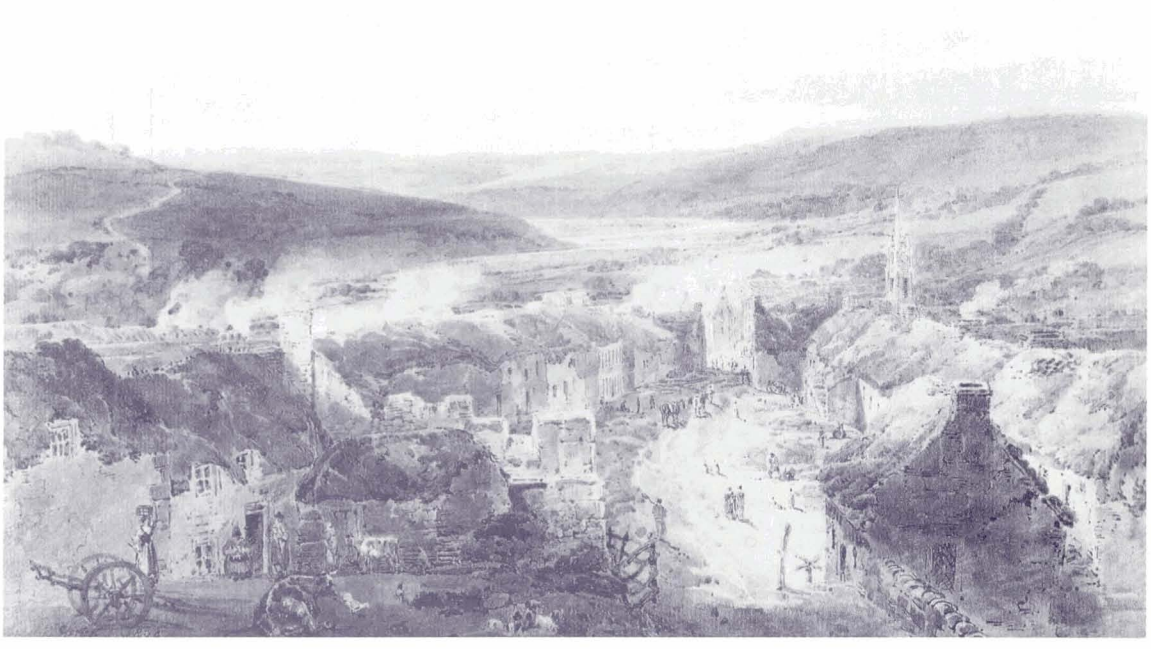
1.01 Historic Background

Thatching is one of the most ancient of building skills but over the last 150 years it has been declining and changing. We are aware that thatch has been used since prehistoric times. Undoubtedly thatching was originally a family or community activity, skills being passed from generation to generation. Through much of the period of human occupation almost the entire world population was involved in some way in the execution and maintenance of thatch. With localised practice there was little reason to record or describe the techniques used. This makes detailed investigation of its development virtually impossible. The normal recourse to archaeological evidence is difficult as even on the best preserved sites the thatching material is likely to have decomposed or blown away before the site became covered and preserved. Although little or no evidence of thatch survives on archaeological sites truncated by tillage, most visible sites, such as those that are re-used and disturbed or those that are abandoned and are decayed in situ, preserve evidence of roofing material in the form of microfossils. The microfossils form a signature in the sediment which can be found if sought. On waterlogged sites thatching material may actually survive. The problem with this evidence is the interpretation. The archaeologist may be able to recognise the material used for thatching but not how it was used. Even if fixing devices are located none are exclusively thatch related.

The earliest documentary records in Scotland, in which thatch is specifically mentioned, tend to be Burgh bye-laws banning or regulating its use. These tend to date from the seventeenth century onwards although earlier, but less specific, rights to cut turf for the building and repair of houses are known.



Highland steading, Kinlochewe, Ross-shire showing at least four different types of thatch. (after GWW photograph F0748.)



The Village of Jedburgh, 1800, Thomas Girtin

What we do have is thatch preserved, in its entirety, under sheet metal and the undisturbed sub-strata of top dressed thatch types, that may have survived for generations. These thatches are invaluable as the information they can provide stretches far beyond simple building techniques. They can preserve early strains of cereal crops, provide information on agricultural practices, on variation or failure of certain crops, and on the types of weeds encountered in pre-improvement farming. They also provide a unique environment for certain types of insect.

It is therefore extremely important that all thatches in this category are given maximum protection and that any disturbance is delayed until adequate investigative techniques are developed and implemented.

1.02 A Family Activity

Traditionally, thatching appears to have been a family or community activity. This situation possibly derives from the nature of many of the simpler forms of thatch which often depended on the thatching of a roof being completed within a single working day.

Thatching by the family is still, or was until recently, the situation on many of the islands off the west coast of Scotland. On Jura, elderly thatchers tell of family rivalries to obtain the best thatching materials. On Lewis, where the straw for the thatch came from the individual croft, each crofter formed liaisons with other crofters within the township for mutual assistance in the thatching of their buildings.

It seems reasonable to assume that thatching remained a family or community activity as long as simple thatching techniques were the norm.

1.03 A Craft Activity

New thatching techniques developed in those areas where buildings began to be too large for the simple laid-on thatching techniques. Fixings were introduced that held the thatch in place as it was introduced to the roof. This allowed the roof to be thatched over a period of time without undue danger of losing the material if the weather changed. This would be a gradual process culminating in some extremely large and sophisticated roofs in many parts of the world. In Scotland, larger roofs were adopted along the eastern seaboard and in the Central Lowlands.

Mechanically fixed thatches, as described above, demanded specific skills. As these skills developed, thatching moved from being an annual community or family effort, into the realms of a craft skill. Thatchers were then able to support their families largely from the income generated from their craft, supplemented probably by a smaller scale agricultural involvement in the same way as millers, wrights, masons and others organised their affairs. Each master thatcher probably served only his own community or even part of the community, passing the skills from father to son.

1.04 Craft Skills in Itinerant Workforces

Family or community thatchers often came from areas where it was necessary for some of the family to leave the homeland for a period of time each year to supplement the family income. The Highlands and Islands of Scotland and the western countries of Ireland were the main sources of these itinerant workforces. These itinerant workers would be well versed in the simpler forms of thatching making them doubly useful to the rich farmers of the Lowland Counties of Scotland, who would not only employ them to assist with general harvest work but could use them to thatch the hay and cereal stacks and form clamps for the storage of root crops. These activities involved the same thatching skills as they practised in their home community and the interchange of ideas may have been beneficial to both communities. Once an understanding was established it is possible that the itinerant labour force may have been employed in other thatching work around the farm, either before or after the harvest, providing a further incentive to their being there at the correct time for the harvest work.

1.05 Craft Business

The natural development for any craft activity that generates a regular demand for its services, is to set up a craft business. This occurred in thatching at a much later date than with other trades and crafts for the reasons given above. Eventually thatching businesses were established often serving; small burghs, where the Dean of Guild had not introduced anti-thatch legislation; the new planned villages; or a district containing a number of small communities. These businesses were often family concerns probably resulting from a prominent thatcher having a number of sons and extending the area of operations to provide work for all of them. Certainly the late survivals of this type of business in Scotland all appear to have produced successive generations of thatchers. The last surviving example was the Brough family from Auchtermuchty in Fife which died out as thatchers in 1968.

The Brough family appears to have had a wider sphere of influence than was traditional, possibly as a result of a demand caused by a shortage of thatchers as the craft died out in the first half of this century.

Jock Brough, was based in Auchtermuchty, Fife, his father in Newburgh, Fife and his grandfather in

Distribution of work of Brough family

Map of Scotland showing the sphere of influence of the Brough family of thatchers.

Abernethy, Perthshire. These locations are close together but Jock Brough is recorded as working with his father on roofs at Fortingall, Perthshire during the First World War. He had regular work on the Glamis Estate, Angus: in the Carse of Gowrie, Perthshire; and round Aberfeldy, Perthshire in addition to his home based work in North Fife. Towards the end of his career he was travelling even further to roofs at Swanston on the outskirts of Edinburgh and in 1957 he thatched Burn's Cottage, Alloway: the Tam o'Shanter Inn, Ayr; and Soutar Johnny's Cottage, Kirkowald, Ayrshire. These were reed thatches, alien to these areas, but at that time part of the natural progression as thatches changed for economic reasons.

The Broughs, like other thatching families had alternative work for the quiet periods. This was not "on the land" as was traditional amongst thatchers but as salmon fishers at one of the fishing stations on the Rivers Tay or Earn.

A second Brough family of thatchers was based at Longforgan, Perthshire in the Carse of Gowrie but these Broughs were rivals.

Other thatching families have come to the fore since 1968 but these are either incomers or are families that carried out various jobs such as ditching, draining, fencing, dyking as well as thatching rather than from families of specialist thatchers.

1.06 Craft Organisations

The setting up of craft businesses inevitably leads to the forming of craft guilds or trade organisations. Craft or trade organisations instigate the standardisation of the craft.

1.07 Changing Techniques

A study of old photographs and drawings of thatched roofs shows that, over the last 100 years, the external appearance of thatch has changed several times in those areas where the simple laying-on techniques are still in use.

The changes reflect the availability of new inexpensive materials that simplify the thatching process. Straw and heather ropes took a long time to prepare, were bulky and difficult to handle and susceptible to frost damage. The use of second-hand herring nets, trawl nets and ropes reduced the preparation time. Coir began to be imported and was cheap, and much easier to use particularly in threading it through the main ropes to form a type of net. Chicken-wire netting was also inexpensive and re-usable and could be weighted with stones or waste metal such as straightened cart tyres, rubbing strakes off shipwrecks, and other metal objects. These could be attached to the netting by rope or twine or latterly by hooks made by wrapping fence wire round the weight and forming a hook with the end of the wire where it is tied off.

1.08 A Fashionable Element

As thatch began to lose ground as a functional roof covering a number of revivals were instigated. Late eighteenth century Classical architects such as Robert Adam, designed romantic lodge houses using thatched roofs to cover inappropriate plan forms. Decorative thatch was also used for bowers, summer houses and follies at that period.

The cottage orné was another type of building designed in a romantic idiom including elaborate dormers and highly decorative finishing details.

The Arts and Crafts Movement brought about a lesser revival in the use of thatch and a similar movement in Europe in the last thirty years has resulted in some particularly large thatched villas in the vicinity of Brussels as the homes of a new breed of Eurocrats. This is to a certain extent reflected in the Highlands and Islands with a rash of inappropriately thatched folk museums, reconstructed blackhouses and thatched whitehouses mainly using the thatch as a cosmetic finish rather than as a functional roof covering.

1.09 Conservation of Traditional Thatching Techniques

Scotland has one of the widest ranges of surviving traditional thatching techniques in Europe. This has been reducing steadily since late last century to a situation where many are down to a single known example.

The wide range of traditional thatches can be attributed to a number of factors. Thatching within the burghs was often banned at an early date to reduce the risk of fire. In rural areas, thatching continued as a communal activity or was carried out by an intinerant workforce before or after harvesting activities. These factors reduced the apportunities to set up craft businesses which in turn negated the need for craft guilds and subsequent standardisation.

Historic Scotland's interest is in arresting this decline by providing support for those owners and thatchers still maintaining traditional thatched roofs. There is also an interest in experimental thatches based on traditional descriptions or in surviving thatches found under later sheet materials. These survivals will assist future generations to appreciate the ingenuity and diversity of our forebears' lifestyle.

2
ADVANTAGES

2.01 Use of Locally Available Materials

A range of cereal straws and wild grasses are used, including wheat, oats, barley, bere, rye, bent (marram) and couchgrass. Other materials used include flax, water reed, rushes, sedge, iris, heather, juniper, broom, dock and bracken as well as turf, and occasionally a coating of clay is used as a form of fire protection. The different materials are applied using a wide range of methods, each producing individual characteristics on the finished roof or within the roof space.

One material that is available in great quantity, but does not appear to have been used in the recent past in Scotland, is seaweed. Temporary holding-lashings using seaweed ropes have been recorded on crucks at 11 Melvaig, Gairloch, Ross-shire. Whole roofs of seaweed thatch, as found on the Island of Laeso, Denmark, and in Sweden do not survive in Scotland but the method of application is reflected in the thatch used for Lewis blackhouses and Lowland root crop clamps. One reason for this may be that kelp was more valuable for burning to produce potash and soda or for use as a fertiliser, than as a roofing material.

2.02 Use of Agricultural and Low-Cost Equipment

The simple forms of thatching can be carried out using tools normally found on a croft. The flaughter spade (breast plough) can be used to cut turf for the under thatch as can a normal delving spade. A standard heuk (hook or sickle) will cut the materials when they are not part of the crop. Hay forks help in handling the thatch and in applying the net. A short ladder to reach from the wallhead to the ridge is the only specialist tool required, but even this has other uses.

On specialist roofs the same conditions prevail. The ladder is the most expensive single tool. Leggats are normally made up by the thatcher, needles are made by the local blacksmith and the other tools tend to be agricultural. Snips for wire netting and fence wire also have agricultural uses.

2.03 Use of Second Hand Materials

The Western Isles have a long tradition of using driftwood for the construction of roofs, doors, windows, trevises and furniture. Beaches were regularly scoured for driftwood and as other materials began to come ashore it was a small step to using these found materials for the thatching. Discarded ropes and fishing nets of various types were no use to the fishermen but helpful to the thatcher. Windows from wrecked trawlers were used as rooflights and one house in South Uist has a thick nylon hawser round the lower edge of the roof to weigh down the wire netting over the thatch.

Second-hand bricks are used to weight the thatch in South Uist and Tiree. Straightened cartwheel tires are used as weights in Jura. Rubbing strakes off wrecked trawlers perform a similar function in Caithness. Pieces of discarded agricultural machinery are commonly used in all parts of Scotland.

2.04 Self Sufficiency

Communal thatching and maintenance cut the overheads of the crofter. This was of particular use to those who may have had little in the way of cash crops.

2.05 Acoustic Insulation

A thatched roof, particularly the low rounded types used in the Western and Northern Isles, produces extremely quiet living conditions in stormy weather. There is no impact noise, even in the heaviest rain, making the house a quiet haven in areas where gale force winds are commonplace during nine months each year.

The weight and thickness of the thatch also reduces airborne sound, making communication almost impossible between those working on the exterior and interior simultaneously. When consultation of this kind is required it is easier to communicate via a third person positioned at the door who can hear and be heard by those inside and outside the house.

2.06 Thermal Insulation

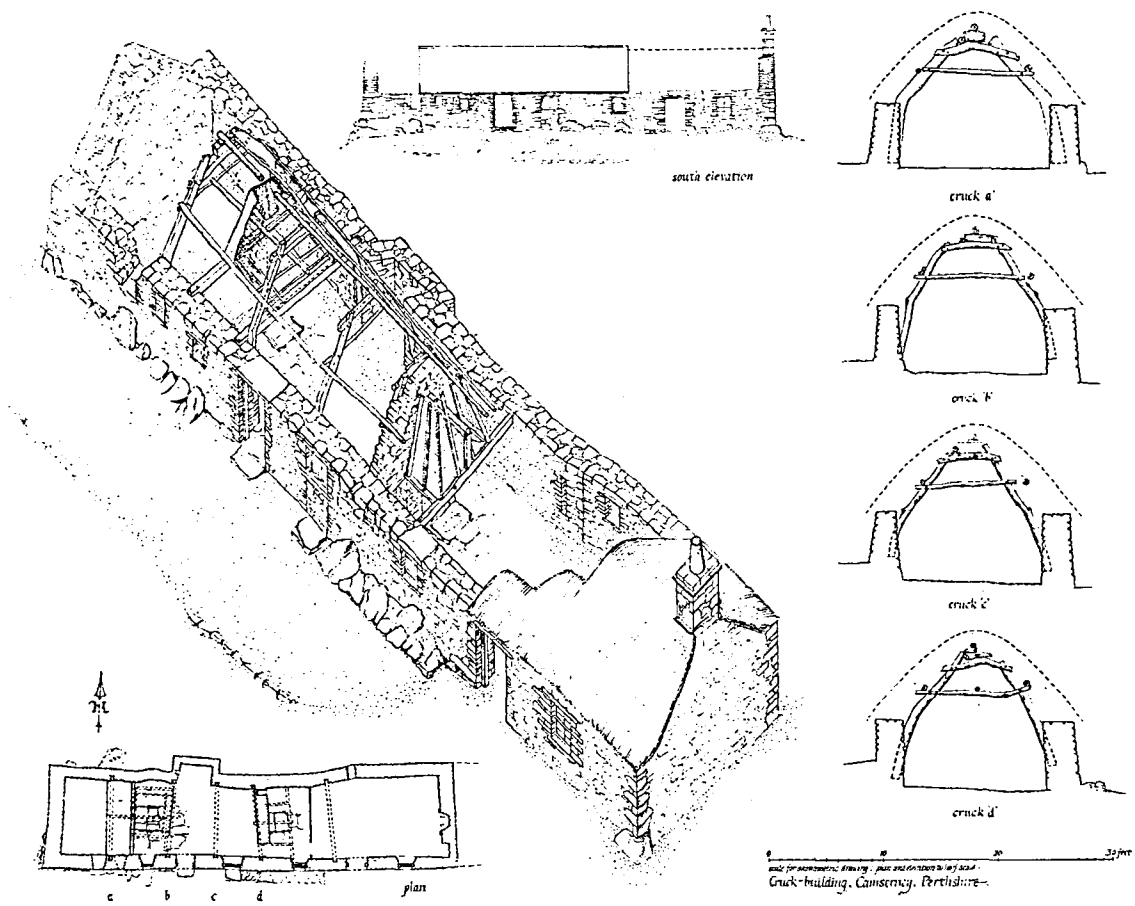
Thatch is generally considered, by persons living under it, to provide a well insulated roof, warm in the winter and cool in summer.

Theoretical calculated thermal transmission does not reflect the perceptions of the occupants as the insulation value is considered minimal since air can pass through the material. This air movement occurs slowly and as air is an insulator there is reason to question the published insulation values. The Scottish practice of having a turf sub stratum also reduces the amount of air movement through the thatch. New ways of calculating the thermal transmission are being considered by the Building Research Establishment and reports should be watched for changes in the near future.

2.07 Accommodates Irregular Roof Structure

Thatch is a very tolerant material capable of covering a multitude of irregularities. This ability reduces the cost of the structure as the roof can be made up using natural timbers without the need for accurate dressing. Similarly, the roof could be made up with different thicknesses of driftwood and lapped joints can project beyond the line of the structure without affecting the line or performance of the thatch. The same holds good for materials such as whalebone.

The sweetening of line achievable with thatch was used to advantage by the designers of the cottage orné to produce a romantic image. When the thatch is removed from such a building all the subtlety of the design disappears leaving a roof design that often looks stilted and awkward.



Camserney Farm, Dull, Perthshire showing irregularity of plan and roof structure. RCAHMS.PTD/154/1

2.08 Sustainable Resources

Thatch is a sustainable resource capable, in theory, of being renewed repeatedly without damage to the environment.

The standard of most natural thatching materials is improved by regular harvesting. Reeds, marram, broom, heather, and juniper all regrow in a more usable form. Reeds and marram actually become more dense and spread when regularly harvested.

Unfortunately materials that were formerly protected by the crofters as thatching materials are now being used to over-winter cattle with disastrous results for the environment as sand dunes begin to move due to marram roots being pulled up by grazing cattle.

2.09 Re-cycleable

Thatch is a re-cycleable material. Old thatch makes an excellent fertiliser particularly if the thatch is soot-laden. Clean thatch can be added to the midden or compost heap.

3
DISADVANTAGES

3.01 Fire Hazard

Thatch has little resistance to fire should a spark settle on the dry surface where there is a reasonable draught, to fan the spark into flame. Once a fire is established it is likely to spread by flash flame across the dry surface.

Traditional solutions tended to be based on the use of well burnt smoke to put out sparks. This was done in two principal ways. The first was to construct a chimneyless dwelling without even a smokehole. The roof space had to be large enough to contain the dead smoke until it slowly dispersed through the thatch or escaped at the doorway. The second was to construct a large slow-draught canopy based on the principle that even although the chimney was made from flammable materials, the slow draught would extinguish any sparks.

A method of fireproofing was advocated in the Mechanics Magazine Vol XXXVI page 106 and repeated by John Claudius Loudon in 1842.

"Thatch may be rendered comparatively incombustible by soaking it in lime-wash, made of lime, or whitewash, and size, in the usual way, to every four gallons of which has been added one pound of rather more of alum."

He goes on to explain that the lime and size form a film over the surface of each straw and that this film is non soluble in water. There is no record of the long term performance of this material.

3.02 Susceptible to Prolonged Damp Conditions

Most thatchers and publications on thatch warn against the adverse effects of moss on a thatched roof and recommend its regular removal.

Loudon describes thatched roofs where the thatch was held in place by the use of a layer of turf instead of sewing. The ridges and hips are also made up with turf. He goes on to say:

"We have known many roofs of this kind in Scotland which have lasted the length of a farmer lease (nineteen to twenty-one years) without any repairs: the surface of the thatch becoming covered with growing moss excludes air and moisture and prevents decomposition".

Generally this would be considered as erroneous advice since it would encourage the saturation of the roof.

Thatches on lower pitched roofs tend to become saturated in prolonged wet weather. In the type of thatched buildings found in the Western Isles it is important to keep the building heated and ventilated to prevent saturation of the thatch. Buildings that are not heated require additional ventilation and many roofs have been destroyed by failure to observe these simple rules.

The blackhouse at 42 Arnol, Lewis is a chimneyless byre dwelling and part of Historic Scotland's commitment to looking after the building is to ensure that the fire is lit six days a week. If the fire has to be put out for any length of time fungal growths can be observed in those parts of the thatch not impregnated with soot. This illustrates the delicate balance that exists in these structures between use and maintenance. Thatched houses in the Uists that have been abandoned and sealed up in recent years have usually lost the roof over the kitchen end of the house within nine months of the abandonment; but the remaining roof, then well ventilated, will often last for years. The reason why the kitchen end consistently fails first is not fully understood and requires further investigation.

3.03 Damage by Birds

Thatch that is secured internally is often subjected to damage by birds withdrawing loose straw for use as nesting materials. Birds can also cause damage when searching for food. Damage of this type always indicates that there are ears of unthrashed corn or small insects hidden in the straw. The problem is usually caused by incompletely threshed straw which has become more common since the introduction of the combine harvester. The use of incompletely threshed straw is not desirable and is not simply a conservation issue. Holes made in the surface of the thatch by the above action are often colonised by small birds as nesting sites. A wire netting cover can assist in preventing this type of damage but this can cause problems by preventing the straightforward removal of moss.

Persistent attacks by birds can de-stabilise the thatch and render it susceptible to wind damage.

3.04 Vulnerable to Vermin

Rodents can cause considerable damage to thatch should they be present in the house.

Often the damage occurs immediately after re-thatching due to a mouse, rat or squirrel being trapped in a bundle of thatching material. Damage can also be caused by rodents searching out incompletely threshed cereals.

3.05 Vulnerable to Wind Damage

High winds and gales can damage thatch that is badly detailed, inadequately fixed, or has been previously damaged by birds or vermin.

3.06 Maintenance Commitment

All thatches require regular maintenance. The maintenance cycle varies according to the thatch type, the roof pitch, the degree of shade or exposure and the materials used. It is important that owners are fully informed of the maintenance cycle appropriate to the thatch type used on their property, particularly if they have recently occupied the property and have no previous experience of thatched roofs or if they have moved to an area where a different type of thatched roof is prevalent.

3.07 Specific Requirement for Ventilation

Thatch, particularly that over a low to medium pitch, as found in the Highlands and Islands of Scotland, does require a considerable amount of ventilation. If this is not forthcoming, the thatch will become saturated in prolonged rainstorms and the damp inner surfaces are likely to rot and cause structural failure in the roof timbers.

Low pitches are used to reduce the risk of wind damage in those parts of the country where hurricane force winds are not uncommon.

Traditionally house doors, in these regions, were only closed at night or during exceptionally stormy weather and the fire was kept burning, in the kitchen, almost continuously. Barns and byres are usually well ventilated and therefore cause little problem.

Any thatched house used as a holiday retreat, should have an inbuilt ventilation system that does not jeopardise the necessary security.

3.08 Insurance

Many insurance companies refuse household cover for thatched roofed properties, but some companies specialising in this type of property do exist. Intending owners should ensure that they are able to obtain the necessary cover before finalising the purchase of a property. They should also be fully aware of any special requirements the insurance company may have, and if alterations are required, ensure that they have the necessary Local Authority and Listed Building consents.

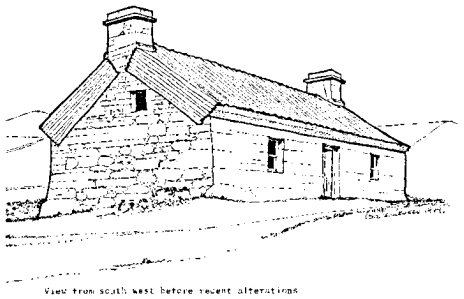
4
CURRENT SITUATION

4.01 Surviving Traditional Thatches

In most regions of Scotland traditional thatches have almost ceased to exist. The largest surviving group of these thatches is in the Uists including Benbecula and Berneray, Harris. Skye and Tiree have significant numbers related to the overall populations. Orkney and Shetland still have some traditional thatches but these are now in danger of disappearing apart from those looked after by the respective museums services.

Distribution over the rest of the country has been reduced to isolated examples or small groups, often in a poor state of repair or having been rethatched by over-zealous thatching enthusiasts more interested in promoting thatching as an ongoing process than in traditional techniques. Many of these thatches have been produced by immigrant thatchers from England using techniques taught there. **This may be the way forward for modern thatched buildings but they should not be substituted for traditional thatches without appropriate consents.**

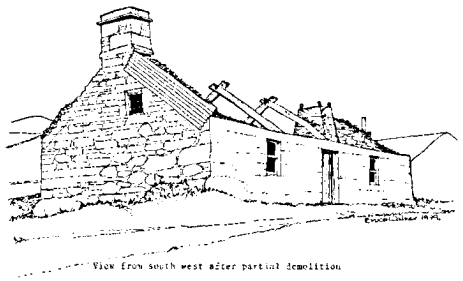
View from south west before recent alterations



The largest number of surviving traditional thatches are those preserved under corrugated iron or other sheet material. Care must be taken in this respect as some buildings were "thatched" purely for insulation prior to the sheeting being applied. These are easy to recognise as there is no surface wear on the thatching materials.

There are also a small number of sections of traditional thatch preserved in storage at the Highland Folk Museum, Kingussie. These are awaiting the construction of a building techniques gallery before being put on display. These sections of thatch were cut in as large a single piece as could be transported from their original site to the museum and have been stored without interference.

View from south west after partial demolition



The museum sections and those traditional thatches still under sheet materials should at some time be archaeologically investigated once an appropriate technique has been agreed. This process is already under consideration and should be available by mid 1996.

The scientific importance of undisturbed sub-strata of existing thatches under metal sheeting or top-dressed thatch has been highlighted in articles in The Times and Country Life in 1995. These were not considering thatch as a building construction technique but as a source of information on early farming techniques, types of cereal grown, types of weed found in the crop, techniques of growing a mixed cereal crop as insurance against crop failure and other data.

John Letts, a botanist investigating the lower strata of various English straw thatches has reached the conclusion that huge changes in cereal crops began to occur after the 1830s and that before that there were very diverse varieties of crops grown. These diverse crops were well adapted to local conditions and were very reliable, though they did not always produce high yields.

Given the time lapse between innovation in the Lothians and the Hebrides, John Lett's date of change of "1830s onwards" might become "1880s onwards" in the Western Highlands and Hebrides, making many of the thatches there a potential source of pre-improvement agricultural information.

Positively identified traditional thatches should now be subjected to stringent control to avoid yet more examples disappearing without adequate recording. Similarly, a programme of taped interviews or video recordings should be made of traditional thatchers who have now given up the craft, principally to establish the range of variations that existed from township to township, area to area, and region to region.

4.02 Decline of Traditional Skills

Traditional skills continue to decline as thatched buildings are abandoned or re-roofed with alternative coverings. **The decline could be arrested by using the interviews recommended**

in item 4.01 as a base for the teaching of regional thatching techniques in technical colleges offering Scotvec certificates in regional craft skills.

It is important that the district and regional aspects be stressed; otherwise, any new courses could accelerate the decline rather than arrest it.

4.03 Continuing Decline of Traditional Thatches

The formation of craft guilds amongst thatchers in Scotland did not reach the levels achieved in England. This may explain the survival of such a wide range of thatches in Scotland. However, the recent availability of books on English thatching practice concentrating on reed, wheat reed and long straw is having an adverse affect on Scottish traditional thatches in some parts of the country. The concept that these imported thatches will last much longer is encouraging change even although there is no proof that the claims will be fulfilled in the weather conditions found in these districts. **Some imported thatches have failed in less than five years fulfilling predictions made in some English thatching publications.**

4.04 Decline in Availability of Materials

4.04a Straw

Cereal straw has changed character since the 1950s. Changes in harvesting techniques are causing damage to the straw and a reduction in demand for straw has encouraged the growing of shorter stemmed cereals. Although the mechanical damage to the straw is a problem, the greatest difference has come from the increased use of nitrate based chemical fertilisers. The high nitrate content makes the straw extremely brittle and therefore liable to damage by wind vibration. When straw is being chosen for thatching several strands should be worked back and forwards between the fingers. High nitrate content straws will break readily whilst organically grown straw will be tough and resistent.

The production of organically grown straw is becoming increasingly difficult as agricultural land becomes more and more polluted with free nitrogen. Areas of set-aside could take twenty-five years or more to return to normal nitrogen levels even assuming that: there is no further pollution caused by wind-blown fertilizer from adjoining or nearby fields; the underground drainage system is not continuing to introduce nitrogen-rich wash from other properties; and that acid rain and other airborne pollutants are not present.

When straw is grown specifically for thatching it should be harvested whilst still slightly green. Although cut green, the straw must be thoroughly dried after harvesting as straw with pith in the centre does not perform as well as hollow straw.

Thatching straw that requires to be pulled rather than cut must be grown in light sandy soil as the soil must be easily knocked off the roots. This material also requires to be well dried before use.

4.04b Reeds, Sedges

Reeds and sedges are also subject to nitrate pollution in the form of surface water drainage from the cereal fields discharging into the reed beds. Many traditional reed beds have been destroyed by this process and others are showing signs of deterioration. Thatchers should be particularly careful when purchasing reeds and should condemn bundles of obviously weak reeds. Polluted reeds tend to be papery whereas healthy reeds are cane-like. Many of the best reeds available at present are from the former Eastern Bloc countries where the use of chemical fertilisers has been minimal, but this situation is likely to change as their economies strengthen.

4.04c Other Materials

Virtually all the natural materials employed in thatching can be made more suitable for that purpose by regular harvesting in prescribed ways. Heather was encouraged to grow tall rather than short and bushy. Regular trimming of broom to obtain suitable fronds encouraged fresh growth that made ideal thatch. Cutting of marram grass encouraged the root system to develop and thicken, and so on. Changes in practice such as the controlled burning of heather on grouse moors, allowing broom to grow naturally, and the over wintering of cattle on the marram grass results in a shortage of these natural materials even in areas where these plants appear to be the dominant species. Consideration should be given to setting aside areas for the production of thatching materials for those traditional thatches still being maintained.

4.05 Concept of Thatch as a Single Material

Thatch is often perceived as a standardised material. This perception spreads far beyond the general public being found amongst architects, builders, conservation officers, surveyors and others connected with the building industry as well as archaeologists, historians and those concerned with the interpretation of the past.

The practice of those compiling the statuory lists of Historic Buildings would formerly be to state simply

that a building was thatched without making any effort to differentiate between the various types. This made it difficult to assess the impact of a change in thatching technique until any rethatching work was completed. Thatchers working from England and producing a thatch that was considered acceptable in one region of Scotland found themselves being criticised when they repeated this thatch in another area or region. It was also difficult for Conservation Officers changing areas or architects working in a number of regions to find the appropriate solution that would not offend locals who remembered or knew local practice.

A more descriptive approach to listing combined with other more specific forms of recording will do much to improve the situation and assist officials in arriving at an appropriate decision.

4.06 Import of Craft Skills

Traditionally Scottish and English professional thatchers served an apprenticeship in the area where they were to carry on their craft. New training methods were introduced some years ago, resulting in a new group of thatchers who have no traditional base. Many of these thatchers are prepared to tender for work in any region of the United Kingdom and Ireland. Some are prepared to adapt to local materials and practices whilst others wish to work in the style and techniques of their training. Whilst there is no problem with this on new properties the problems outlined in item 4.05 can result in changes to listed buildings by replacing historically correct thatch with a modern alternative. This is not so crucial in the Lowland areas as it is in the Highlands and Islands since the Lowland thatches are often very similar in finished appearance to their English counterparts. The biggest problem in the Lowlands is to control the skews and ridge details and ensure that an appropriate type is adopted. In the Highlands and Islands the principles adopted in thatching are so different that the imported thatch looks, and often is, totally inappropriate.

Even if a thatcher is found who is prepared to adapt to local materials and practices, there are some practical considerations that will make it difficult for him to carry out the ambitions in totality. He has to be itinerant. Must follow each local tradition requiring a mastery of many different thatching techniques and has to produce or arrange for all the different types of thatching material such as ropes, mats, fixings and weights.

If all these responsibilities are left entirely to the thatcher he will be forced to standardise in some respects in order to establish a manageable working method.

Traditionally made thatches employ not one, but many different crafts. A substitute must be found for the farm-hands and family members who traditionally assisted the thatchers. It is therefore essential that conservation officers and other commissioning bodies ensure that the correct materials are available at the right time for the work to proceed. Thatchers would possibly find it stimulating to try different techniques and working methods if they get the necessary support and the right materials.

4.07 New Materials

The current resurgence of thatch as a roofing material in affluent countries such as south east England, USA, Belgium and the Netherlands has resulted in a rash of new sources for traditional materials and a range of completely new materials designed to overcome some of the traditional problems associated with thatched roofs. Some of these are desirable in terms of the performance but very few can be used without destroying the integrity of the traditional thatching methods.

The problem of fire resistant dips has been discussed in item 3.1 particularly when applied to reed. The use of aluminium foil as a fire barrier has both advantages and disadvantages: it does form a barrier to the fire but it also restricts or stops the natural ventilation that is so essential to thatch in a damp climate. Various geotextiles are being investigated to establish whether they could be used to provide fire resistance, reduce dust from the thatch, and provide the natural ventilation crucial to many of these thatch types.

Similarly some thatchers have used "natural-plastic" reeds which have the appearance and colour of natural reeds but do not rot and are not susceptible to attack by birds, vermin, vegetation or fungus. Each case would have to be carefully considered and their use in relation to historic structures assessed on the grounds of performance related to traditional principles. Some change is inevitable in buildings used for domestic purposes but everything possible should be done to protect as much of the historic fabric as possible. Certainly, historic roof timbers should not be removed to obtain a regular surface to take thatching bats. The older elements of the structure, such as the irregular timbers, must be retained at all costs and any adjustment made should be in the more transient material, that is, the thatch.

5
HISTORIC SCOTLAND POLICY

5.01 Listing

The Secretary of State for Scotland is required to compile lists of buildings of special architectural or historic interest. The administration of both local and national conservation policies is based upon these lists. At present a comprehensive resurvey of the historic building stock is under way.

All buildings erected before 1840, the character of which remains substantially unaltered, are included. Later buildings are selected on the basis of their individual character and quality, special regard being paid, for example, to distinctive regional variations in the use of building materials such as thatch. Buildings which merit inclusion on the lists are assigned to one of three categories, A, B or C(S), according to their relative importance. Outstanding examples of any building type, including some, such as thatched houses or byres, which may at first glance seem modest and unremarkable, can be placed in the highest category, A. Those seeking further information about listing and listing categories should consult Historic Scotland booklet *Scotland's Listed Buildings - A Guide to their Protection.*

5.02 Protection Policies

The fact that a building is listed as being of special architectural or historical interest does not mean that it must be preserved intact in all circumstances and in perpetuity. It does mean, however, that demolition will be firmly resisted and that alterations to the exterior and interior must, as far as practicable, preserve or restore the character for which the building was listed. This is ensured by a statutory process known as listed building control. If you wish, for example, to alter the form of the roof or the roof covering material (or the method of applying and fixing it) in a manner which the Planning Authority considers may affect the character of the building, you will need to obtain listed building consent before undertaking any work. Failure to obtain the necessary consent is an offence. Further information about listed building consent is given in the booklet referred to above and in the Memorandum of Guidance on Listed Buildings and Conservation Areas, published by Historic Scotland in 1993.

The Memorandum sets out Government policy on conservation and in their consideration of applications for listed building consent Planning Authorities are expected to follow the guidance offered in the document. Appendix 1 of the Memorandum gives detailed advice about specific matters. On the subject of thatch it says the following -

> **"Thatched buildings are a very vulnerable type.** They divide into two distinct groups: vernacular and architect-designed. Buildings in the vernacular group fall into two categories: the mainly Lowland types where the ridge is covered in a different material from the roof (this may be concrete, metal, timber, turf, straws or sedges), and the mainly Highland types where the thatching materials are carried over the ridge in a soft uninterrupted curve. Each category will include buildings where the thatch has been laid in an ordered manner in the line with the roof pitch and those where the thatch has been sprinkled on the roof haphazardly. Architect-designed thatched buildings include the cottage-style houses of the later 18th and early 19th century Picturesque school and on the late 19th and early 20th century Arts and Crafts Movement. The remaining buildings in both groups are scarce and important.
>
> The methods and materials used in the thatching of vernacular buildings varied greatly from one area to another. Depending upon availability, materials such as straw rushes, heather, murran grass (also known as bent or marram grass), reed, dock, iris and even potato shaws, were used, and were secured to the roof by thrusting, stobbing or stinging, stitching, pegging, claying, roping or netting. Most vernacular thatches were supported on a layer of divots which rested on the roof structure: in some instances the divots themselves formed the "thatch". More than one material and technique may have been used in one area: the roofs of the houses of those of higher social standing tended to be better built using higher quality materials. Often the whole roof structure may be of significance, especially where the trusses or framing members are of pegged construction or of roughly dressed or undressed timber, occasionally in the form of "cruck" couples.
>
> Every effort should be made to retain and repair traditional thatched roofs on vernacular buildings. Financial assistance for such work may be available through Historic Scotland's Thatched Houses Maintenance Scheme: further details may be obtained from your local Conservation Officer. Problems may arise in obtaining suitable craftspersons and materials, and in satisfying building and fire regulations, but these can often be overcome: Your local Conservation Officer should be able to advise and assist.
>
> Vernacular buildings which have been the subject of well-intentioned "restoration" have sometimes been rethatched using the wrong method or materials: where this is the case, the thatch should be corrected on the basis of thorough research into its original form at the first

opportunity. Thatched roofs of interest may be concealed beneath a late covering of corrugated iron: where this is the case removal of the sheet metal and repair of the thatch should be encouraged. Proposals to reinstate the thatch on a roof which is known to have been thatched should be carefully assessed in the light of surviving evidence and information provided by photographic and other records and local recollection

Should retention of the thatch on a vernacular building prove impractical, the roof should be recorded in detail by the appropriate agencies before it is removed.

In the re-thatching of architect-designed buildings, English techniques and materials (water reed, sedge, long straw and combed straw) may be acceptable. Particular attention should be given to reproducing faithfully distinctive features such as dormers, ridging and stitching".

5.03 Listed Buildings Consent

Listed Building Consent is necessary for any change to the type of thatch, the thatching materials, and the details or fixings.

See item 5.02.

5.04 Reinstatement of Thatch

Reinstatement of thatch on a listed building now protected by a more recent roof covering must be approached cautiously. Normally Historic Scotland would be against this in principle but in exceptional circumstances where there is complete evidence of the type, form, details and materials it might be considered acceptable, provided Listed Building Consent is obtained.

Care should also be taken to ensure that the existing roof timbers are capable of carrying the weight of the thatch when wet and that historic timbers and interiors are not put in jeopardy. As a matter of principle reinstatement of thatch should only be considered if the building is to be occupied or used throughout the year as poorly ventilated thatch is particularly susceptible to rot.

5.05 Thatch under Sheet Materials

The importance of undisturbed thatch under sheet materials has been stressed in item 4.01 and the utmost care should be taken not to damage or disturb this material notwithstanding the guidance given in the Memorandum.

Any alteration to the thatch must have Listed Buildings Consent and must be the subject of a full investigation.

5.06 "Grants" Scheme

Historic Scotland provides financial assistance through the Thatched Houses Maintenance Scheme. This is administered through the local conservation offices or their appointed agents. See item 5.02.

Thatched buildings that are no longer inhabited, including those that have lost their roof altogether and survive as abandoned ruins, may also, depending on their historical, architectural or archaeological importance, be eligible for an Ancient Monuments Grant administered by Historic Scotland (Ancient Monuments Division).

5.07 Experimental Thatches

Experimental thatches may occasionally be supported through the "THMS Grants" scheme. These would normally be considered only if the application presents a well-reasoned case, clear objectives, an approved monitoring system, an adequate site and assurance that the scheme will run for an agreed period of time with approved maintenance and control.

6
RECORDING

6.01 Location

In recording the location of a thatched roof the information collected should include:

1. Ordnance Survey: National Grid Reference. (Six figure)
2. Parish or Burgh.
3. Former County.
4. Unitary Authority.
5. Address of property including postcode.
6. Name of occupant.
7. Name and postal address of owner.
8. Main axis of roof.
9. Relationship to other buildings and man-made features (including archaeological context).
10. Relationship to trees or vegetation.
11. General situation.
12. Exposure.
13. Historical information (if known).

The inclusion of the parish and former county allows historic records to be consulted to link thatch to documentary evidence. The axis of the roof can be useful in assessing the projected or actual performance of the thatch.

6.02 Building Type

When recording the building type the following information should be recorded:

1. Original usage.
2. Number of storeys.
3. Current usage.

6.03 Recorded Changes

This should include:

1. Change of use.

This might explain sudden deterioration in the thatch or a change in the cyclical maintenance or in the thatching materials.

2. Change of form.

External changes in the roof form are always of interest. They might reflect the maintenance cycles as many types of thatch build up over the years. In some cases this simply adds to the bulk of the thatch in other cases, such as stob thatching, the pitch of the roof gradually becomes steeper and may result in a thatch depth of more than two metres over the ridge. Eventually these roofs will become too heavy and the thatcher will strip them back or they may fail structurally and the structural timbers have to be replaced. If changes of roof pitch are documented - the classic example being Burns Cottage, Alloway, recorded by numerous artists and photographers from the time of Burns to the present day - the maintenance cycle could be established with reasonable accuracy.

3. Change of thatch type.

This might also be reflected in the Change of Form as a change to a less flexible thatching material might result in a change from a rounded roof structure to one with an apex. The evidence is all too common in the roof timbers and in traces of flashings left against gables. Such details are seldom related to the thatching materials available at the time of recording but to previous types of thatch.

6.04 Visual Record

Copies of sketches, drawings, paintings, models and photographs of the building at various stages of the building history should be collected to form a building archive. This type of information is particularly relevant when studying and analysing thatched roofs as, if the record is complete enough, the maintenance cycle can be established.

The most recorded thatched roof in Scotland must be Burns Cottage, Alloway, Ayrshire as it has been continuously used as the subject of descriptions, sketches, drawings, paintings and photographs over almost two hundred years. The recurring changes of roof pitch over this period indicates a stob thatch, building in height over a number of years before being stripped or partially stripped and re-thatched. This cycle was abandoned in favour of reed thatch during its life as a museum. Recently it has returned to having a straw thatch which may be stob patched in the future and the original maintenance cycle re-established.

Similarly, the changes in roping techniques in various townships in the Hebrides and their eventual demise in favour of weighted wire netting shows the transient nature of the material in recent years.

6.05 Current Roof Types

Record the nature of:

1. Principal roof structure.
2. Secondary roof structure.
3. Sub-stratum of thatch.

6.06 Current External Form

Does the thatch adopt

- a rounded form? *(Illustration a)*
- a ridged form?

If ridged is the ridge

- plaited? *(Illustration b)*
- flush with pitch? *(Illustration c)*
- flat top? *(Illustration d)*
- raised? *(Illustration e)*

If plaited

- describe.

If flush with pitch: is the ridge

- scobed? *(Illustration f)*
- clay?
- concrete?
- tiled?
- sheeted?
- turf?

If raised: is the ridge

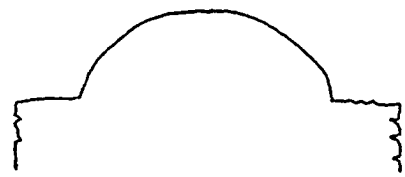
- block cut?
- weighted? *(Illustration g)*
- turf?
- concrete?
- tiled?
- sheeted?

If block cut

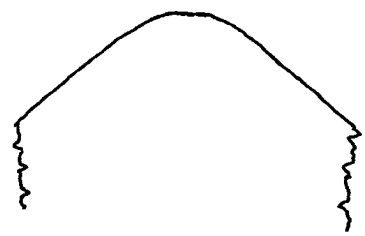
- is the ridge material the same as that of the roof pitch?
- is the ridge material folded over?
- is the ridge material open at the top?

Does the thatch

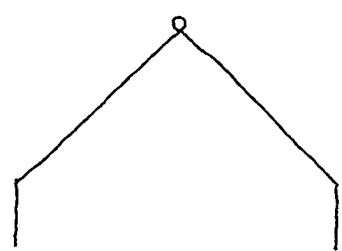
- overhang at the eaves? *(Illustration h)*
- finish flush with eaves? *(Illustration i)*
- leave the wallhead exposed? *(Illustration j)*
- overhang at the skews?
- finish flush with the skews?
- finish against a bargeboard?
- finish against raised masonry skews?
- have turf flashing at skews?
- have clay flashing at eaves?
- have cement flashing at eaves?
- have lead flashing at eaves?



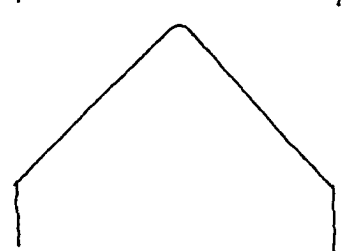
a) Typical rounded roof forms.

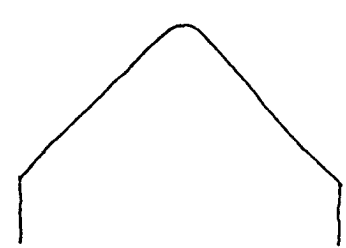


Typical ridged roof forms: Illustrations b),c),d),e)

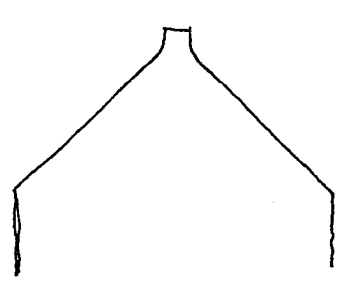


b) Plaited





c) Flush with roof pitch



d) Flat topped

Does the thatching material change at

- ridge?
- eaves?
- skews?

Is the thatch

- roped?
- netted?

If roped

- describe method

If netted

- describe.

6.07 Current Thatch Type

Is the material laid on

- at random?
- to run with pitch?
- to run with pitch but canted to project at skews?

Is the thatch

- netted?
- roped?
- scolloped?
- other?

Is the material securely fixed with

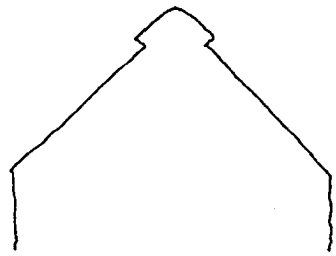
- turf?
- clay?
- pegs?
- stobbing?
- scobs?
- stitching?
- sways?
- other?

If roped or netted, are the weights

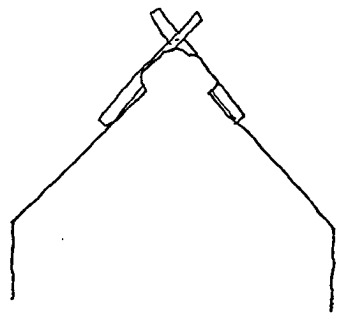
- above eaves? *(Illustrations k)i-iii)*
- at eaves? *(Illustrations l)i +ii)*
- below eaves? *(Illustrations m)i-iii)*
- resting on wallhead? *(Illustration n)*

Is the thatch on a sub-stratum

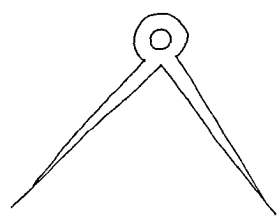
- of turf?
- of other thatch?
- of wattle?
- of random twigs?
- of rope?
- of mat?



e) Raised

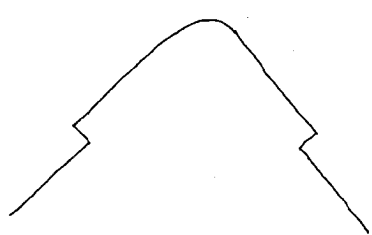


e) Raised with external weights

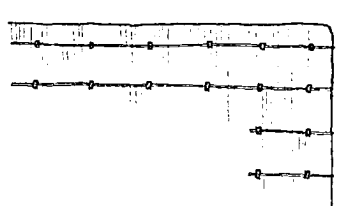


b) Plaited ridge

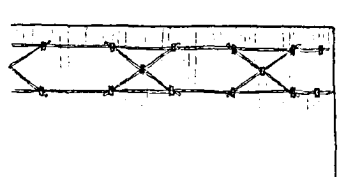
c) Flush ridge



e) Raised ridge

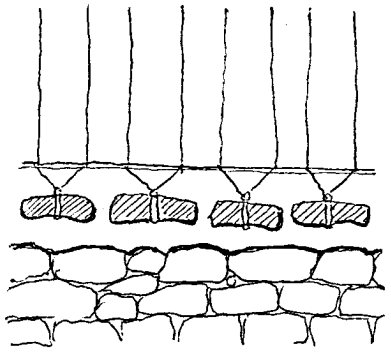


f) Examples of scobed ridges

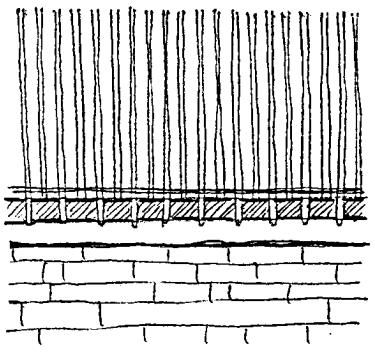


Is the thatch overlaid with

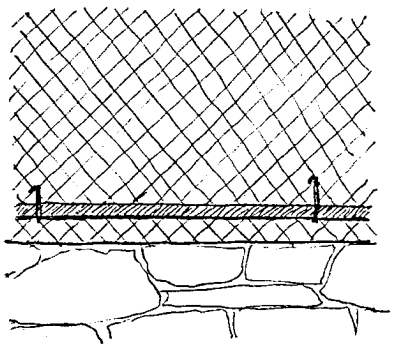
- turf?
- clay?
- other material?



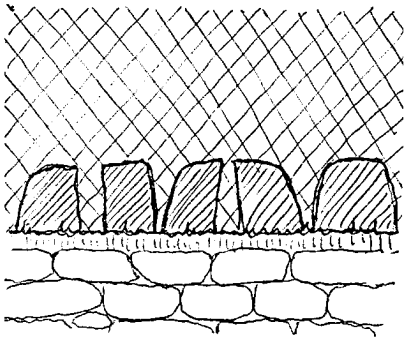
k)i Parallel rope system, linked by ground rope, and weighted with individual stones.



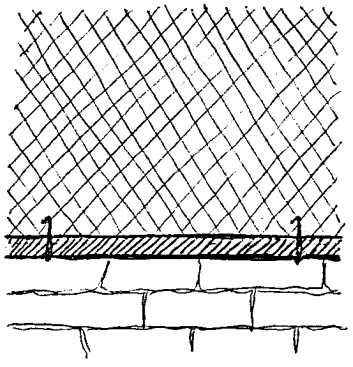
k)ii Parallel rope system, linked by ground rope, and weighted with long thin slabs of flagstone.



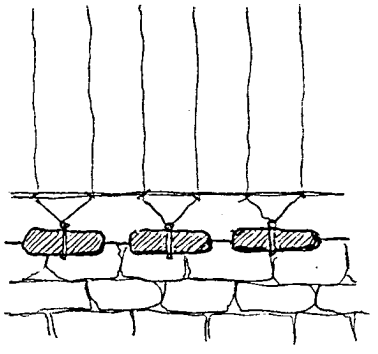
k)iii Chicken wire weighted with straightened iron cart tyres.



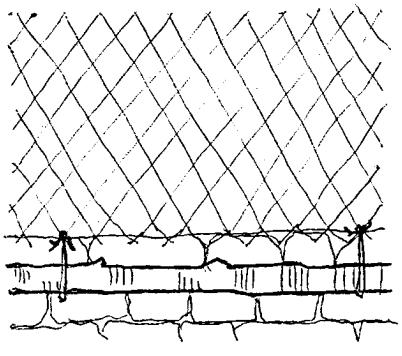
n) Examples of thatch weights resting on wallhead. Netted thatch weighted with individual stones resting on the base of the net sitting on the exposed wallhead.



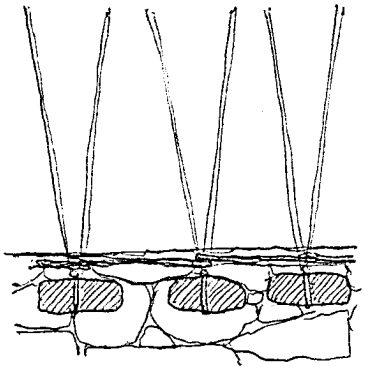
l)i Chicken wire weighted with iron bar or discarded rubbing strakes off shipwrecks.



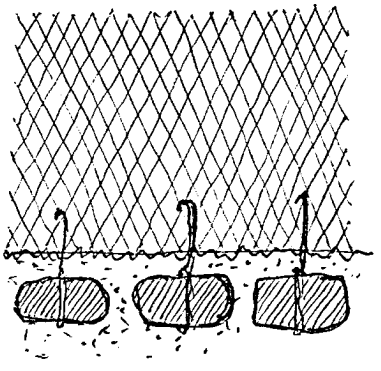
l)ii Parallel rope system, linked by ground rope, and weighted with individual stones.



m)i Chicken wire weighted with caber tied to the netting with twine or fence wire.



m)ii Angled rope system, linked by ground rope, and weighted with individual stones.



m)iii Chicken wire weighted with individual stones attached by fence wire hooks.

6.08 Current Materials

Is the thatch made from

- straw?

If straw

- wheat?
- oats?
- barley?
- bere?
- rye?
- flax?

This is not easy to assess but a straw, particularly having the the remains of an ear, is all that is required for a botanical identification.

Was the straw

- pulled?
- cut?

Is the thatch made from

- other grasses?

If other grass

- marram?
- couchgrass?
- hay?

Is the thatch made from

- reeds?
- rushes?
- iris?
- sedge?
- heather?
- broom?
- juniper?
- dock?
- bracken?
- eel grass
- seaweed
- other?

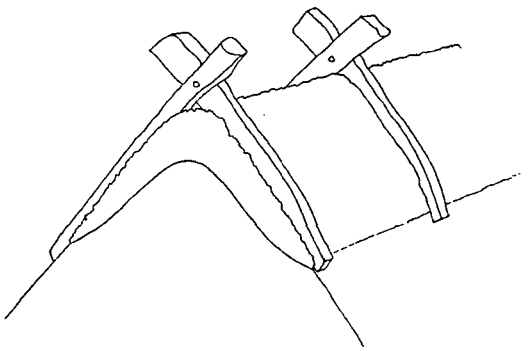
If other

- describe.

6.09 Maintenance Cycle

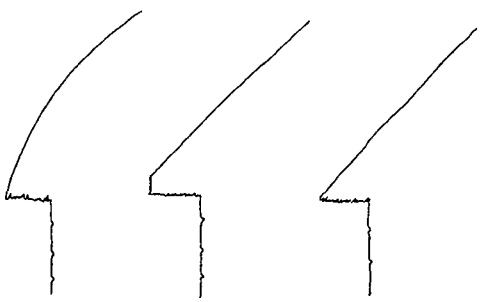
All thatches require regular maintenance. Owners and grant giving bodiesshould be aware of the maintenance commitment for the thatch being considered. Each project should acknowledge:

a. Annual maintenance commitment.
b. Biennial maintenance commitment.
c. Quinquinnial maintenance commitment.
d. Longer term commitment.
e. Expected life of thatch assuming that maintenance commitment is recognised and fulfilled.
f. Sources of supply for materials.
g. Available craft skills.

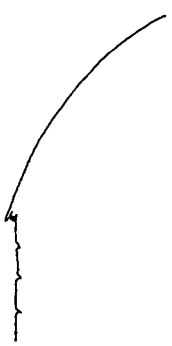


g) Raised ridge weighted with timber

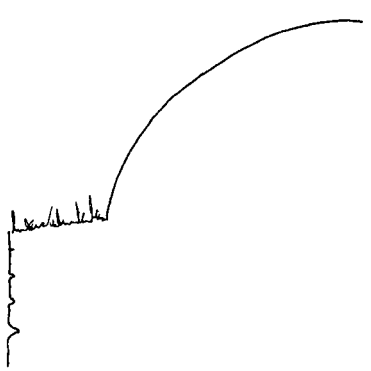
Eaves types: Illustrations h),i),j)



h) Overhanging



i) Flush



j) Exposed wallhead.

7
THATCHING PRINCIPLES

7.01 Water Resistance

Thatch achieves its water resistance in the same way as shingles, slate or tile, that is,

by passing the drops of water from piece to piece down the weather slope of the roof.

Difficulties occur each time the thatch is penetrated as water can flow freely down the penetrating surface and into the building. A skirt formed round the penetrating feature can be used to divert the water out into the thatch where the above mentioned system would operate. Fixing devices driven into the thatch cannot incorporate a skirt and these should therefore be driven upwards into the thatch.

Thatch laid with the "weather coat" running parallel to the angle of the roof structure sheds water reasonably quickly if the pitch is greater that 45 degrees. Surface water on such a thatch should not penetrate more that two inches (50mm) below the weather face on these roofs. Fixings more than three inches (75mm) below the weather face are therefore unlikely to become wet and can therefore penetrate the roof at right angles to the structure.

7.02 Wind Resistance

In the Northern Isles and along the western seaboard of Scotland, thatch is often subjected to gale and even hurricane force winds on a fairly regular basis. Thatch in these regions is usually netted and roped or if not netted, very closely roped. This helps to counteract the pressure and suction effects on the windward and leeward sides of the roof respectively. Sharp angles are avoided at ridges and hips. Skews are anchored with large turfs and or roped to anchor points at the gables. Eaves are normally formed without a projection. In the Western Isles exposed wallheads act as wind spoilers or deflectors causing the wind to rise and hit the roof about mid pitch thereby protecting the eaves that are securely held by a row of soldier stones.

Similarly, projections through the roof, such as timber lums have the thatch swept up against the sides and are normally wrapped round with rope to prevent the wind penetrating the thatch and causing damage. Scobs, turf or concrete can be used to achieve the same results in less exposed areas.

7.03 Heat Retention

Thatch has always been considered to be one of the warmest roof coverings available in Scotland. This is not reflected in the current heat transference statistics but the current figures assume that heat goes straight through the roof. Although smoke and air will pass through thatch its rate of escape is slow and, as the hollow straws of the thatch contain static air, the roof keeps the building warm in winter and cool in summer. This is assisted by the turf substratum. New thermal values are being considered by the Building Research Establishment.

7.04 Ventilation

A building with a thatched roof ventilates naturally when in use as warm air can pass slowly through the thatch as described in item 7.03.

When thatched buildings are locked up for prolonged periods, particularly with closed windows and sealed doors, problems start. Thatch starved of ventilation, particularly over the low pitched roofs found in many Highland and Island buildings, will quickly become saturated with water in periods of prolonged wet weather. If this happens the roof structure becomes vulnerable to rot. The kitchen end of the house is usually the most vulnerable and can fall within nine months of the building being closed up.

7.05 Economic Viability

Thatches in the Highlands and Islands often require annual maintenance and may have to be renewed every decade but they are ideally suited to the areas in which they occur. The materials cost very little to obtain. The annual top dressing ensures a tough weathering coat and protects the older material from the effects of the wind. Changing the specification to a more expensive thatch does not necessarily mean that the thatch will last longer, as is often suggested. Rather reliance on the same surface over a number of years, could lead to a thatch with a shorter life span than the traditional one. In one known example a Norfolk style thatch used near Belfast lasted only one season on the north side of the roof.

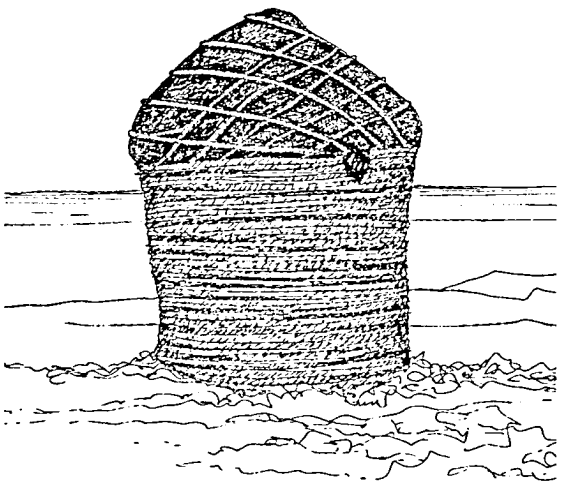
Conversely the cost of setting up scaffolding on a larger property in Central Scotland would make the use of thatches requiring annual maintenance totally impracticable as the cost of the scaffold offsets the savings in material.

8
SUB-STRATUM

8.01 Heaped Material.

The earliest thatches possibly developed from the need to provide protection for collected materials, particularly foodstuffs. Comparatively recent applications include: potato pits and other root-crop clamps; hay stacks; cereal-crop stacks; ice heaps; building materials; bee skeps; and as temporary protection for partly built walls.

Cottages have been recorded in England where the roof structure comprises a series of horizontal joists supporting bundles of straw or brushwood piled up to form a pitched roof profile. These so called "flat-roofed" or "solid roofed" cottages are then thatched over the brushwood or straw formwork.



Straw rope granary, Caithness, 1905. Thatch formed over conical top of heaped material such as straw sheaves or brushwood. (After photograph in PSAS)

Examples of this type of structure have been recorded in Scotland the most unusual examples being a design for a peat walled ice-house published in 1888 and a straw-rope granary recorded in Caithness in 1905.

8.02 Brushwood

A thin layer of brushwood laid at right angles to the roof structure is sometimes adopted as a sub-stratum.

8.03 Wattle

Early descriptions refer almost exclusively to sub-stratum of wattle often making comparisons with the construction of hurdles. These descriptions tend to be the product of English travellers. Scots writers refer to "stake and rice" when describing wattle work. The term is a deviation of the Old Norse words for a stake and brushwood. "Hris", pronounced with a silent "h" being corrupted to rice.

Surprisingly, in complete contradiction to the descriptions, the use of wattle as the sub-stratum in a roof is rare. The technique is found as a walling material, for the construction of canopy chimneys, to form roads, to protect the sides of ditches and wells, as external doors, as panels in furniture, as basketwork, and as fencing but seldom on the roof. In contrast to this, the use of wattle as a sub-stratum is commonly found in eighteenth century buildings in Ireland but often as an open weave of equally sized osiers rather than hurdle fashion with parallel stakes and interwoven osiers.

8.04 Simmons and other hand made rope.

Simmons style straw rope, is the traditional sub-stratum to thatch along the eastern side of the Orkney Islands. When straw was scarce, fine heather was used instead but this was disliked owing to the difficulty in twisting the rope and handling it on the roof.

The sub-stratum was formed in the following way:

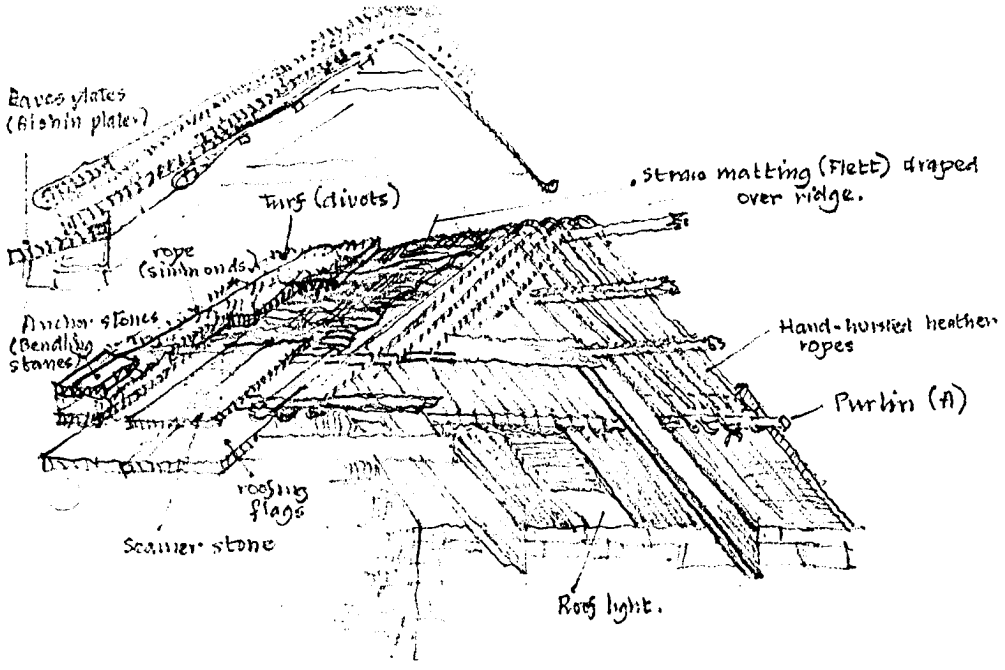
"The end of a simmon was fixed to the laight (purlin) on one side, brought over the upper laights, then round the laight on the other side, and over the ridge again, and so on. The simmon was passed till the whole roof was shut in by a web-work resembling darning. This process was called "needling the roof.""

This made an almost continuous mat visible from the accommodation below. This made a neat roof as is shown in the following description:

"The only pleasing thing to attract the eye in a rural hut of this kind was the neat way in which the straw simmons were laced from side to side over the mane-tree (ridge) to form the inner side of the thatch and make a firm foundation for the straw covering. For a time the new yellow simmons brightened the otherwise sombre colouring of the farmers abode, but when the all-prevailing smoke had done its work of dyeing, and the dampness of the atmosphere had turned the adhering soot into a substance resembling tar.....the neat twist of the simmons was no longer recognisable as a thing of beauty."

Few of those roofs survive, and those that do have different systems of fixing the simmons to the bottom purlins.

A variation on this form of sub-stratum is to be found on Berneray, Harris; North Uist; Benbecula; and to a lesser extent South Uist. There the traditional material is heather rope but examples using coir, thick twine or even fence wire are known. The spacing of the rope is also different from two to six inches (50-150mm) apart, as is the fixing at the



Estaban, Frith, Orkney.

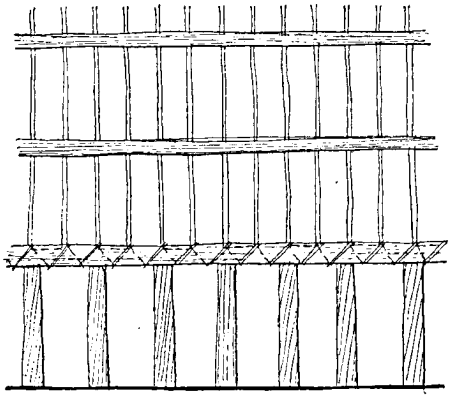
Simmons sub-stratum with straw matt (flett) draped over the ridge.

RCAHMS ORD/5/1.

bottom purlin. The ropes pass over the ridge and upper purlins as in Orkney but below the bottom purlin at each side to loop over a short stick spanning between the wallhead and the bottom purlin.

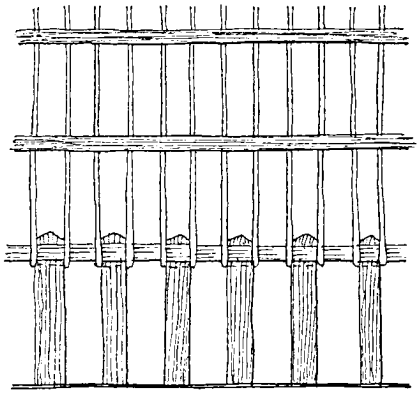
8.05 Straw Mat

The logical development from a simmons sub-stratum would be a straw mat. These are recorded in Wales, as are straw rope roofs. A straw mat sub-stratum can be seen in the Kenixton Farmhouse, now in the Welsh Folk Museum, St Fagans.



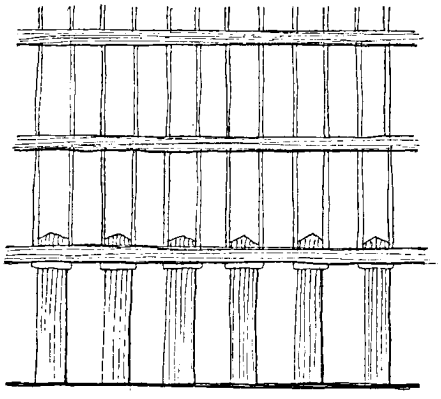
Sidinish, North Uist, Western Isles.

Parallel heather ropes bound to base purlins.



Berneray, Harris, Western Isles.

Parallel ropes passed over purlins, under the base purlin and round the back of short lengths of timber between wallhead and the base purlin.



Berneray, Harris, Western Isles.

Parallel ropes passed over purlins and round the front of short lengths of timber between wallhead and the base purlin.

To date no examples are known in Scotland although straw mat is sometimes used, in Orkney, over simmons, to support the thatch but this is not visible.

8.06 Cabres

The sub-stratum most commonly found in Scotland is not wattle as the early descriptions would suggest but cabres laid from eaves to ridge. These take various forms from thin branches following the line

of the roof from wallhead to wallhead over the purlins and ridge tree of a rounded roof section, to straight poles spanning from wallhead to ridge without intermediate support. There is a wide range of variations between these two extremes.

The Old Manse at Over Croy, Dunbartonshire, dating from the eighteenth century or earlier, had cabres with pegs through the upper end to allow them to be hooked over the ridge tree obviously to prevent their slipping or exerting an outward thrust at the wallhead.

Many houses at Sleat in Skye were constructed with cabre roofs without a supporting roof structure. These regularly collapsed inwards leaving the roof inverted, ridge on the floor and the ends of the cabres projecting upwards over the eaves. These were immediately rebuilt to their original form without an internal structure or cross ties.

In the Western Isles driftwood is often used in place of cabres, occasionally augmented by straw or heather ropes running lengthwise across the roof pitch to prevent the thatch falling through the wider gaps. Roofs of this type do not always run in a straight line between ridge and wallhead. A sudden change of direction often occurs between the purlin closest to the wallhead and the wallhead itself forming a soldier course to accommodate the wallhead turf turning up the roof and the thatching turf turning down. It is also significant in the application and weighting of the thatch as it allows the weights on the ends of the ropes to hang rather than nestling into the surface of the thatch. This keeps tension on the rope and prevents the rope sitting in a damp hollow where it might rot.

8.07 Flagstone

In Orkney, where there are considerable quantities of sandstone flag with poor weathering qualities, thatch was commonly laid over a lapped and seamed flagstone sub-stratum. The flagstone was placed on the roof with the naturally dished surface upwards, to encourage water penetrating the thatch to run away from the seamed joints. This was assisted by the inverted taper of the seamer stones.

In this case the thatch surrendered its waterproofing function to the flag whilst retaining its thermal and acoustic properties. These properties in turn protect the flag from frost damage.

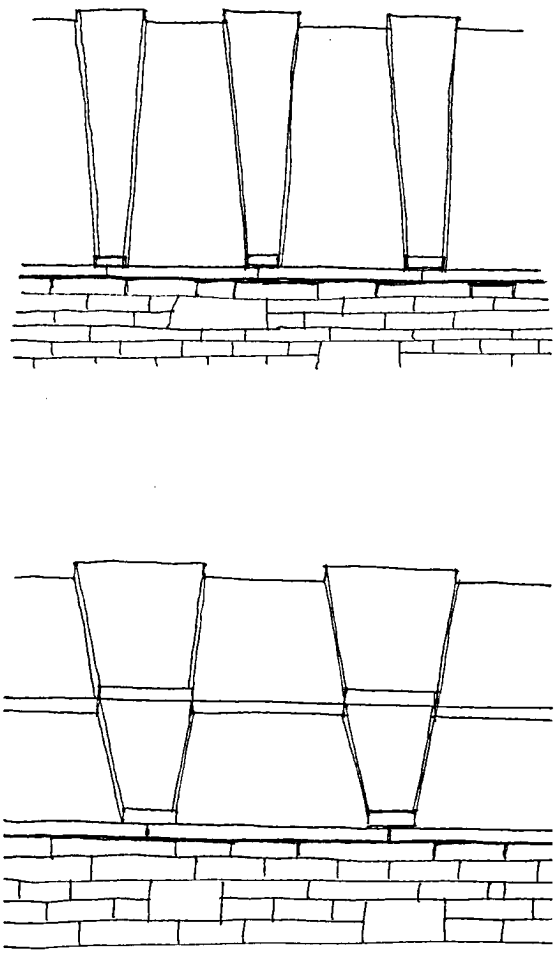
8.08 Pantiles

Pantile was introduced into Scotland as a low cost roof covering in the early eighteenth century. It was locally produced in small brick and tile works and in some areas the resulting fired tile was semi-porous. The vernacular solution was to point the joints with lime then tar the entire roof surface or to use the pantile as a sub-stratum under thatch. The thatch could be either a laid-on type or turf. One of the largest concentrations of this technique is to be found along the south coast of the Moray Firth where the last brick and tile works to manufacture pantiles was situated at Blackpotts, Whitehills, Banffshire.

8.09 Battens

Thatching battens are normally laid across the pitch of the roof. This is most common on coupled roofs but may also be found on rafters supported by purlins. This is the common form of sub-stratum in the Central Lowlands, in the cottage-orné, in Arts and Crafts movement buildings and under twentieth century thatches. Sometimes these are used in conjunction with a second sub-stratum of turf, particularly when straw is used. Reeds span comfortably over thatching battens at approximately two feet (600mm) centres.

The thatch is usually spliced or stitched to the battens unless there is a secondary stratum such as turf.



Examples of seamed flagstone sub-strata from Orkney.

9
THATCH TYPES

9.01 Natural Mat

Natural mat thatches are made up from well-matted fibrous material such as well-established green turf, fibrous peat, and other well-matted material such as flaas

Flaas is a form of water propagated vegetable matt sometimes found at the edge of muddy pools but more commonly covering the softer areas of a peat bog. When suitably thick and homogeneous it is torn from the surface in sheets and is used as one of the substrata to act as a form of reservoir to hold water, penetrating a living turf thatch, then slowly release it back to the living turf as it is required. The reservoir effect is made possible by the amount of sphagnum moss incorporated in the mat and its ability to absorb and hold water when available yet survive through drier periods.

The thickness of green turf is determined by the depth of the root system. On some sandy soils the mat thickness will not exceed one inch (25mm). Deep soils on the other hand take longer to produce a mat, as there is more soil for the roots to spread into, but when properly established will produce a fibrous mat about 4 inches (100mm) thick.

Peat can be cut to any required depth but the fibrous material is usually near the top of the bog and seldom more than a foot (300mm) deep.

Flaas may be quite deep when pulled but tends to compress when applied as a sub-stratum.

9.02 Random

Randomly applied thatching materials perform in the same way as those laid in parallel lines. Water falling on the roof surface penetrates until it is stopped by a strand of thatch. This may be well below the outer surface of the thatch but from there the water will travel along the straw in a downward direction, passing from the end of one straw to the next till it reaches the wallhead or the eaves.

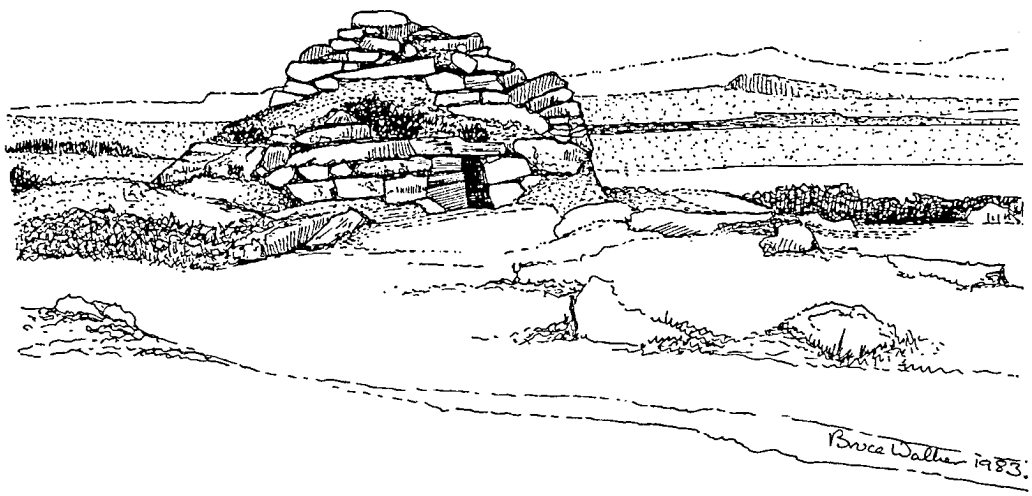
Random thatches are used in Lewis on blackhouse roofs. They are also used in the formation of the thatched covering for potato and other root crop clamps. Both of these coverings are subjected not only to rain from above but to warm damp air rising from the interior and the random thatch seems to perform particularly well in this situation. It is also easy and quick to apply and in the case of the root crop clamps can be restrained by heaping soil on the thatch provided a series of ventilation outlets are installed at the ridge.

Random straw or seaweed ridges are common in many North European and Scandinavian countries, often restrained by pairs of logs held together and crossing at the ridge. Some block cut ridges are formed in the same way but using material such as sedge.

9.03 Directional

Directional thatches depend on the material running with the slope of the roof. Cereal straws and grasses are laid with the slope, some traditions insist on the cut-end being up the slope, others the cut end down. Some change from the base course to the rest of the roof and some show no preference as to the way it is applied and the cut-ends can be found at the up slope or down-slope end on adjoining straws.

Most woody types of thatch such as heather, juniper, gorse and broom are fixed with the woody end up-slope in the roof. Dock and bracken are pulled and placed on the roof with the root showing as the weather surface.



Ruins of Shieling hut, Uig, Lewis, with remains of turf thatch

10
MATERIALS

10.01 Turf

Modern descriptions tend to use the all-encompassing expression "turf" for all fibrous earthen material. Formerly there was a distinct terminology for each different texture and cut of "turf" but the individual terms used sometimes referred to different materials in different regions of the country. The differences are most apparent between Scotland and Ireland and illustrate on a grand scale the difficulties encountered by researchers in the subject.

The Scots build with "turf" the Irish with "sods". The Scots burn "peat", the Irish "turf" but the Scots use "sods" to bank up the fire at night. In Scotland thin turfs are known as "divot", in Ireland "scraws", but in Shetland large thin turfs are known as "pones". The term "scraws" in Scotland can be used to describe a "wattle" sub-stratum for thatch. Thick "divots" are known as "fale" as are blocks of peaty material cut in parallelogram shaped section. The list is far from exhaustive and is further confused by local variations and by the use of Scots and Irish Gaelic terminology in the west and Norse terminology in the Orkneys and Shetland. In Ireland, the Scots terminology is used in Scots speaking areas such as Co Antrim, Co Down and East Donegal. The terminology most prevalent in referring to thatching techniques is "divot", "pone", and "scraw".

a. DIVOT. "A thin flat turf, generally of an oblong form, used for covering cottages and also for fuel."

The term is common in most regions of Scotland but with a wide range of spellings: DEVIT, DEVOT, DIFFAT, DIFFET, DIVAD, DIVAT, DIVET, DIVIOT, DIVIT, DIVVET, DIVVIT, DOVAT, and DYVOT.

The material is cut with a flaughter spade (breast plough) or with a normal garden spade. A flaughter spade with a dished blade produces a divot that is easy to lay as the tapered edges make lapping the material easier to achieve. If used in more than one layer, the thicker centre section can be placed opposite the butt joint between two tapered edges.

b. PONE "A thin turf" used for roofing.

The term appears to be exclusive to Shetland.

c. SCRAW "A thin turf...pared with a flaughter-spade to cover houses".

The term scraw is most common in south-west Scotland and in Ireland. Alternative spellings include SCRA and SCRAA.

In some areas the scraw was cut in a long length and carried to the roof in a roll to be applied in a continuous strip running over a roof from eaves to eaves.

The term "SCOWB and SCRAW" is more problematical. Warrack refers to it as "A wattle used in thatching with straw or thin pieces of turf." The term was also used as an adverb meaning "snug, trim and shipshape" in south-west Scotland.

The generally accepted definition for SCOB, SCOBB, SCOBE, SCOUB and SCOWB is "A twig or cane of willow or hazel, especially one bent over in the form of a staple and used to fasten down thatch".

10.02 Flaas

FLAA, FLAIS or FLAAS is used by some writers to refer to a thin turf, being used as an alternative to pone or to divot. These interpretations appear to be incorrect as in the Shetland dialect the term is applied to a form of water propagated vegetable mat comprising sphagnum moss interlaced with the root systems of plants that have propagated on its surface until it forms a thick homogeneous mat. The material forms on STANGs or STRANGRILs - a small semi stagnant sheet of water that is overgrown and half solid with vegetation. It is torn from the surface in sheets and used as an under thatch for turf or straw thatching.

10.03 Straw

A wide range of straws are used for thatching in Scotland including barely, bere, oats, rye and wheat. Oat or rye straw is the preferred material in most regions but wheat was used where available.

The straw is prepared for thatch in different ways in different regions. Thatchers generally prefer the straw to be harvested whilst slightly green as the straw is tougher and longer lasting. Specific varieties of each type of cereal are recommended in different regions and the farmer considered the straw quality as well as the yield in choosing the variety to sow. In some regions the straw is pulled, in others cut with the heuk, scythe or reaping machine. Bruised straw that has passed through a threshing machine or combine harvester is of little use to a thatcher laying directional thatch but can be used for random thatch provided it is tough. It is essential that the straw is well dried prior to use as thatching. It should be dried in stooks in the field, then stacked in the farmyard with a good cover to the stack. Traditionally this stack was thatched but a Dutch barn or other roof is equally suitable. The threshing should take place shortly before the material is used as thatch.

Present conditions make the above conditions difficult to achieve and the use of straw in any form is

under threat from the increased use of nitrate fertiliser which increases the yield but hastens decomposition of the straw. If straw thatching is to continue, small farmers, well away from areas where high nitrate fertilisers are used, must be encouraged to grow thatching straw using traditional methods.

10.04 Grass

Natural grasses such as marram (Ammophila arenaria) and couch grass (Agropyron repens) are also used. Regular harvesting, for thatch, stimulated growth and ensured a plentiful supply. A reduction in the number of thatched houses has led to neglect of the traditional thatch producing areas and changes in husbandry such as the over-wintering of cattle on the sand-dunes has all but destroyed the traditional thatch- producing areas in many townships.

10.05 Flax

Flax is suffering in the same way as cereal straws. It was traditionally grown for both the stems and the seed. The stem was tough and fibrous and used to produce linen. The seed head was crushed to produce linseed oil and the husk used to produce cattle cake. Now only the seedhead is considered important and is grown with rich nitrate fertilisers making the vegetable part of the stem weak and brittle. It still contains the linen fibre but its quality as a thatch is impaired.

As with the cereal straws, flax will have to be grown in a low-nitrate soil to produce a suitable thatching material.

10.06 Reed

The reed most commonly used for thatching is the common water-reed (Phragmites communis). It often exceeds six feet (1.8m) in height and may reach ten feet (3m).

It was not a traditional thatching material in Scotland but was planted along the north bank of the River Tay in the eighteenth century to reduce or prevent coastal erosion. The experiment was successful and some ground was reclaimed from the river as the reed beds spread into the shallow water. Initially the reeds were harvested and used as litter in the cattle courts of local farms. By the mid nineteenth century, reeds were being used to thatch cornstacks but it was almost the end of the century before reed thatch took over from straw for the roofing of houses.

The change was probably occasioned by a combination of factors. Straw of sufficient quality had to be hand threshed, making it more expensive while reeds were probably specified for Cottage Orné or Arts and Crafts style buildings in the area. Many of the decorative thatching styles were English in origin.

The Tay reed beds fell into disuse in the 1940s and were revived again in the 1970s when Suffolk thatchers could no longer obtain suitable straw and changed to reeds. They are still being harvested commercially.

Smaller quantities of this material are available in other parts of Scotland but not on a commercial scale.

Reed also appears to be known as windle-strae grass in Scotland as was Cynosurus cristatus.

The great reed mace (Typha Latifolia) erroneously known as bulrush, and the reed mace (Typha augustifolia) were both used as thatching materials in the same way as reed.

10.07 Rush

Rushes are commonly used for laid on types of directional thatch. The common rush (Juncus conglomeratus) is most commonly used but Jura thatchers preferred the soft rush (Juncus offusus) or hard rush (Juncus inflexus) which although slightly shorter are less slippery to use and bed better on the roof.

10.08 Iris

The flag iris (Iris pseudacorus), also known as yellow flag or yellow iris, was used in the same way as rushes as a laid-on directional thatch.

10.09 Sedge

The sedge most commonly used for thatching is the great pendulous sedge (Carex pendula) also known as the tall sedge.

Sedge should be delivered to the roof in a green state. Ideally it should be left to soak for twenty four hours after which it can then be drawn and gleaned for use. It is normally used to form the ridge of a reed thatched roof.

10.10 Bracken

The bracken fern (Pteridium aquilinum) is found in the Highlands of Scotland from sea level to an altitude of 2,000 feet (610 metres).

The bracken has a stout fleshy stem that spreads underground. The stipes and rachis are long and straight and harden to carry the weight of the spread-out leafage. The plant, which can grow to a height of twelve feet (3.66m) is pulled and the leafage stripped. It is laid on the roof with the roots exposed and these can be lined-up by using a plank or lathe that moves up the roof course by course.

Roofs are known where the foliage has been left on the stalk but this tends to become dry and brittle and

rubs into a fine powder between the fingers. These roofs are under sheet metal and may simply be an insulation thatch rather than a fully functional one.

10.11 Dock

Dock (Rumex viridis and Rumex sanguineus) the all green and blood-veined varieties grow to a height of four feet (1.2m). The plant is known as "docken" in many parts of Scotland. it is pulled, the foliage stripped and the stems used in the same way as bracken.

10.12 Heather

Heather or Ling (Calluna vulgaris) has tough wiry stems which can attain considerable size. The thatcher seeks out long stemmed heather which is cut and baled. The plant is used complete with the flower-head and bushy upper branches. it is difficult to work as it is inclined to spring up until it is securely fixed. Even the best heather thatched roofs are inclined to look open, from underneath, when first thatched.

Heather thatching was at its most popular phase between 1880 and the First World War. Heather burning for grouse moors makes suitably long heather difficult to locate. Arrangements should be made to protect specific areas for growing heather for thatched roofs.

10.13 Juniper

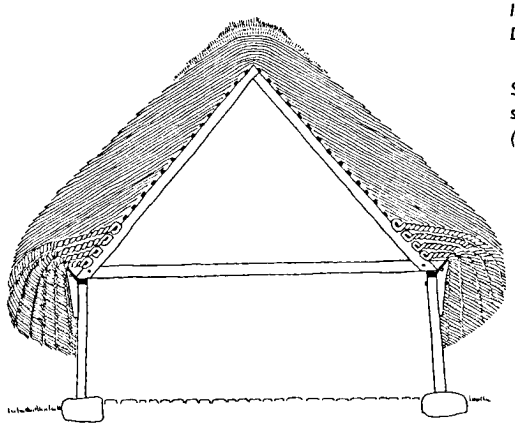
Common juniper (Juniperus communis) varies between a low growing shrub and a small conical tree up to twenty feet (6.1m) high. it is used in much the same way as heather and appears to be particularly suited to vertical thatches on the sides of wattle structures.

10.14 Broom

Broom (Sarothamnus scoparius) is a shrub three to five feet (0.9-1.5m) high and is found on hillsides and moors all over Scotland. The Scottish name is "whin". It is cut in long straight branches with a woody stem that is sharpened to push into the under turf. It makes a long lasting thatch and was one of the most popular thatching materials in Scotland in the nineteenth century.

10.15 Seaweed

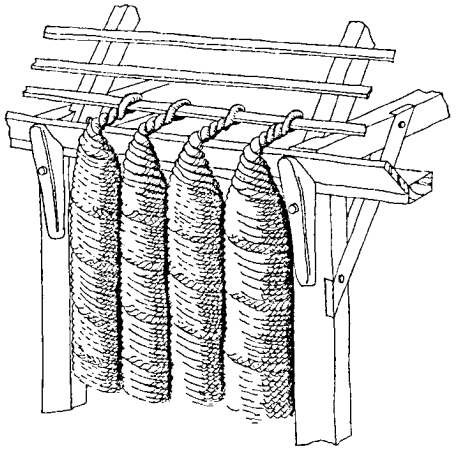
Seaweed thatch has not survived in Scotland. Indeed, there is little direct evidence for its use despite the fact that there are great quantities of seaweed available. Seaweed ropes have been found as temporary lashings to a cruck at Melvaig, Gairloch, Rosshire and a seaweed thatch has been reported in Orkney.



Island of Laeso, Denmark.

Section through seaweed thatch (after Stoklund)

Seaweed thatches have been located on both sides of the Kattegat. One from Læso, a Danish island in the Kattegat, was recently moved to the open-air museum in Copenhagen. The roof is lathed. Bundles of seaweed are twisted round the bottom laths like a straw rope but much thicker. The ropes are tightly packed on the base lath then on the two or three laths above that till a flat shelf is formed in coiled seaweed. Layers of loose seaweed are then piled on top, layer upon layer until the roof is completely covered and the apex covered with turf. Up to a hundred people could take part in a thatching. The thatch is capable of lasting for hundreds of years as is testified by some very old survivals in that region.



Island of Laeso, Denmark.

Sketch showing formation of seaweed ropes (after Stoklund)

The reason for including this description is to encourage archaeologists to consider this type of thatch as a possibility and to check for possible survivals. This is particularly relevant when dealing with coastal farming communities and hunter-gatherer groups.

10.16 Eel-grass

Eel-grass or grass-wrack was also used for thatching. Often mistaken for seaweed, it is one of the few true flowering plants to grow in the sea round the British Isles. Its habitat is well below the low-water mark

and is usually found on the beach after a spell of stormy weather and is distinguished from seaweed by its long, light-green leak-like leaves.

Magnus Spence records its use as a thatching material in Orkney at the turn of the century, where it was known as "buss". Buss normally refers to seaweed and confirms the confusion that exists regarding this material.

A living informant claims that large quantities of eel-grass used to come ashore at St Peter's Pool, Orkney particularly after a strong westerly gale. It was collected from the shore and piled on a closely laced simmens sub-stratum. A good twelve inches (300mm) of eel-grass was applied before the material was secured under wire net, anchored with flagstones round the eaves. Presumably heather simmens would have been used prior to the availability of wire net.

10.17 Other Materials

Other forms of haulm were used occasionally particularly beanstalks, potato shaws and other low grade material. These were only used in emergencies and should not be considered for permanent roofs.

11
FIXINGS

VISIBLE

11.01 Rope

Rope provides an efficient method of restraining thatch. It is normally used in conjunction with weights that exert an even downward pressure and accommodate any stretching of the rope. Alternatively the ends can be attached to pegs, pins or corbelled stones projecting from the outer walls of the building. This alternative is less common in Scotland, although it is known in the south west, the Isle of Man and in Ireland.

The traditional material was sugan, made by hand usually using heather, straw or hay but in reality capable of being made with any fibrous material that can be teased out and twisted. Coir became a natural successor in the latter years of the nineteenth century, or at least after the First World War when it was cheap and easy to procure. Flax, hemp, jute, manila and artificial fibre ropes have all been used but usually in the form of second-hand rope, no longer able to fulfil its original function but still strong enough to hold the weights restraining the thatch.

Rope was applied to the roof in three main ways: i) parallel ropes running from eaves to eaves across the roof: ii) angled ropes running from eaves to eaves: and iii) by forming a web or net.

11.01. i) Parallel ropes running from eaves to eaves are used both as a structural sub stratum and as a thatch restraint.

In Caithness and Orkney the simmons are so close together they touch along their entire length, particularly when used as a sub-stratum. As a roof restraint they are usually slightly apart but not far enough to allow the wind to penetrate and affect the thatch.

In Shetland and the Western Isles, the spacing varies from about four to six inches (100-150mm). The spacing is occasionally wider when used as a sub-stratum the maxim recorded being about a foot apart (300mm).

The restraint at the base of a parallel roped roof also varies. Where long slim weights are used such as poles, long narrow pieces of flagstone or slate, or metal fittings such as straightened metal cart tyres, rubbing strakes from shipwrecks, or metal poles, the rope can be attached to these in a variety of ways: by a half loop, half turn, part lashing or even being attached with twine. Where smaller weights are used, the parallel ropes are often attached to a ground rope before being looped round the weights. A range of fixings is illustrated.

The methods of working round the curved end of a typical blackhouse roof is dealt with in item 11.01 ii.

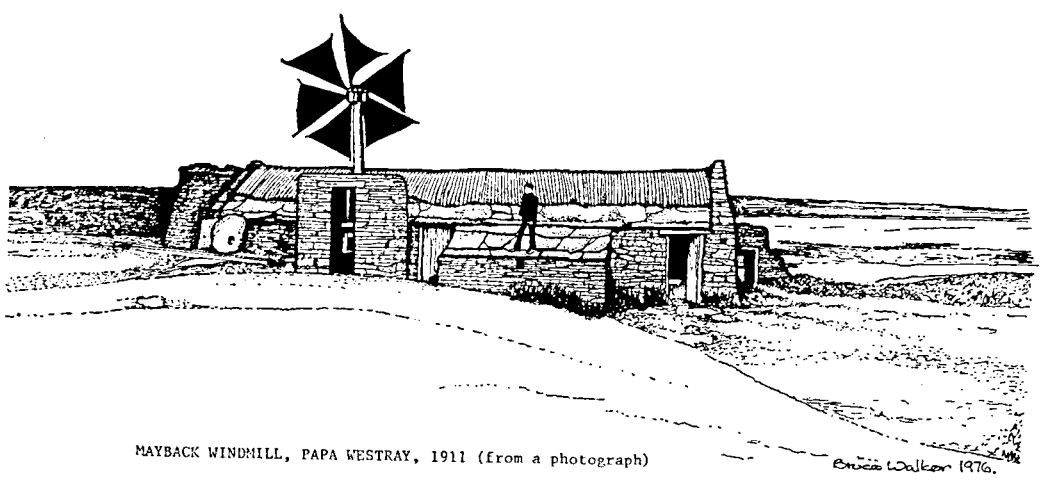
11.01 ii Angled ropes running from eaves to eaves across the roof only appear to be used as a thatch restraint. The main distribution appears to centre on the Western Isles where most of the weights take the form of short stones or even second-hand bricks. Usually the ropes are simply passed round the weight which is then flipped over to form a loop, the ground rope being formed afterwards.

When side to side roping as described in items 11.01 i and 11.01 ii is carried round the curved end of a typical blackhouse roof it is looped over a thatching stick projecting through the thatch at an angle. This stick is usually a projection of the central cabre forming the curved end and rests against the apex of the first roof truss. The angle of the stick helps provide a better grip for the rope and also allows water penetrating along its length to be diverted, by the random thatch and hence to the wallheads. The method of working round the thatch stick varies from community to community from a simple loop round

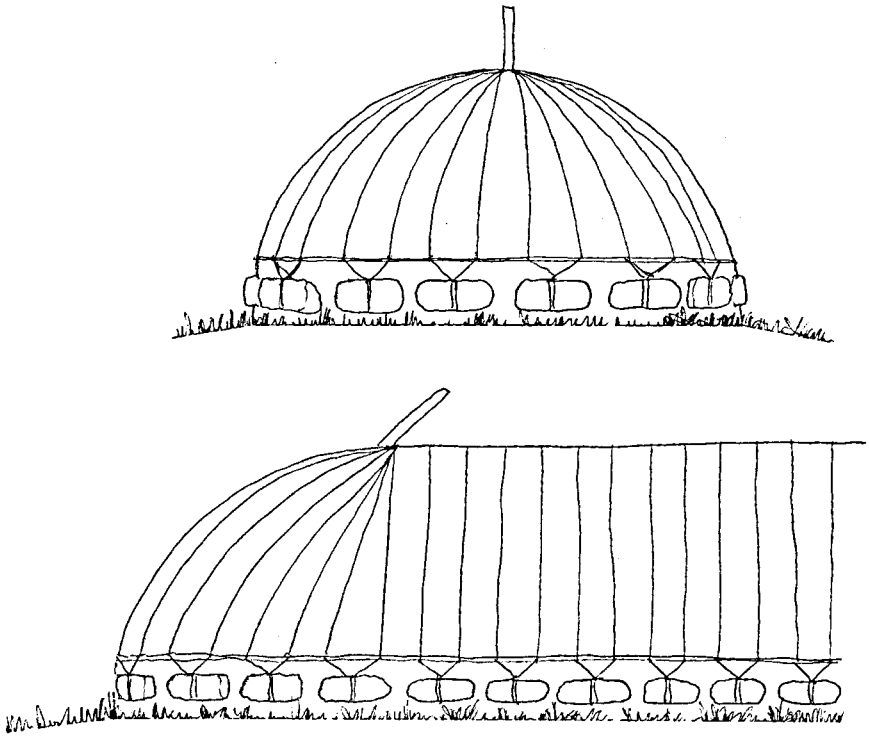
Mayback, Papa Westray, Orkney, 1911.

Closely spaced simmons restraint to thatch on threshing barn.

(Drawing from photograph)

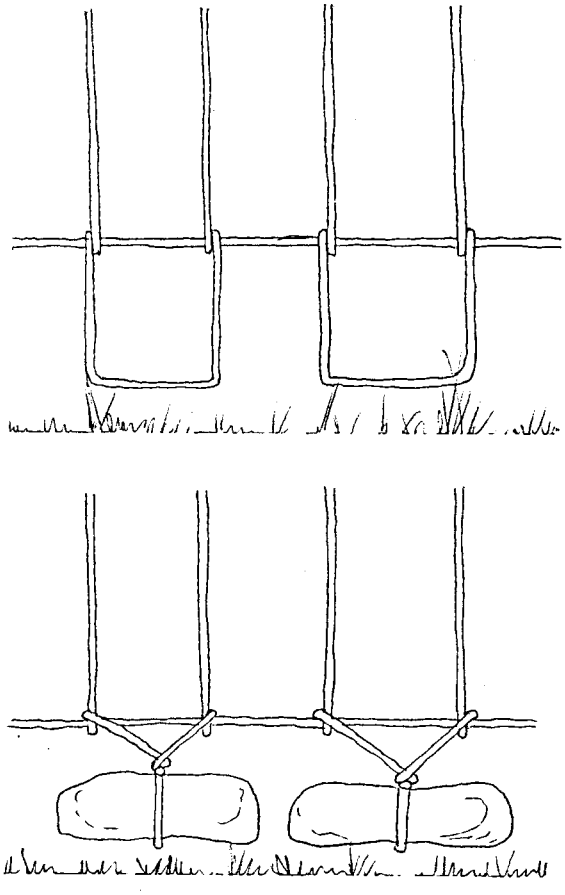


MAYBACK WINDMILL, PAPA WESTRAY, 1911 (from a photograph)



Parallel rope system, Western Isles.

Diagram showing basic spacing and configuration of ropes.

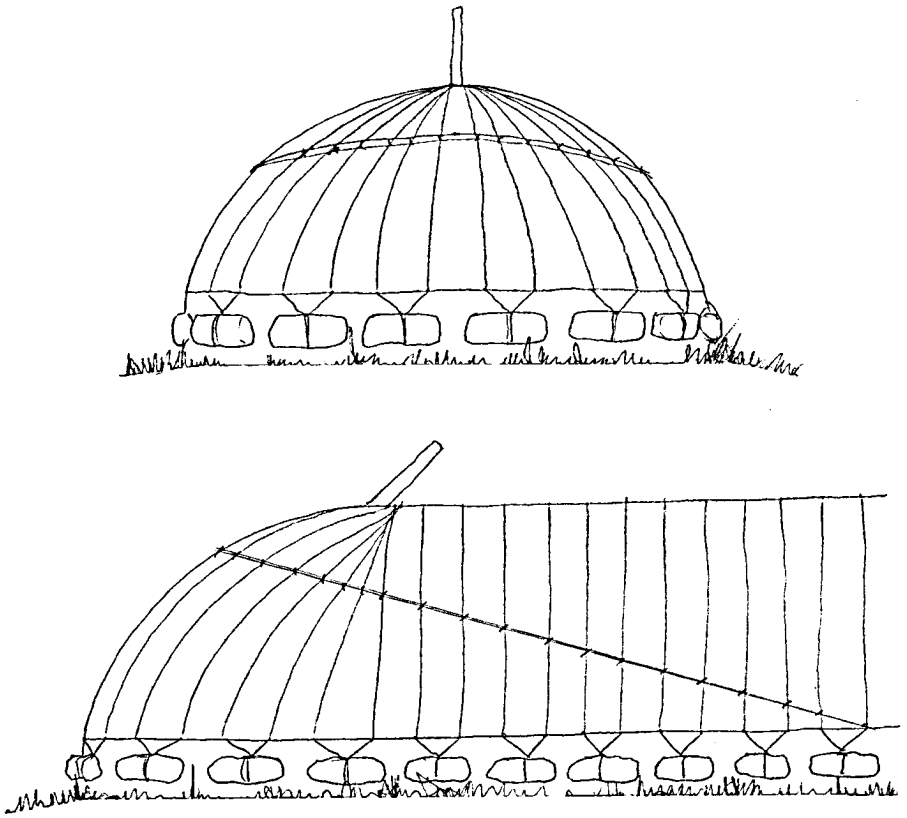


Parallel rope system, Western Isles.

Diagram showing method of attaching stone weights to parallel rope system.

Parallel rope system, Western Isles.

Diagram showing basic additional restraint rope round hipped end. The number of additional restraint ropes and their spacing varies from township to township.



the stick to the forming of a type of plait centred on the thatching stick with the ends spread round the curve. This style is particularly prominent in old photographs of Castlebay, Barra.

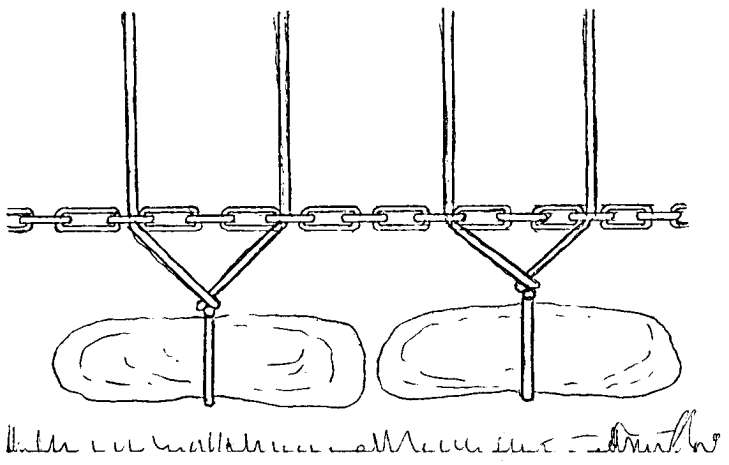
11.01 iii) A rope net or web of ropes is the third method of restraint. This can be incorporated with the two types described above to give additional restraint at the ends of the roof or can be used to provide restraint over the entire roof.

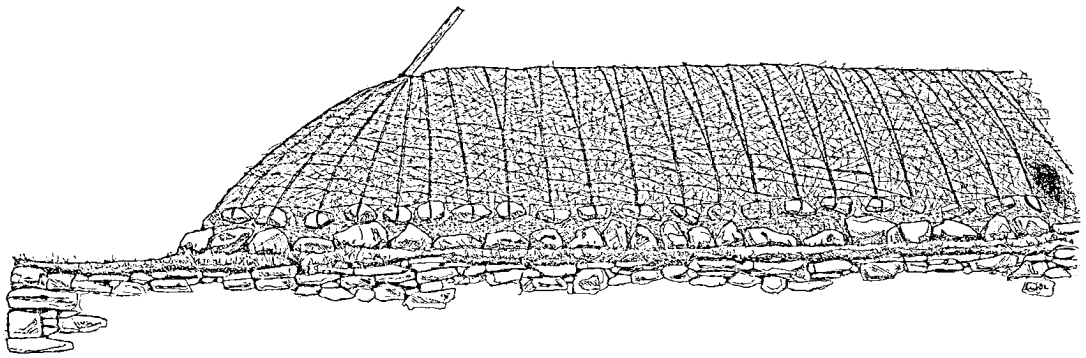
The patterns that can be achieved vary tremendously from what appears to be a square meshed net applied in panels as shown in the illustration of a house in Braemar, Aberdeenshire in the late nineteenth century to the system of horizontals and diagonals creating a symmetrical pattern on a blackhouse on Hirta, St Kilda about the same date or slightly later.

The net or web can be formed by a series of loops, half-hitches, knots or splices again varying from region to region, area to area and even township to township. A number of variations are illustrated.

Parallel rope system, Western Isles.

Diagram showing use of chain as ground rope.

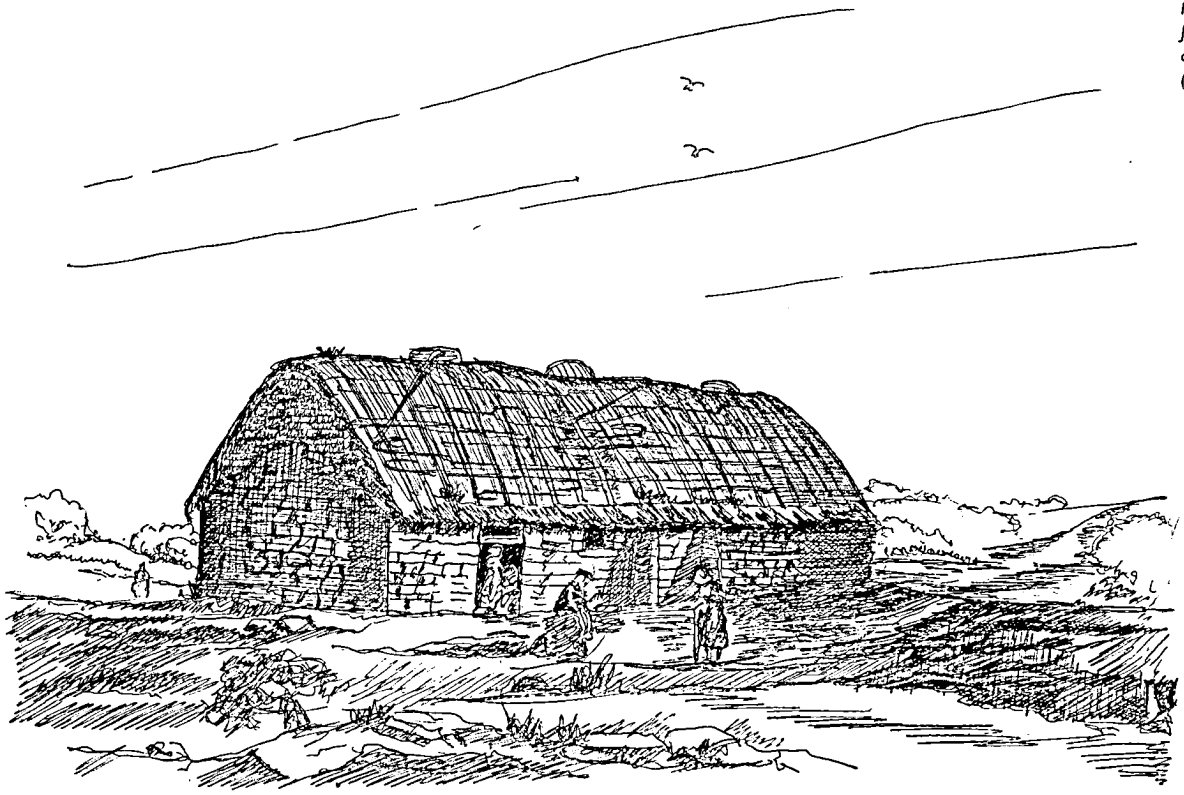




Angled rope system, Western Isles.

Sketch of part of house roof showing arrangement of thatch ropes. See 13.01 for further details.

Care should be taken when preparing descriptions to ensure that a rope net or web has been created as type 11.01 i roofs occasionally have horizontal roping as a temporary fixing. On Jura, Argyllshire the roofs are roped with parallel ropes running from eaves to eaves using fresh sugan each year. The previous year's sugan are fixed at the gable and run horizontally along the roof as a temporary or additional restraint prior to the type 11.01 i ropes being applied and weighted. These often break and spring apart leaving an irregular pattern of horizontal ropes with snake like ends. This may explain horizontal ropes of this type being referred to as AITHERINS defined by Warrack as "ropes woven crosswise on thatch" whilst the Scottish National Dictionary defines AITHER as "an adder".



House on Isle of Jura showing broken aitherins (after Banks)

11.02 Net

Thatch can be netted with second-hand fishing nets or with various forms of wire netting.

Fishing nets are normally found as a stratum under one of the roping systems described in item 11.01. The finer mesh of the fishing net allows the roping to be more widely spaced without danger of loosing the thatch.

Wire netting is applied in panels the width of the roll, then crimped together to form a complete cover to the thatch. When this is used as the principal restraint, weights are usually hung round the lower edge above, on or below the eaves according to local tradition and the weights: fed through the wire, tied on using rope fed through the wire and looped round the individual weights, tied on with twine, or held with fence wire twisted round the weight with the free end forming a hook that is hooked into the netting.

The net can also be restrained by forming a continuous rail under the eaves and fixing the netting to the rail using a series of S-shaped fence wire hooks.

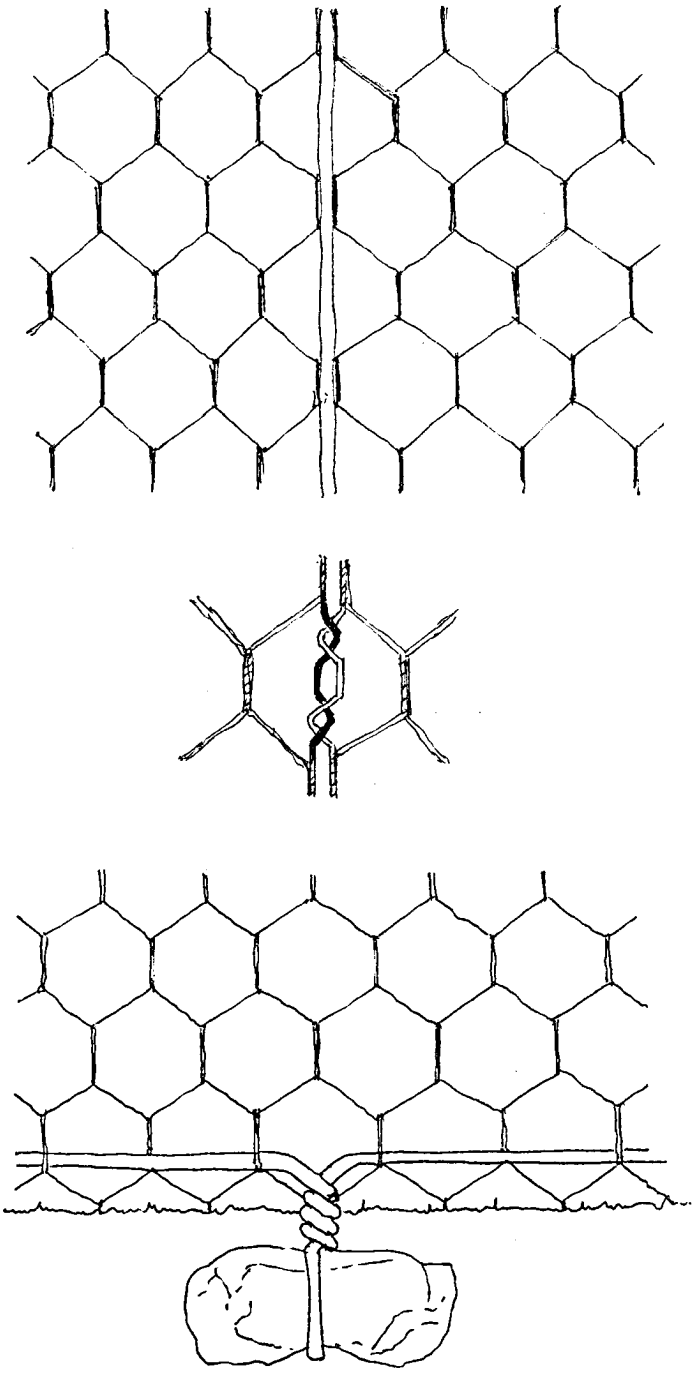


Diagram showing method of joining rolls of wire netting on roof to ensure that these will separate should there be a fire and the thatch have to be removed.

11.03 Raip and Scob

Raip and scob consists of lines of rope or twine fixed at regular intervals with a SCOB -"a twig of willow or hazel bent over in the form of a staple and used to fasten down thatch".

The technique is most common in south-west Scotland, Ireland and Pembrokeshire. The Scottish National Dictionary gives a variety of spellings including SCOBB, SCOBE, SCOUB and SCOWB. In Ireland the fixing is known as a SCOLLOP or SCOBE. The term SCOBE may be Scots in origin as the word may be a derivation from the Gaelic word SCOLB - " a split or thin stick, a wattle". SCOLLOP is also used in Pembrokeshire, possibly as an imported term from Ireland. SGILB is also common in Wales. In England the technique is used in stack yards and the scobs are known by a number of names including BROOCHES, GAD, LEDGERS, ROOFERS, ROOVERS, SPARS, SPEAKS, SPECKES, SPELTS, SPICS and SPITS.

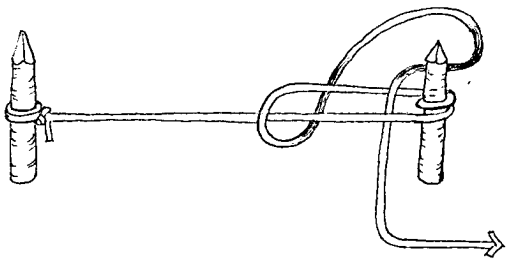
Scobs come in a wide range of sizes from 18 inches to 48 inches (450-1,200mm) in length. The preferred lengths for house thatch are from 24 to 30 inches (600-750mm) whereas those for stack thatching are normally 36 inches. Preferably scobs should be recently split when used. If older scobs are to be used these should be soaked for twenty-four hours prior to use.

When applying raip and scob to a roof the bottom line of scobs should be about twelve inches (300mm) above the eaves, the top line a few inches below the ridge. Intervening lines are normally spaced to allow the length of each yealm to be held by two rows of rope or twine. For straw this usually works out at eighteen to twenty-four inch (455-610mm) centres but closer spacing is necessary for shorter materials such as rush.

There are two basic ways of applying raip and scob. The first utilises a straight scob. The second uses a scob bent like a hairpin. In both cases the scob is driven into the thatch on the horizontal plane or with the inner end slightly upwards. Scobs should not be inserted directly above the previous row but should be offset to avoid the formation of channels in the surface of the thatch.

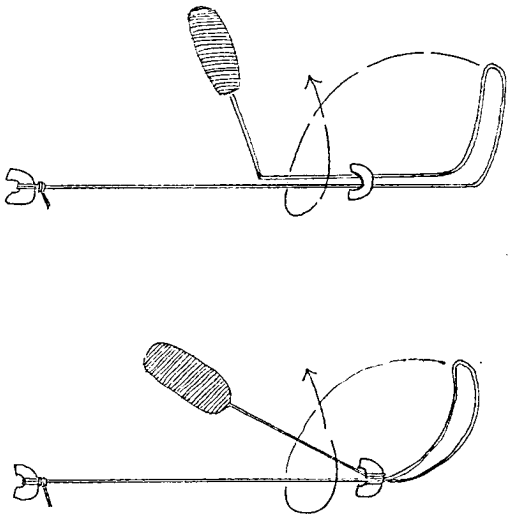
The straight scob is inserted to comply with the above requirements and is left projecting about four inches from the weather face. This technique can only be achieved using a thin twine. The twine is securely tied to the first scob or to a pin in the gable. It is then tensioned to the next by wrapping the twine twice round the projection. A loop is then formed by passing the twine first over then under the connecting twine from the last fixing. The loop is extended to go over the top of the scob before being pulled tight. This makes a knot that will remain insitu when the scob is pushed an inch or more further into the roof. This can be done using a leather palm.

Diagram showing method of tying twine to straight scobs.



The hairpin type scob is driven into the roof as described above leaving a loop on the surface of the thatch. If the raip is thick, the scob simply straddles it before being inserted into the roof. If twine is being used the twine is doubled into a long loop and passed through the eye formed by the scob. It is then turned back over the scob and passed under both pieces of twine and tied tightly to the scob. A second pass of the loop under the connecting twine is also tied off on the scob. This is an easy technique to use even with little or no experience but the loop ends are very obvious to the observer on the ground.

Diagram showing method of tying rope or twine to hairpin scobs.



The most difficult aspect of the raip and scob technique is carrying the line round hip ends without regular visual checks from ground level. This ability develops with experience.

Raip and scob is vulnerable to high winds, particularly on steeply pitched roofs where the corners of the roof can be torn out by the force of the wind. In windy situations the roof pitch is often reduced to diminish the wind resistance set up by the building or stack but this obviously means an increase in thatch depth to maintain its waterproof qualities. Where gales present a major problem roped roofs weighted with stones are the norm. Rounded roof forms are less susceptible to wind damage than are angular forms.

11.04 Scob

Scob thatch comprises the substitution of a series of surface briars, osiers or hazel twigs for the raip described above, pegged to the turf or wattle substratum with scobs. See item 11.03.

11.05 Crook and Caber

Horizontal poles laid along the surface of the roof to hold down the thatch are held in place with a crook of timber usually made by cutting branches at the fork. One side is cut short, the other left long enough to push through the thatch and into the sub-strata where it is wedged tight.

CONCEALED FIXINGS

11.06 Turf

Turves laid slate fashion on a roof as a sub stratum are used to hold straw thatch in position. The bunches of straw are placed side by side between the lapped joints in the turf. The weight of the turf, plus the overburden above that, holds the straw securely.

11.07 Clay

There are two forms of clay thatch: i) where the clay is used to secure the heads of bundles of straw laid side by side in courses and related to the use of lapped turf described in item 11.06: and ii) where the clay is used as a top dressing for a thatch already secured by one of the secret fixings described in items 11.06 to 11.11.

i. Clay used to secure the heads of bundles of straw laid side by side in courses is the older form of clay thatch. Although it is known as clay thatch, the clay remains invisible in the finished roof. The clay is a tempered earth, mixed with sharp sand, gravel and vegetable fibre mixed reasonably dry into a sticky mass then laid on the roof in courses along the heads of a course of bunches. When pressed into position it forms a secure anchor for the thatch.

The technique is recorded in Yorkshire in the seventeenth century and is reasonably widespread in southern Scotland.

ii) Clay used as a top dressing to a straw, broom or heather thatch is more common in the Buchan area. The thatch was fixed to the roof by way of the secret fixings described in items 11.06 to 11.11. Blue clay from the bottom of a peat bog or a tempered earth as described in the section above was part-poured, part dressed into the thatch to form a well consolidated skin. Additional protection from the weather was obtained by coating the completed clay thatch with a thin skin of cow sharn.

The technique appears to have spread through the central belt and into the south west. It was particularly suited to terraced properties as the clay external skin created a fireproof finish to the outside of the roof. **If clay fixed and clay dressed the roof covering must have been almost incombustible.**

11.08 Pegs

Bunches of straw were placed on the roof in courses with one or two split wood pegs through the holding band to secure the thatch. This is usually carried out over a turf undercoat. The bunches were set to lap and provide a smooth weather surface.

11.09 Twine

Binder twine or preferably tarred twine was used to stitch the bunches of thatch to the roof. One thatcher worked outside placing the bunches. A thatching needle was used to push the twine through the roof to an assistant inside the roof. The assistant removed the end of the twine from the needle which was then withdrawn by the thatcher on the roof. It was reinserted on the other side of the thatching batten, the assistant inside re-threaded the needle and it was pulled out and tied by the thatcher. This was repeated for every bundle.

Reed thatched roofs were finished by driving the thatch back into the loop made by the twine until the required line was achieved.

The sequence of applying the bundles varies in different regions and according to the material used.

11.10 Stays

Timber or metal stays can be used as a fixing rather than stitching with twine. The advantage is that the whole process can be completed without an assistant inside the roof. These are held in place with thatching crooks - metal spikes, sharpened at both ends, with one end turned over in the form of a hook.

11.11 Scob

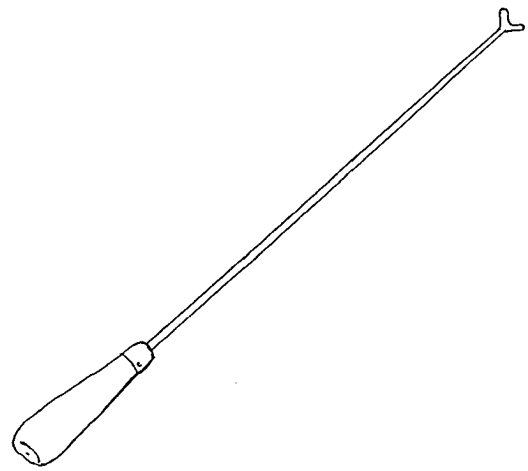
Scobs comprising halved or quartered split hazel wands sharpened at both ends and twisted in the middle to form fixing staples driven into the sub-strata. Can be used for secret fixing either through the bands of a bottle of thatch or to restrain sways. See item 11.04 for surface technique.

11.12 Stob

Stob thatching relies on a combination of weight and friction to keep the thatch in place. Small bottles or twists of straw are thrust into the existing thatch or into the sub strata using a stob. This is a specially

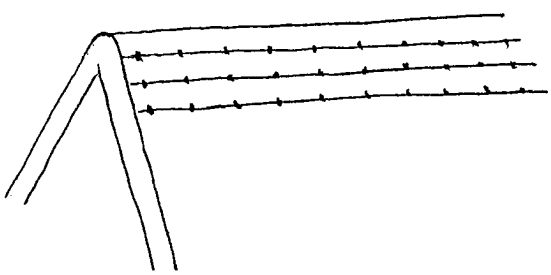
made thrusting tool with a small forked end, a long slender shaft and a comfortable handle. The shaft must be long enough to allow the new straw to be inserted to its full length without damage to the existing roof. Obviously the line taken in thrusting the new material must correspond to the angle of the existing thatching material. The technique is more useful for patching or top dressing existing roofs than as a method of thatching from scratch although it is possible to use it for this purpose particularly when thatching piled up material such as hay and straw stacks.

Continuing repairs or top dressing to this type of thatch generally results in an increase in roof pitch over a prolonged period until the thatch is very deep over the ridge.



Stob stick

Diagram showing flush ridge held by three rows of scobs.



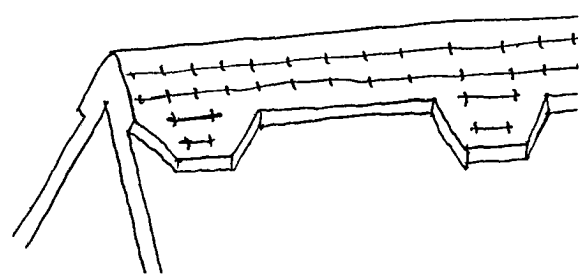


Diagram showing block-cut raised ridge held by scobs.

12
EXTERNAL FEATURES

RIDGE TYPES

12.01 Rounded apex

On these roofs there is no discernible ridge externally, the thatching material being carried over the top of the roof in a smooth uninterrupted line. This can be over a rounded roof structure or over an internal ridged structure, depending on the method adopted in laying the thatch.

12.02 Flush Ridge

The thatch is laid up to, and over, the ridge in an interrupted line. This can be done in the same material as the rest of the roof or, in a specialised ridging material.

12.03 Raised Ridges

Raised ridges come in a variety of forms, from the block-cut decorative ridges of the cottage orné to concrete and turf ridges sitting proud of the natural line of the roof.

Turf ridges should have a layer of clay between the underside of the turf and the thatch to act as a waterproof anchor coat.

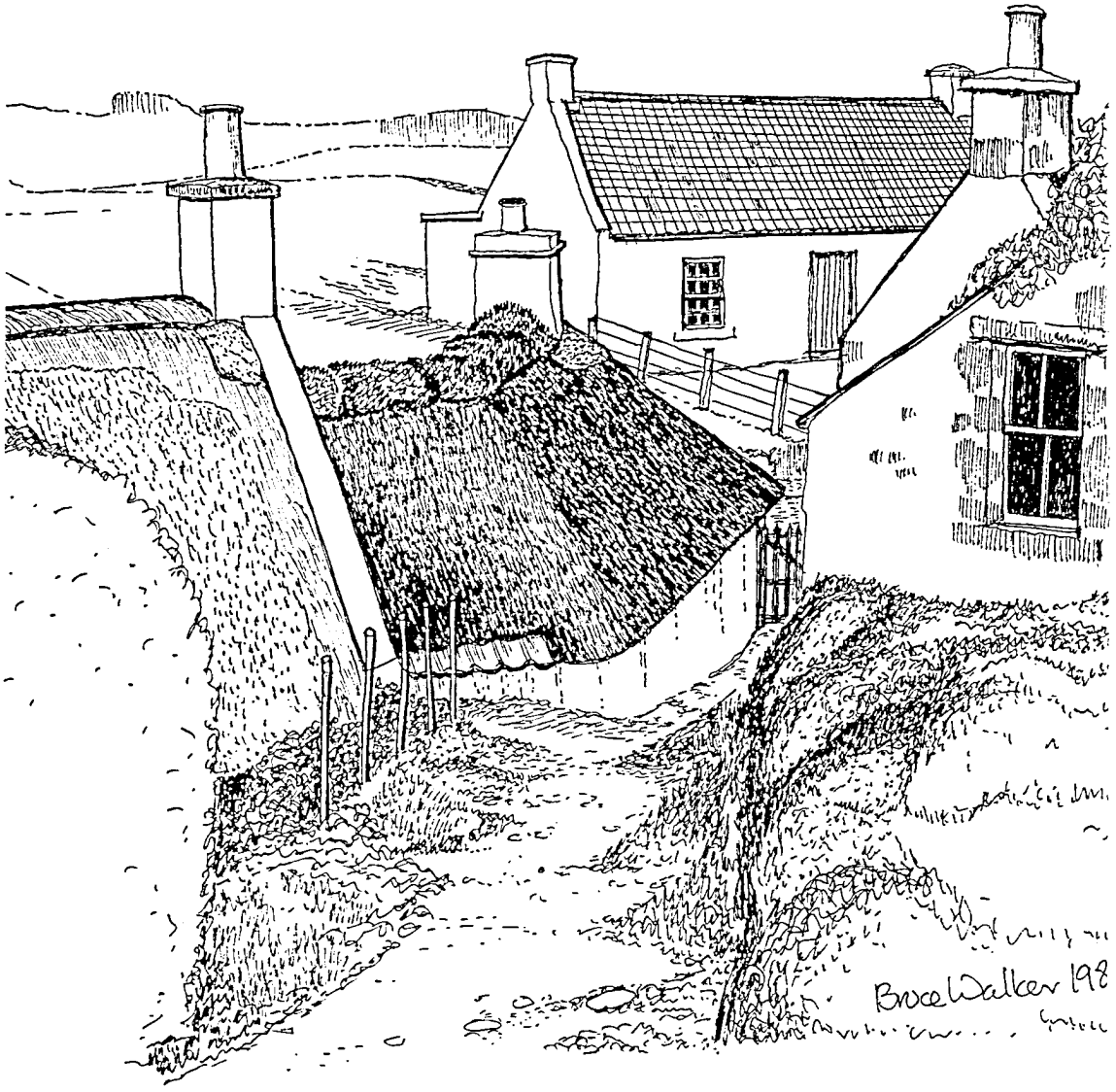
EAVES TYPES

12.11 Exposed Wallheads

In the Hebrides, particularly Lewis and Tiree, many thatches stop close to the inner face of the external

Collessie, Fife.

Sketch showing two reed thatched roofs. The roof to the left has a concrete ridge. The roof in the centre has turf.



wall leaving the wallhead exposed to the elements. These wallheads are always weathered towards the outer face of the wall or, where the wall is mutual to two roofs the wallhead is dished to the centre and drains to either end of the mutual section. Contrary to many published sources, the wallhead is always waterproofed in some way to prevent the rainwater penetrating the wall. The common traditional method was to waterproof the wallhead with blue clay and protect this with living turf. Concrete is sometimes used as an alternative particularly on the Island of Tiree, Argyllshire.

12.12 Flush Eaves

An alternative to the exposed wallhead in exposed areas is the thatched roof finished flush with the wallface at the eaves. Usually this is achieved by carrying the bottom ends of the thatch base course over the wallhead and dressing the rest of the thatch to that line.

12.13 Overhanging Eaves

Although overhanging eaves are more vulnerable to wind damage they do shed rainwater clear of the wall face. If the eaves are regular, the rainwater can be collected in gutters and transferred to water butts. This was a common way of augmenting the water supply for many houses prior to the installation of piped water.

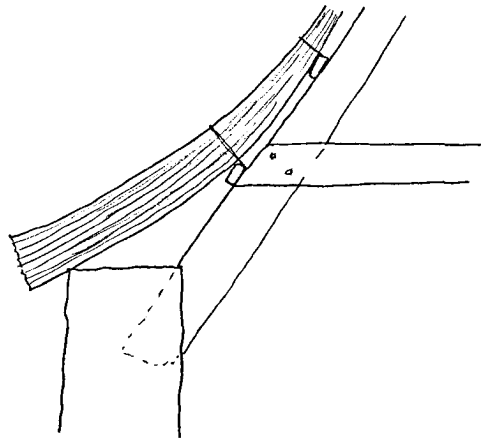


Diagram showing method of forming overhanging reed thatch eaves whilst bending the yealm to tension the reed. In this case the wallhead is being used to tile the yealm. On roofs with wallplates a tilting fillet serves the same purpose.

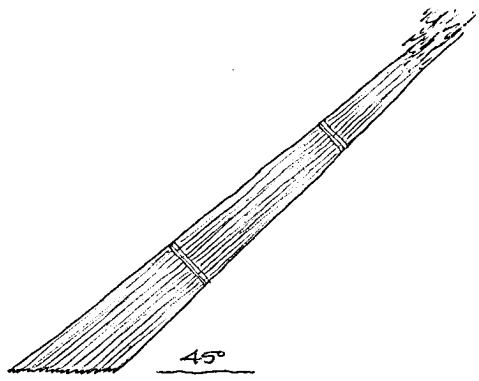


Diagram showing method of angling the base yealm prior to application to the roof.

Gutters were usually formed using two butt jointed boards forming a V shape. These were attached to a blacksmith made bracket that allowed the gutter to be adjusted to different projections of the eaves resulting from wear and subsequent repair of the thatch.

SKEW TYPES

12.21 Raised Masonry Skews

In the smaller burghs recent straw and reed thatches often abut raised masonry skews. These may be crow stepped or tabled depending on the region under consideration. Yet, where they occur, nineteenth- or early twentieth-century photographs show thatch with turf covering to the skews. This is particularly the case in the crow stepped regions. One possible explanation is that the crowsteps provided a firm base on which to establish the turf covering to the skews.

12.22 Timber Bargeboards

An alternative to the raised masonry skew was the timber bargeboard. By using a bargeboard to edge the thatch at the skew, water landing on the upper surface could pass down the inner face to where it corresponds to the outer face of the gable and thus escape without danger of penetrating or soaking the masonry.

12.23 Flush Skews

Basically this is the same detail as the flush eaves detail at item 12.12 with only a small amount of the thatching material carried over the top edge of the skew to direct water over the joint between roofing material and wall.

12.24 Angled Thatch Forming Overhang at Skews

This is not a common detail in Scotland, particularly on traditional thatches, because of its vulnerability to wind damage. The detail is to be found occasionally on Arts and Crafts style buildings and some recent re-thatching by English thatchers. The detail is most usually found on Cottage Orné thatches.

The usual way of achieving this detail is to turn medium length bundles of reeds at an angle of 45 degrees to eaves and skew, gradually straightening the eaves course bundles until they are running with the roof pitch. The skew bundles remain at the original angle but as the thatching progresses up the roof, the butts are dressed in the normal way to conceal the direction of the straw. Further detailed information can be obtained in the Rural Development Commission publication 69: The Thatchers Craft, which is regularly republished.

12.25 Rolled Overhanging Skews

Thatched buildings in south west Scotland are often finished with overhanging skews constructed in the form of a thatch roll or bottle tied back to the roof structure but forming protection for the skew from water penetration and wind damage. Essentially the rolled skew forms the same type of wind protection as the timber bargeboard.

12.26 Turf Skews

Turf is often used as a finish to the skews of both masonry and turf walled structures. The turf used for this purpose takes the form of large thin divots set to cover the joint between thatch and wall and overlapping each other to ensure sufficient depth of material to waterproof the joint. The details vary from region to region but crowsteps may reflect the stepping of masonry where thicker turf was used and a secure seating was required.

WINDOWS

12.31 Wallhead Dormers

Wallhead dormers take two main forms: a) those that can be accommodated within the pitch of the weather surface: and b) those that require a considerable change of roof pitch.

a) Wallhead dormers that can be accommodated within the pitch of the weathered surface often have a waterproof surface such as a flagstone, sheet lead, slates or tiles to carry any penetrating water out over the head of the dormer. This is less essential with straw thatches as the natural curve of the weather surface, from the thatch projection to the weather pitch, provides additional depth at this point. Either way the fixing technique remains standard but the thatch is finished to a different line.

b) When the wallhead is carried up to contain the window causing a considerable change in the roof pitch over the window, this often creates problems at the sides of the dormer. The sides may be thatched or may be clad in some other material. Whatever the problem it is essential to repeat the solution already adopted keeping visual change to a minimum. This is a detail normally associated with the Cottage Orné or the Arts and Crafts Movement. New dormers of this type should be discouraged unless in one of the two building styles noted above or in a new build situation.

When a series of these dormers is constructed on the north side of a roof the resultant valleys are extremely vulnerable to rot as the sun may be blocked by the dormer at either end.

12.32 Dormers in Roof Pitch

Dormer windows set into the pitch of the roof have similar problems to wallhead dormers at the sides. They have the additional problem of carrying the thatch over the roof pitch below the windows. As with the wallhead dormers in section 12.31b it is important to repeat the details already used. Similarly this is a detail normally associated with the Cottage Orné or the Arts and Crafts Movement and new dormers of this type should be discouraged unless in one of the two building styles noted above. These dormers are also susceptible to rot in the valleys on the north side of a roof.

When dormers are found in traditional thatches they tend to be formed within the depth of the thatch covering, causing as little variation to the weather surface as possible in much the same way as the wallhead dormers described in section 12.31a.

12.33 Rooflights

Rooflights are more common in traditional thatches but only in specific areas. These are of two types: a) those set into the base of traditional random thatches: b) those set into directional thatches.

a) Those set into random thatches are always positioned towards the bottom end of the pitch and overhang the series of short timbers forming a soldier course on the wallhead. This eliminates the problem of weathering under the roof light by creating the drip at the least vulnerable point on the roof.

The roof light can vary from a simple frame with an oiled calf skin stretched over it to form a translucent surface to standard cast-iron roof lights manufactured to be used in slate roofs.

During thatching the roof light is protected by a loose turf the size of the roof light. The thatch is formed without consideration for the roof light position. When the roof is complete, metal needles are pushed through the roof, from the inside, on either side of the roof light to allow the thatcher to locate the roof light. The net is lifted and the thatch burrowed into and pushed to the edges of the hole that is required to remove the protective turf. The sides of the opening are weighted with stones during the roping process to complete the protection.

b) Roof lights set into directional thatch are normally standard cast-iron types but glazed timber framed types are also found. The directional thatch forms a drip into the glass and the sides are protected by secret gutters. Rather then continue the thatch down the slope from the bottom of the roof light, a strip of slate, sheet metal or corrugated iron is often used to make the flashing under the roof light easier to detail.

VENTILATION AND SERVICES

12.41 Smoke Holes

Smoke holes are now a thing of the past. Although many references survive and early photography shows smoke-blackened raised rims on the line of the ridge of some traditional houses, the exact method of constructing these openings has not survived.

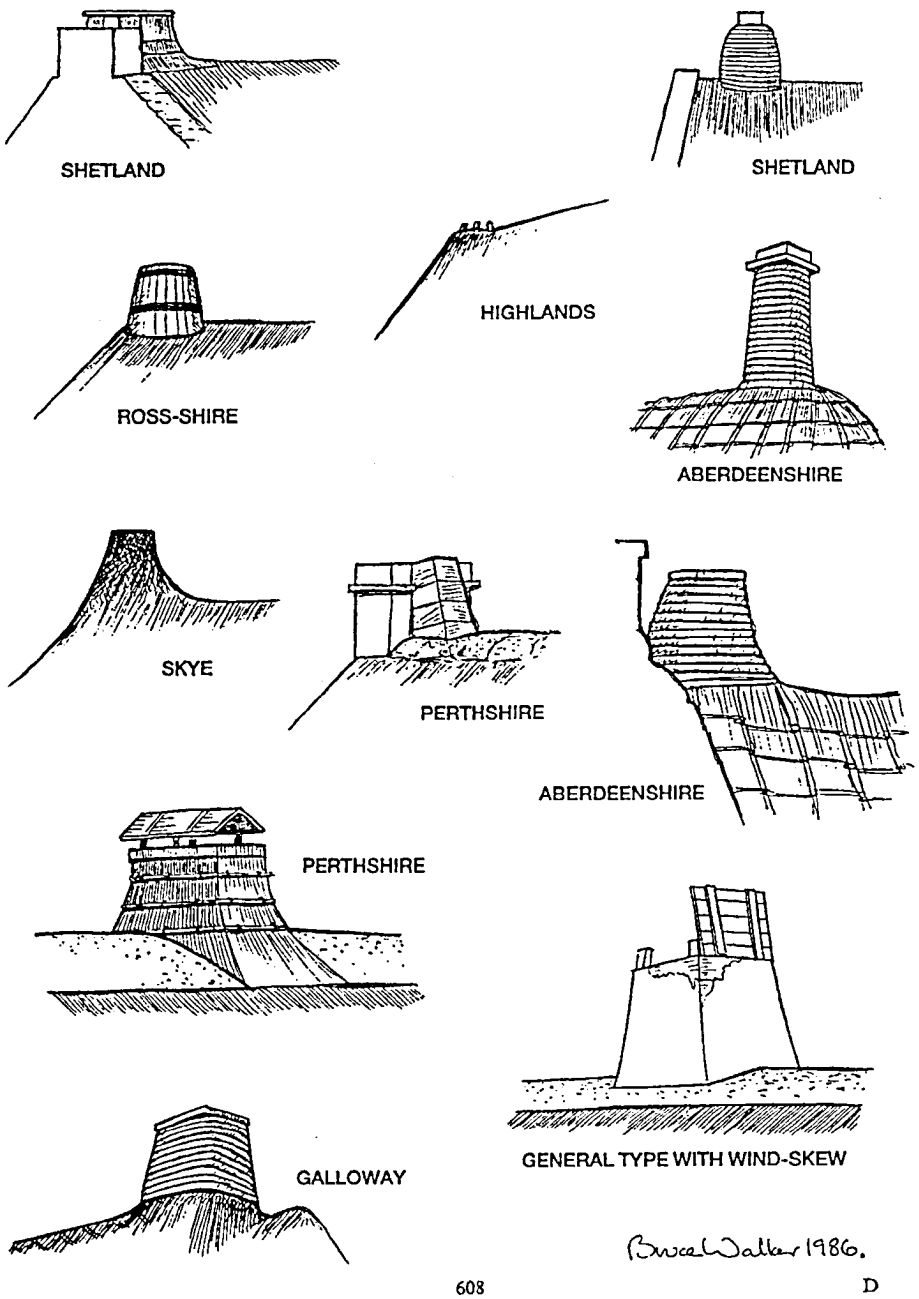
The weak point would be exposed straw that might catch fire if a spark was to lodge there in the draught. Upturned buckets, half barrels or timber boxes with the bottoms removed were used to protect the opening. These could be protected in the same way as the timber lums described below.

12.42 Timber Lums

Timber lums are generally square on plan but circular forms are known. They project through the thatch at the apex of the roof. The thatching material is swept up the face of the boards and the whole structure is bound round with the same type of simmons or rope as is used to rope the thatch. Water hitting the lum tended to run out over the surface of the rope and from there on to the thatch proper.

Lums constructed in conjunction with green turf or later netted thatches use projecting timbers to form a weathering to throw the water clear of the timber and onto the thatch.

Various types of smokehole and timber lum from different regions of Scotland.

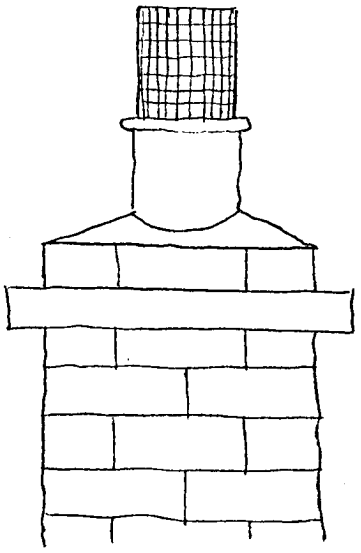


608

D

12.43 Masonry Flues

The chimney stack from a masonry flue, or even a clay flue, is normally constructed in brick rather than stonework. This is particularly true in the sandstone areas of the country where the poor quality of some of the sandstones, combined with the effects of the flue gasses, changes of temperature and rapid wetting and drying combine to cause the matrix of the stone to decompose. On early buildings the bricks are usually hand made and shallow in depth.



Masonry chimneyhead with chimney pot fitted with spark arrestor.

By the nineteenth century the bricks are of similar proportions to modern bricks.

Penetration of rain down the face of the chimney stack is reduced by the introduction of projecting weathering courses on all four faces, either in the form of corbelled brick, tile, slate or flagstone. This throws the water out over the thatch where it will be conveyed to the eaves. Sometimes this only occurs on the downslope face of the chimney to coincide with the point where the weather face meets the chimney and the side faces are finished with a lime concrete or cement fillet to perform the same function.

Chimney cans should be fitted with wire mesh spark arrestors.

12.44 Vent Pipes

Soil, waste and other ventilation pipes penetrating the thatch should be fitted with a lead skirt designed to slip between the layers of thatch and carry water approaching the pipe from above, or coming down the face of the pipe, round the obstruction and back onto the weather surface.

12.45 Aerials

Aerials for radio or television taken through a thatched roof should run slightly up-hill through the thatch to prevent forming a route for the ingress of water.

RAINWATER DISPERSAL

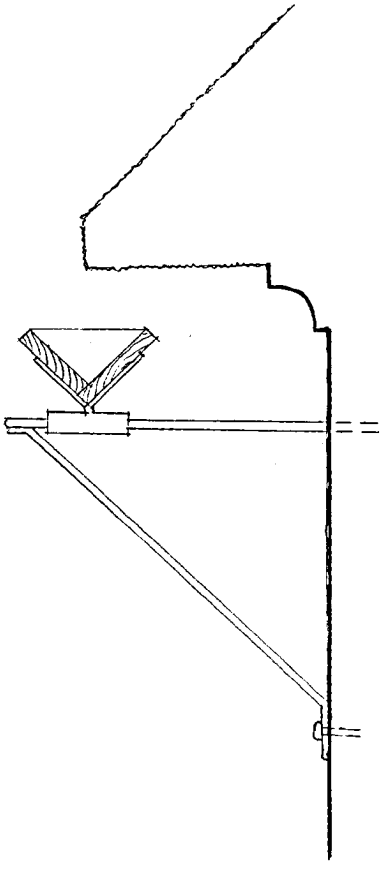
12.51 Gutters

The main reason for collecting water from a thatched roof is not to protect the house walls nor those passing underneath but to augment the water supply in those areas where drought was experienced in the summer, prior to the introduction of a mains water supply.

The method employed was to construct a simple V-shaped gutter by butt-jointing two boards along their length and supporting this under the eaves on an adjustable bracket. The bracket had to be adjustable to allow the gutter to be removed for re-thatching or redressing works. It also had to be capable of moving inwards or outwards to accommodate the new line of the thatch after the above operations or to move gradually closer to the wall as the edge of the thatch weathered back.

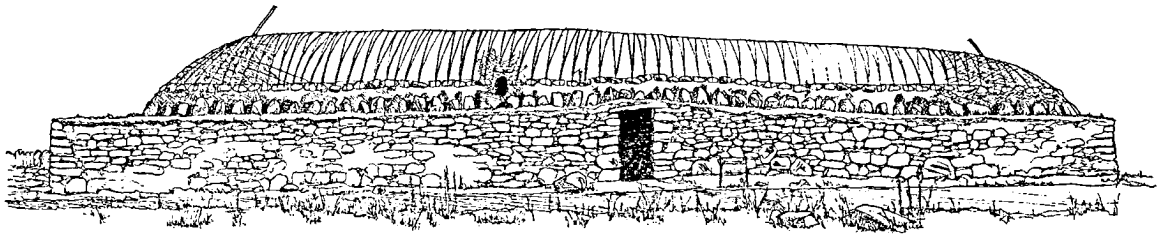
Short gutters of this type were sometimes erected where the thatch projected over the door lintel of a single storey house. They simply discharge to one side.

There are slight variations in the design and construction of these timber gutters. The inner surface was sometimes tarred as was the butt-joint but generally they remained simple and expendable.

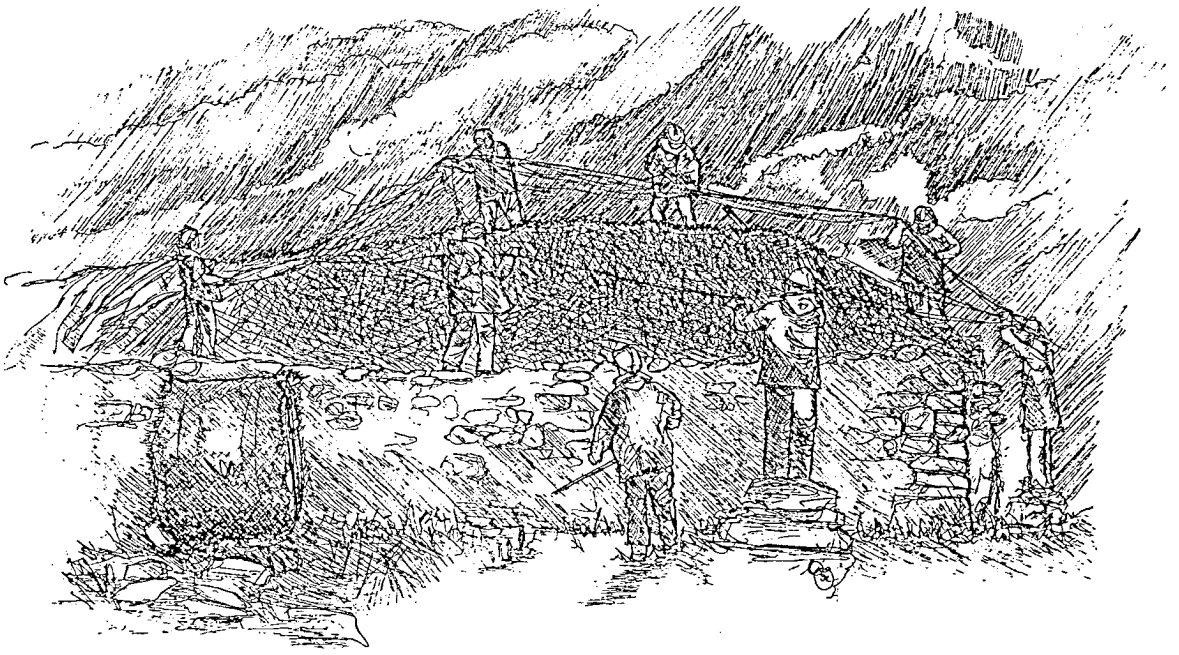


4 Gladgate, Auchtermuchty, Fife.

V-shaped timber gutter fitted to adjustable bracket.



42 Arnol, Lewis, from the east



42 Arnol, Lewis, securing the thatch from an approaching squall

13
CASE STUDIES

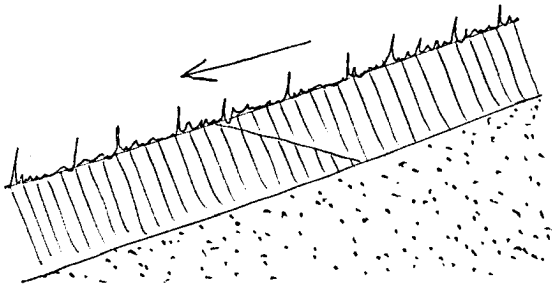
13.01 42 Arnol, Lewis

The Historic Scotland blackhouse at 42 Arnol is an example of a random type oat-straw thatch over a sub-stratum of heather turf.

The building comprises two parallel ranges sharing a mutual wall. The mutual wall forms the valley between the two roofs and is constructed to shed the water to either end. The dished surface between the two roofs is higher in the centre than at the two ends and the whole of the gutter and the exposed wallheads are waterproofed with a 150mm layer of blue clay, protected from the elements by a 100mm thickness of living grass turf that turns up the solider course of roof slats round the base of the roof pitch.

42 Arnol, Lewis, Western Isles.

Diagram showing method of jointing grass turf on the exposed wallheads.



The living turf of the wallheads must be considered as part of the thatching system as it is used to conduct the water from the roof to the outside face of the wall. To achieve this the turf must be of even thickness, laid to a fall with all joints formed with a 45 degree lap to encourage the water to flow over, rather than into, the joint.

The turf sub-stratum covers the majority of the slats comprising the secondary roof structure. It is formed using lapped heather turves placed on the roof with the vegetation side to the interior. These are not fixed in any way but rely on friction to maintain their position. At 42 Arnol the turf sub-stratum covers all but four small sections of the roof: one to either side of the ridge above the fire in the kitchen and one to either side of the ridge at the hip end of the room. Other Arnol blackhouses had different configurations based on the amount of thatch to be stripped each year as fertilizer for the potato crop. Whatever the arrangement it is essential to have a complete cover of turf at the ridge, to provide safe footing for the thatcher completing the upper part of the thatch, and at the bottom of the roof pitch, lapping the green turf of the wallhead where it turns up the soldier course.

When the turfing is complete the fire is lit to drive the gollochs (earwigs) from the turf. The roof is then ready to take the straw coating.

As the straw is laid on the roof in a randomly scattered loose form and the whole roof has to be covered before the weighting nets and ropes are applied, it is essential to carry out the work in comparatively still weather. This is not always easy to achieve in the changeable climate of the Hebrides and certain precautions have to be taken. Rain is not a problem for the thatchers but the change in wind speed immediately before the rain arrives can cause problems or total disaster unless steps are taken to secure the loose straw until the wind speed returns to normal. As a result each house has a landmark in the distance that is watched for signs of an approaching squall. As the landmark changes visibly or disappears the straw is secured temporarily until after the squall has passed.

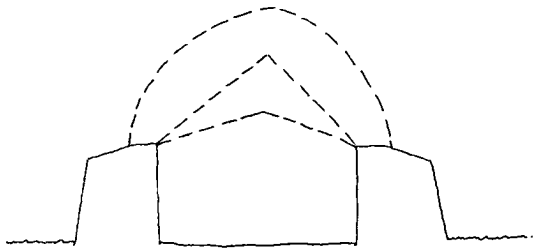
Traditionally, thatching was a community activity and the larger the workforce available the easier and faster the work proceeded. This was especially true when the net was applied because the comparatively heavy second-hand drift nets had to be supported clear of the thatch before being gently lowered into position. The lighter weight of the nylon net used in the Historic Scotland rethatching made it possible for the net to be applied by only six men supporting the weight of the net and holding it clear of the roof on extended pitch forks. A six-man team is the minimum requirement for many of the other thatching activities. When thatching the roof pitch the arrangement is two men thatching with three men breaking open the bales and carrying the straw to the fourth man who supplies the thatchers from the wallhead. When working on the ridge, one man thatches, one man on the ridge catches the straw and passes it to the thatcher, two men on the wallhead throw the bundles of straw to the men on the ridge and two men break down the bales and supply the men on the wallhead. When roping the thatch it is necessary to have one man on the ridge, directing two men one on each wallhead.

Thatching starts at the hipped end where the roof net is laid out. The thatcher stands with his toes against the upturned wallhead turf at the edge of the roof. Straw is handed to the thatcher in armfuls and he sprinkles this on the roof starting at his feet and compacting it between the roof slope and his shins. As the thatch begins to build up above his knees he leans towards the roof slope continuing the sprinkling and compacting process working up the body as he leans further into the roof eventually using a broom handle to assist him in the compacting and to achieve the desired line. This continues till a fully compacted section exists between the thatcher and the roof from his toes to chest and over to the ridge. On completion of each section the thatcher

reaches behind him and lifts a stone to form the soldier course round the base of the thatch. Each stone is placed and kicked against the thatch to hold it in position and prevent its moving during the remainder of the thatching process. The assistant thatcher begins the same process immediately to the left of the thatcher. The thatch can only be completed to the same height as the thatchers chin and a line over to the ridge. When this is done both thatchers move one place to the left, the assistant thatcher beginning the process again as the principal thatcher finishes the section that the assistant has just vacated. It is essential that the same thatcher completes the whole roof as the final shape of the roof is dependant on the thatchers technique and body shape as he is using his body as a form of flexible template. This process continues round the entire roof eventually marrying up with the starting section. A short ladder is used to gain access from the wallhead to the ridge. The thatcher stands at the end of the ridge over the folded net. The straw is passed to the thatcher who sprinkles it on the ridge in front of him using the broom handle to marry the crown to the line of the thatch. The thatch at the crown is finished to the knee height of the thatcher, or higher over the shallow pitch of the byre gradually reducing to knee height over the house. After the thatching is completed the roof is covered with the net and the soldier course of stones is put in place over the edges of the net.

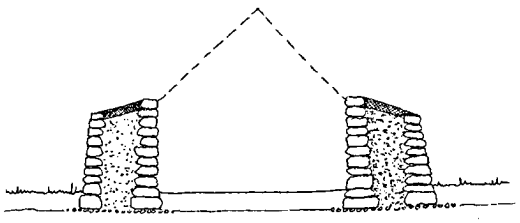
At this stage the roof is temporarily roped to allow it to settle prior to the final roping. The temporary roping starts at one hip. A plank is held in position above the soldier course and a length of coir is attached to one end. The coir is then passed over the thatching stick, back down the roof, round the plank, back round the thatching stick and so on till the coir is tied off at the other end of the plank. This is repeated right round the roof passing the coir back and forward across the ridge of the house to planks on either side of the roof. The roping is controlled by the principal thatcher who stands on the ridge with the ball of coir under his arm. He passes sufficient coir down to either side keeping the strain on the rope by standing on the last tightened strand. When the temporary roping is completed the roof is left to settle. As this happens the net should be constantly checked and tightened under the soldier course to prevent the thatch bulging over the top of the stones. Hollows in the thatch should be teased out, after lifting the net, and beaten back to the line of the roof. Temporary roping of this type is used as a conservation tool to reduce the length of time spent on the roof. Traditionally, large planks such as scaffold boards were not available and the technique described below for final roping would have been used in each phase.

After the roof has settled the permanent roping is carried out. This is undertaken in the same way as the temporary roping but is much more accurate in terms of line and spacing. The roping starts at one of the thatching sticks. The rope is tied to the stick by the master thatcher and a length of coir paid out to one of the two men fixing the stones. The man inserts a stone into the curve of the rope and the rope is tensioned by the thatcher until the stone is approximately four to six inches (100-150mm) above

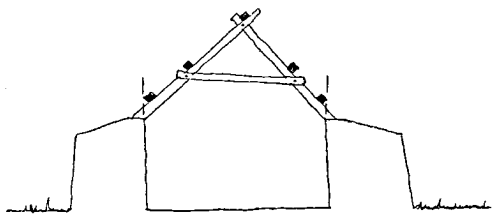


42 Arnol, Lewis, Western Isles.

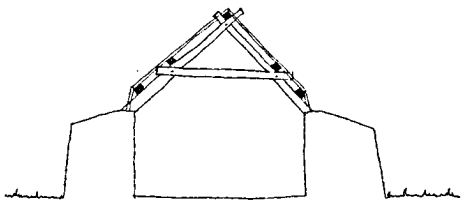
Diagrammatic section through house/byre showing maximum/minimum roof pitches and outline of completed thatch.



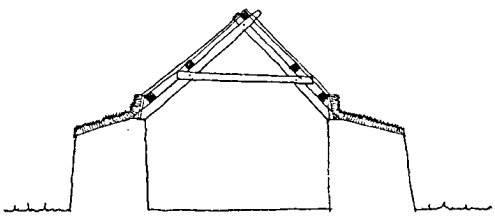
Section through external walls.



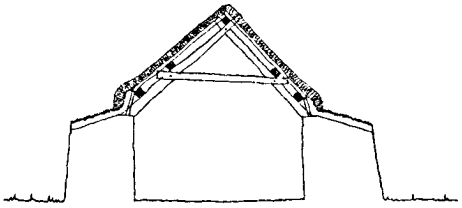
Section showing typical roof truss and purlins.



Section showing roof slats over purlins.



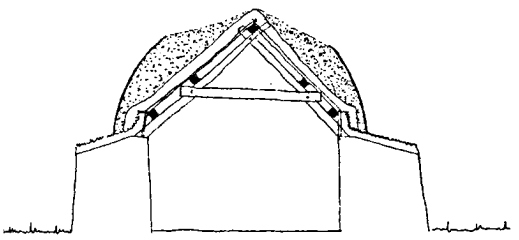
Section showing grass turf over wallheads and turning up soldier course.



Section showing heather turf over slats and turning down over soldier course.

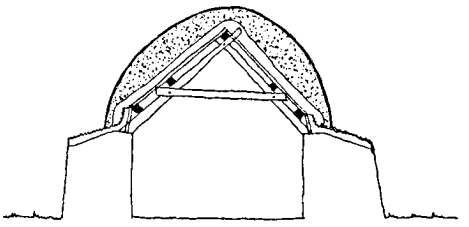
the soldier course. The tension is held by the thatcher's foot. The man on the wallhead flips the stone over sideways to make a half hitch on the rope and the thatcher lowers a length of coir to the other wallhead man who repeats the process. As the two wallhead men work round the hip the thatcher takes total control. He becomes the only person who can assess if the balance of the stones is correct. He is also the person who determines the line of the ropes over the ridge. The process is carried on along the whole length of the roof and the coir is tied off on the opposite crow stick. After the roping is satisfactorily completed and the thatcher is satisfied with the line of the roof, the horizontal roping takes place. Here the thatcher attaches the coir to a large stone at one side of a roof window, using a clove hitch with a half hitch, the loose end being tucked behind the stone. The coir is angled up to a hanging stone about three stones to the left and is taken in a turn round the vertical coir just above the stone. This is repeated all the way round the roof ensuring that the turn is formed in the same way each time with the loop towards the roof and the main coir running horizontally. It is taken three stones past the first stone to be fixed and the end secured and tucked in under the hanging stone. This leaves the hip roping to complete. It is done in much the same way as roping the bottom of the vertical ropes but it runs at an angle round the hip to secure this vulnerable area. The coir is placed in the centre of the hip about a foot (300mm) above the hanging stones and taken to each side to the first vertically hanging rope clear of the crow stick. It is tied off at this part and the coir is held in position by having been passed through a series of turns taken in the vertical ropes. These can be adjusted to give a true line to the hip rope. The process is repeated about six inches (150mm) above the first hip rope running parallel to it and being tied off at the horizontal rope as before. This is repeated up the whole of the hip. The spacing given here is for an Arnol type roping system and does not necessarily hold good for other townships in Lewis.

The straw used is oat straw. This is the traditional material but unfortunately it is not produced in the traditional way. Problems have been encountered: with poor quality straw that deteriorates quickly - the result of the use of concentrated nitrate fertilisers: with unthreshed ears of corn that germinate and grow on the roof; and with the varieties of oats available. Traditionally the oats grown in Lewis had a long tough fibrous stem; it was grown in sandy soil, was pulled rather than cut and only the root and the bottom seventeen to nineteen inches (430-480mm) of the stem was used for thatching. It is hoped a contract will be let in the near future to ensure that an adequate supply of thatch organically grown traditional varieties, harvested and handled in the appropriate manner, will be available to maintain this roof.



42 Arnol, Lewis, Western Isles.

Section showing portion of thatch formed from wallheads.



Section showing thatch as colmpleted from the ridge.

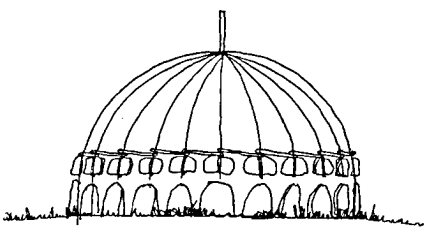
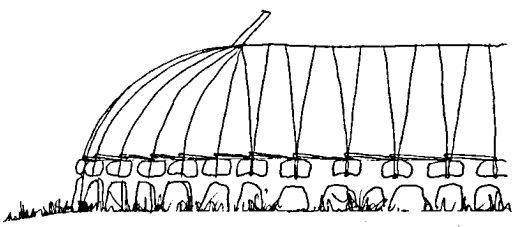
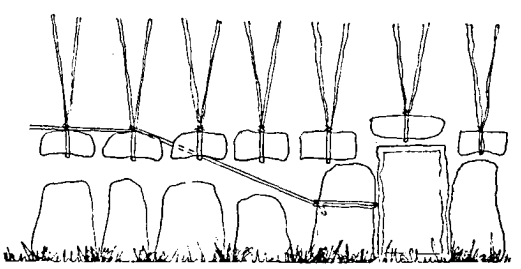
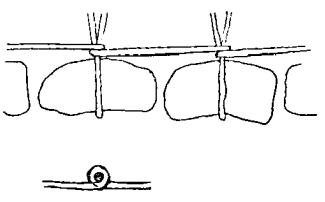


Diagram showing configuration of inclined ropes.





Diagrams showing method of forming ground rope to inclined rope system.

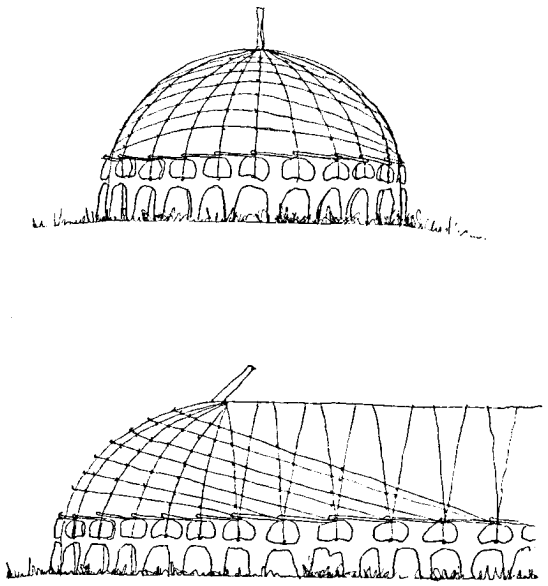


Each year the ropes and net must be removed and the whole roof top dressed with two inches of fresh straw. This becomes the weather coat that withstands the vibration set up by the wind. The roof must then be re-netted and re-roped as described above.

Complete re-thatching should only take place if the roof becomes too heavy or if the thatch fails.

42 Arnol, Lewis, Western Isles.

Diagrams showing additional restraint ropes round hipped ends.



13.02 Knockrome and Keills, Jura, Argyll

The Isle of Jura had, until recently, a distinctive thatching tradition associated with a particular appearance resulting from the method of roping and the failure of the older ropes. This was first recorded by Joseph Banks in the eighteenth century and was used in a distorted form by Thomas Pennant, Sir Banister Fletcher, Rev Donald Budge and Colin Sinclair. Adela Wright and the Royal Commission on the Ancient and Historic Monuments of Scotland have recorded more recent practice.

The structure normally consisted of raised cruck trusses with purlins, although some of the lesser spans were almost flat composite beams rather than crucks. The secondary roof structure was remarkably light being made up of 20-40mm diameter "ground willow" oziers running from eaves to ridge. The substratum to the thatch was heather turf cut from areas of short heather growing on a rough peaty soil. These were in large slabs about 30mm thick.

The thatching material was rushes. The "soft rush" or "loose-flowered rush" (Juncus effúsus) was preferred to the "common rush" (Juncus conglomeratus) as it was easier to place on the roof, being less slippery. This was not surprising as Juncus effúsus was the rush preferred in other areas of Britain for plaiting and forming chair seats. It is slightly shorter than the common rush which grows abundantly at both Keills and Knockrome, but the ease of working with the soft rush made it worthwhile harvesting at some distance from the two township sites. Although many jobs in the crofting townships were communal activities, when it came to gathering thatching materials each household acted independently.

Heather, or more occasionally reed (Phragmites communis), was sometimes used at the skews and eaves under the rush top coat to act as a reinforcement to prevent the ends of the thatch being broken off by the wind.

The rush thatch was applied to the roof starting at the bottom right corner of each pitch. The first course at the eaves was applied with the cut end downwards all the courses above that were laid with the pointed end downwards. The thatch is laid on loose and adjusted by the thatcher to form an even thickness. Neither of the traditional thatchers on Jura had ever started from scratch but had only top dressed existing thatches.

After the thatch was placed to the thatchers satisfaction it was secured by a series of horizontal heather ropes stretched across the roof pitch from skew to skew. The rope was secured to pins set in the gable parallel to the line of the skew. These pins varied in type and form from timber pegs and metal pins to second-hand horseshoes wedged into the masonry. The horizontal ropes were normally two to three years old. New rope was used from eaves to eaves across the roof. These were attached to weights just above eaves level at the base of either pitch. The weights were normally regular sized stones, on Jura these were pieces of slate about the same size, or slightly larger than a thin brick, that is 220-300mm long, 100-150 mm deep and 50-80mm thick.

The older ropes running horizontally across the roof pitch often gave way, springing back into snake-like forms that gave the Jura houses their distinctive character.

Once the thatch base was established it was common to thatch half the roof every year rather than risk being able to do the whole roof every two years. This spread the workload and reduced the element of risk should the weather prevent thatching in any particular year.

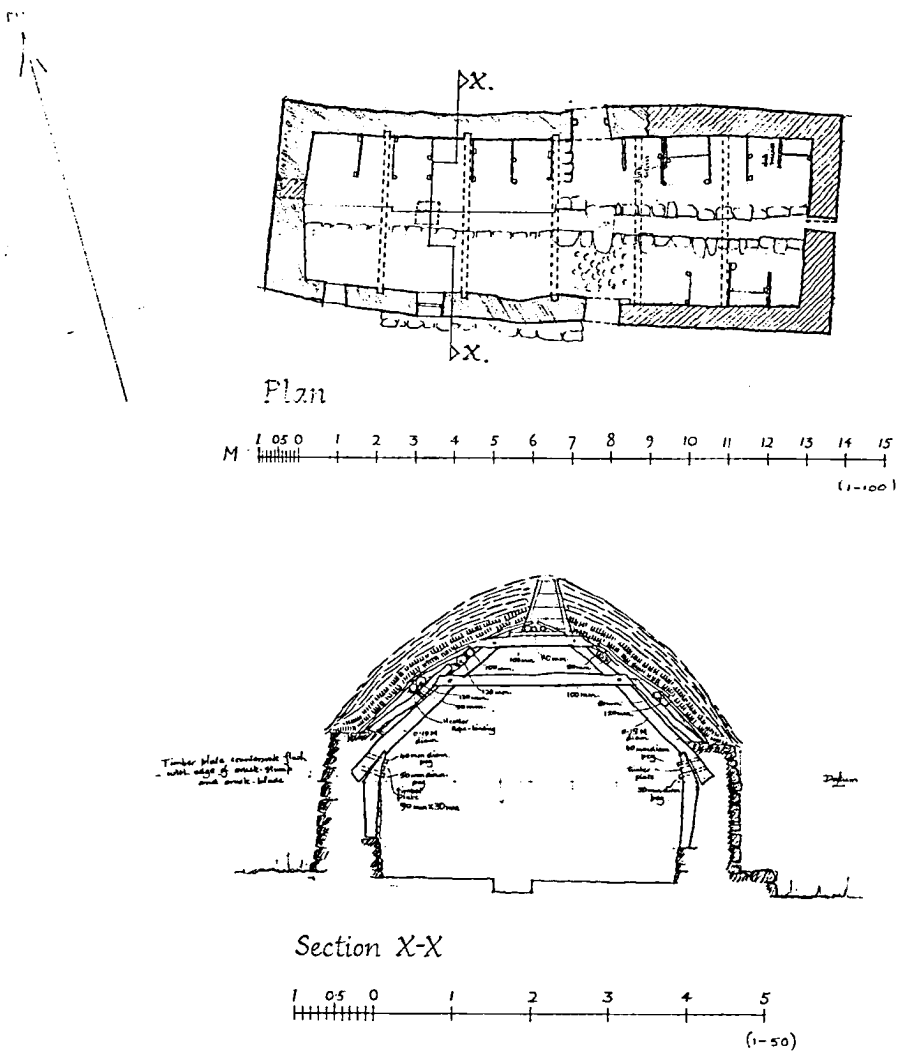
The thatch was applied on a still day and secured as soon as each pitch was completed.

More recently wire netting has been used to retrain the thatch. The netting was unrolled and cut to form panels running from eaves to eaves across the width of the roof. The netting had to be applied carefully to avoid damage to the loose thatch. The weights, usually a continuous iron bar made from straightened

Keills, Jura, Argyll.

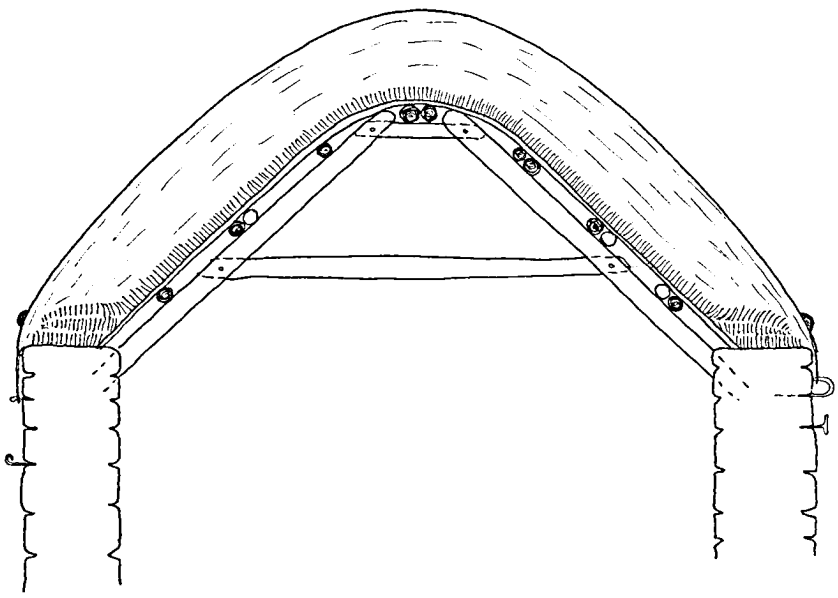
Plan and section through byre.

(RCAHMS)



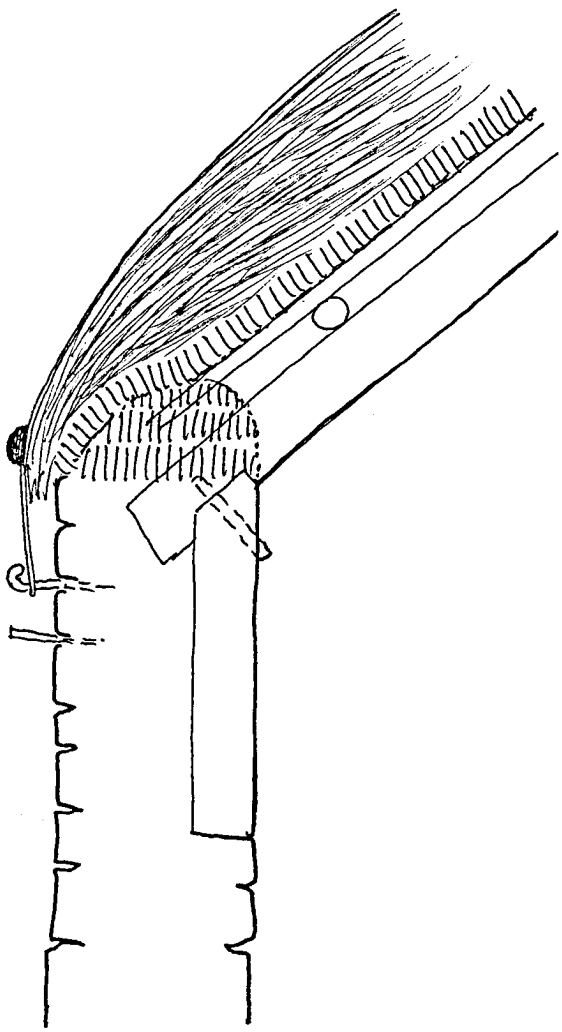
Keills, Jura, Argyll.

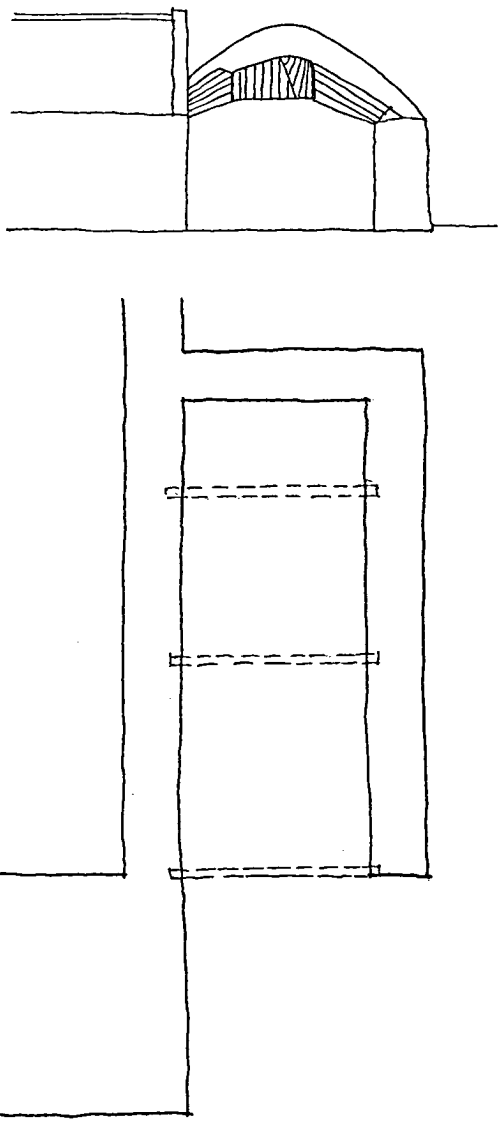
Section through cart shed/stable.



Keills, Jura, Argyll.

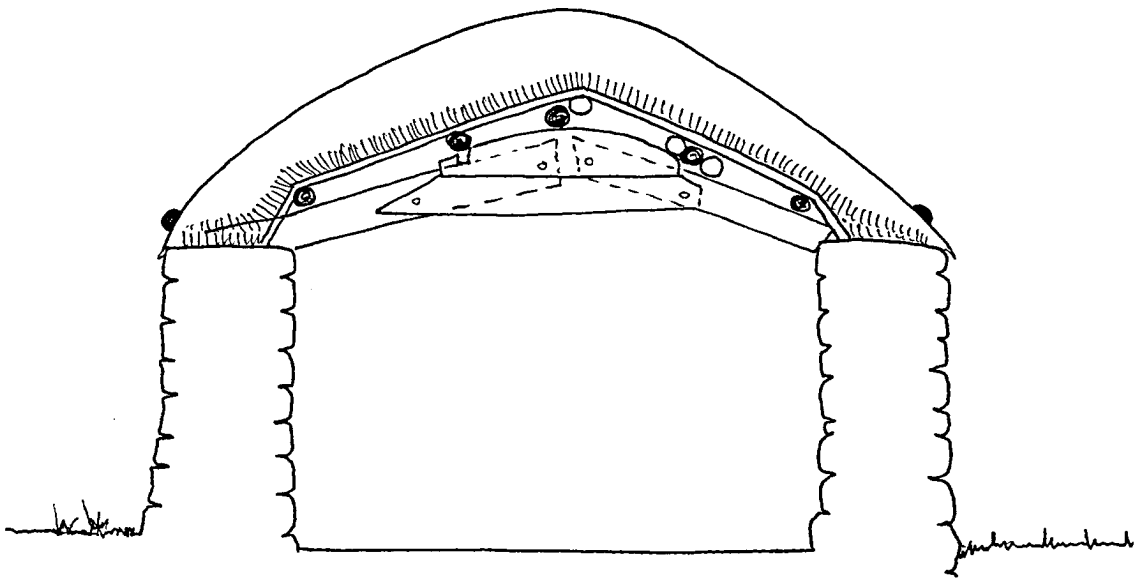
Detail of raised cruck, turf beam fitting, turf substratum and thatch.





Knockrome, Jura, Argyll.

Sections through cart shed showing "flat" roof trusses.

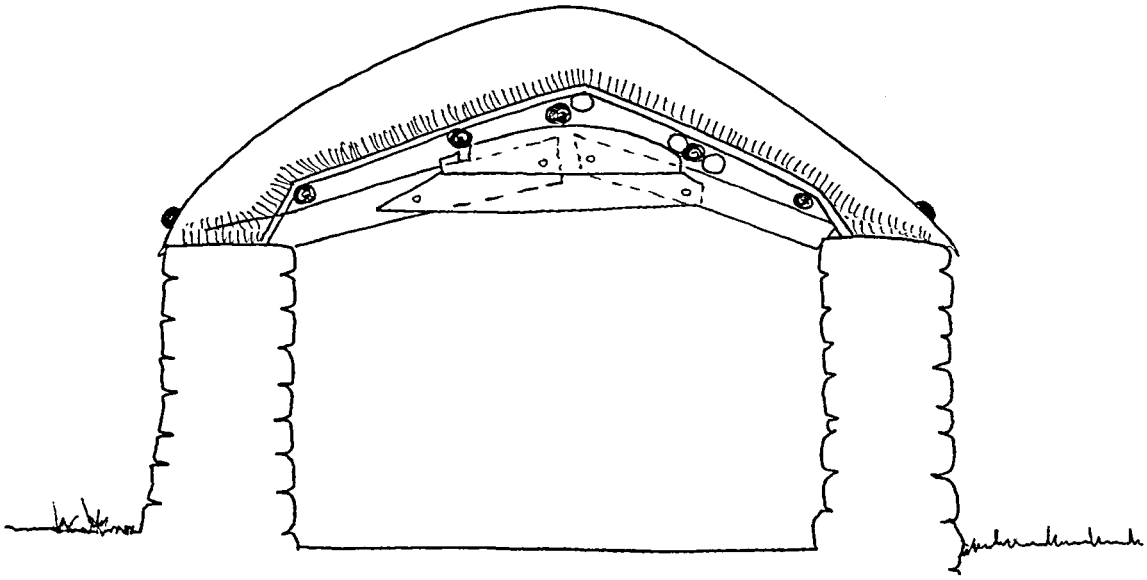


Knockrome, Jura, Argyll.

Sections through cart shed showing "flat" roof trusses.

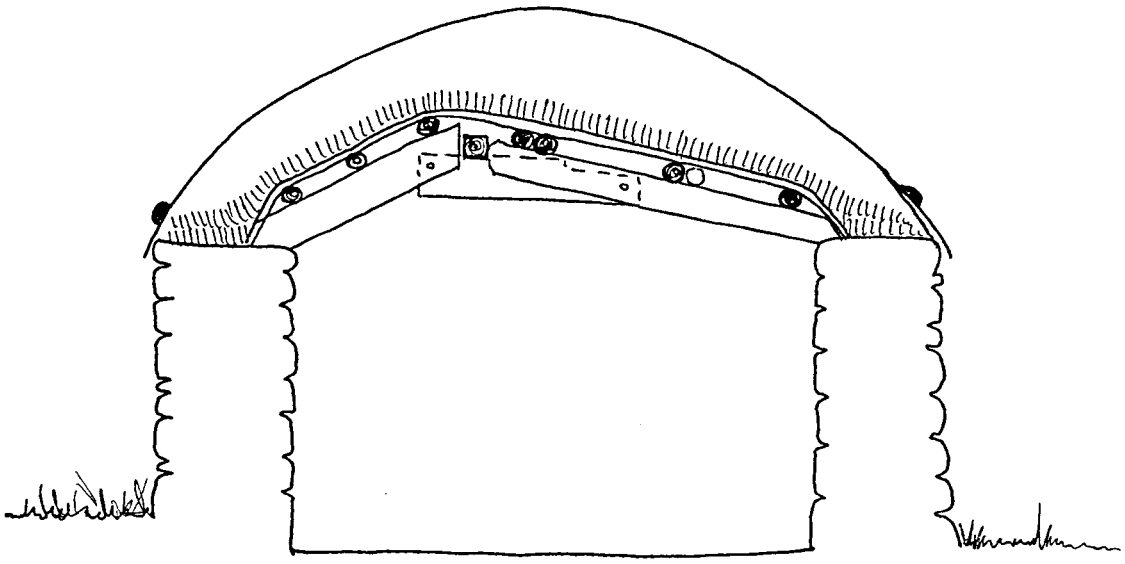
Knockrome, Jura, Argyll.

Sections through cart shed showing "flat" roof trusses.



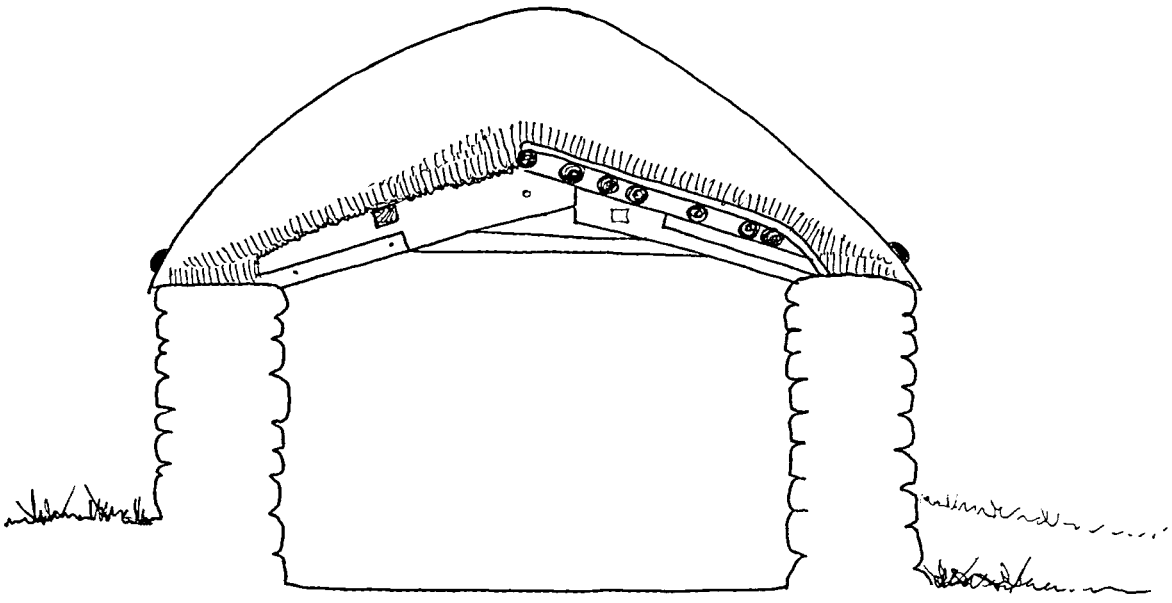
Knockrome, Jura, Argyll.

Sections through cart shed showing "flat" roof trusses.



Knockrome, Jura, Argyll.

Sections through cart shed showing "flat" roof trusses.



iron cart-wheel tyres were applied just above the eaves. The bar could be fed through some of the loops of the chicken wire or could be wired in position with thin galvanised wire. The individual panels were also wired together to form a continuous mesh as any gap was vulnerable to damage by the wind. In exposed situations additional weights and anchorage points were used.

13.03 Round Hay Ricks or Straw Stacks

Rick or stack construction is subject to the same local variations as thatches for buildings. This said, there are some sound principles that apply to the larger ricks and stacks found on the majority of improved farms. These are set out below.

The circular base should be clearly defined prior to commencing. If the material is hay, the layers should be kept as even as possible. Each layer should be fractionally larger in circumference than the one below resulting in a stack a little wider at the eaves than at the base. When the intended height is reached the top should be tested for level before the conical roof is formed. Creating a symmetrical cone is possibly the most skilful part of the rick.

The cone is thatched by applying the material in lanes starting at the eaves and working to the apex before moving the ladder for the next lane. Each lane should be from eighteen to twenty-four inches (450-600mm) wide at the eaves and taper to a few inches wide at the apex. As each yealm of thatching material is applied it should be spread to an even thickness: possibly six inches (150mm) at the eaves and approximately four inches (100mm) above that. The second yealm should overlap the upper two-thirds of the bottom yealm and so on to achieve a fairly even thickness of thatch. Ensure that each yealm follows the same line as the yealm to its right.

Fasten down thatch using raip and scob inserting the scobs into the body of each yealm rather than into the joints. The last lane must be laid with the left hand, the ladder resting on the completed thatch.

The thatch should be worked off at the top as a finial or dolly, the pattern of this varying according to local tradition.

The eaves may be left untrimmed or be trimmed according to local tradition.

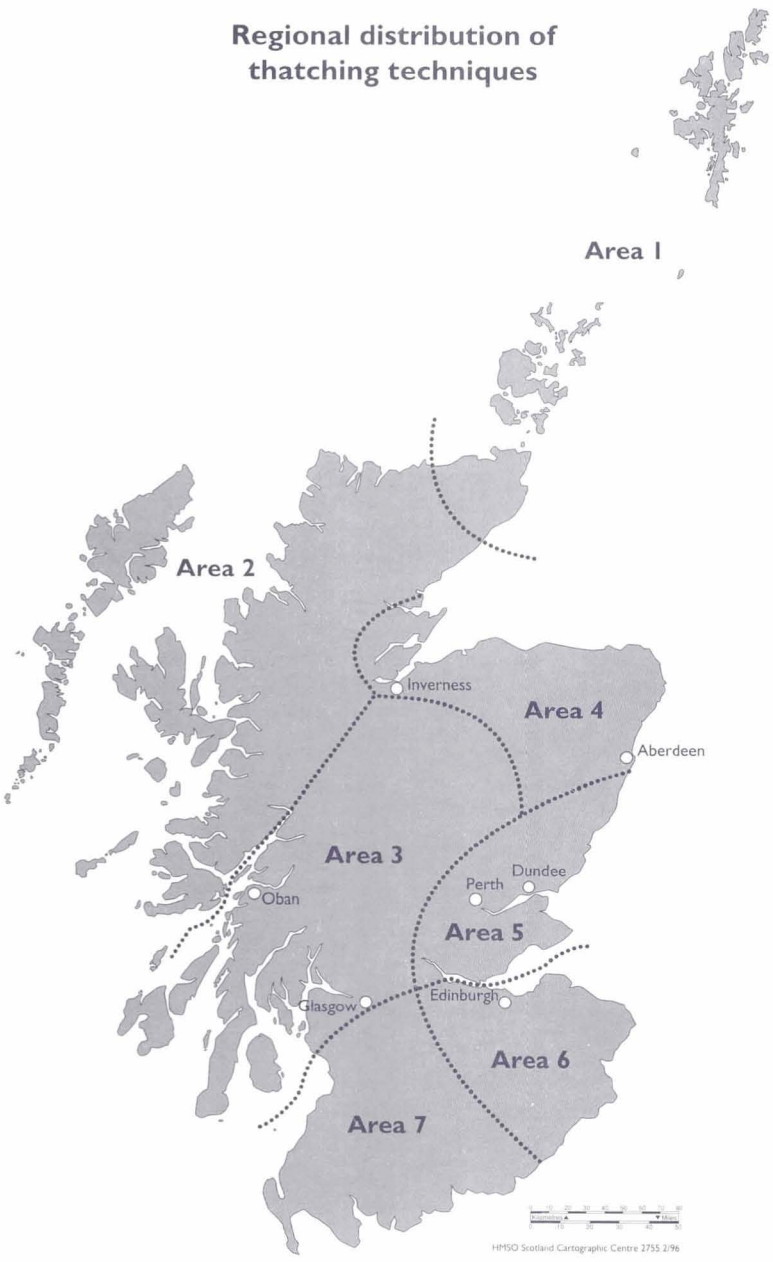
In particularly windy areas roping with weights is necessary rather than raip and scob. Various hybrid techniques are also to be found.

14
REGIONAL DISTRIBUTION

The regional distribution of thatching techniques presented below is based, not on a comprehensive field survey carried out at a particular period and to a standard set of criteria, but on surviving documentary evidence, collected from a wide range of sources varying from casual observations by interested but ill-informed tourists, through a group of educated but not necessarily practical reporters to estate factors and land surveyors. The information given should therefore be considered as a rough guide rather than as a statement of fact and should not be used in arguments that might cause changes to thatching types that have evolved naturally but perhaps as isolated examples differing from the perceived regional norm.

The divisions arrived at through the process described above also appear to reflect a general reaction to the degree of wind exposure likely to be encountered. Thus we find heavily weighted externally restrained thatches in the Northern and Western Isles and in exposed Mainland districts such as the flow country of Caithness and the north west Highlands. Lighter forms of external restraint are found in the north east, the Central and Western Highlands and into the south west. The secretly fixed thatches, similar in external appearance to those of England are to be found in the east and south east of Scotland.

Map of Scotland showing main thatching regions.



Scotland basic wind speeds in metres per second (m/s)

HMSO Scotland Cartographic Centre 2755 2/96

Scotland snow loading zones for flat roof structures also applicable to roped thatches

HMSO Scotland Cartographic Centre 2755 2/96

Thatches preserved under sheet metal particularly those covered in the first half of the nineteenth century are much more valuable than any description. Similarly early thatches surviving as sub-strata to later thatches are equally important. Each thatch should be considered independently and treated according to the evidence available for that particular building.

The reader should also be aware that not everything done as part of the "natural progression" was good for the thatch and that many of the later "innovations" were totally unsympathetic to the original principles and actually accelerated the move from thatch to alternative roof coverings. Previous attempts to describe regional differences in thatching techniques have concentrated on the old county boundaries as many of the early descriptions are taken from Board of Agriculture reports, prepared on a county basis or from Statistical Accounts prepared for individual parishes. This can give a false picture as rural thatches often differ from urban examples and the thatched houses occupied by the gentry would bear little relationship to those occupied by small farmers and crofters. Acceptance of this variation within each division is essential to understanding the surviving evidence. Other factors also come into the equation. These might include the general condition of buildings prior to the agricultural improvements and the subsequent influences exerted by the estates. The extent of any "clearances" and the type of building erected to house the "improving" farmers and their employees would also have a bearing on surviving thatches.

Bearing this in mind, it is intended to consider the country in seven main divisions. These are: 1- North: 2 - North-west Highlands and Islands: 3- Central and Western Highlands: 4 - North east: 5 - East Central: 6 - South-east: and 7 - South-west.

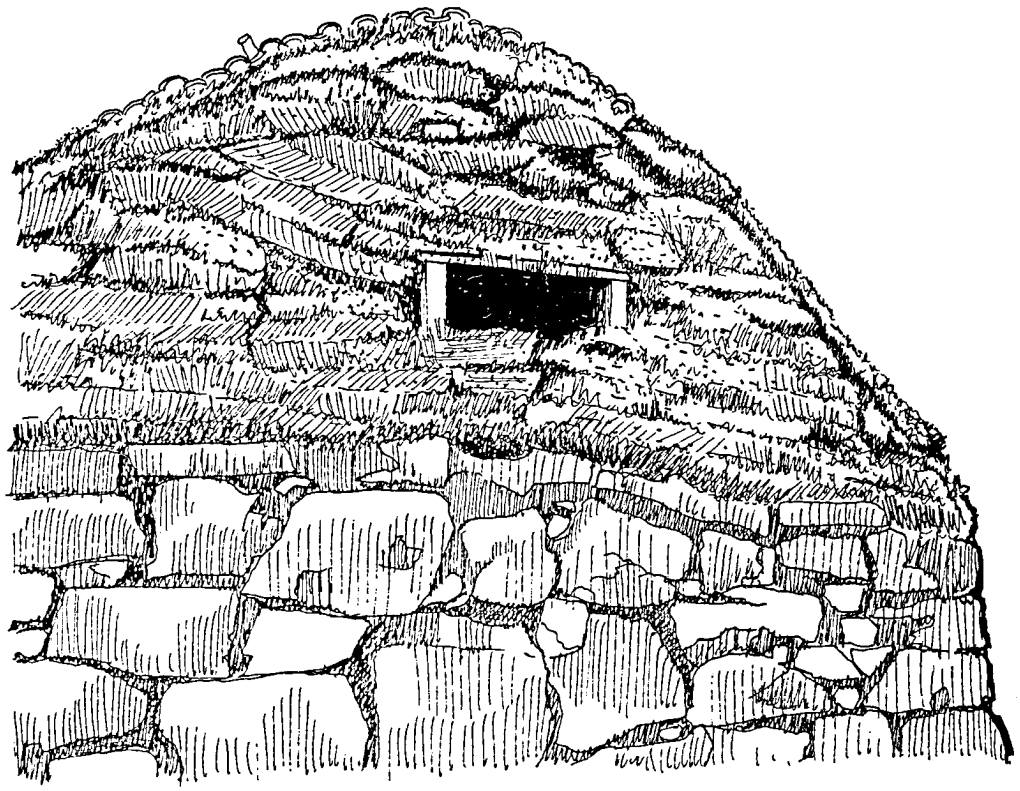
14.01 North

This division comprises the Northern Isles and Caithness.

Little is known of urban thatches in this area but rural thatches utilise closely spaced simmens to restrain the thatching materials on rounded-profile gabled roofs. These are normally weighted by long thin pieces of flagstone. In some cases closely spaced simmens are used as a secondary structure to support the thatch. Generally external heather simmens are used to restrain the thatch, whereas those used as a secondary roof structure are made from straw.

The most common thatch in the recent past has been straw over turf but eel grass, seaweed, rush and heather are also known as are turf roofs or turf over flaas.

In Orkney and Caithness flagstone is often used as a secondary roof structure, thatched over with straw, eel grass, seaweed or turf and restrained with heather simmens weighted with long thin pieces of flagstone.



Byre, Bigton, Shetland.

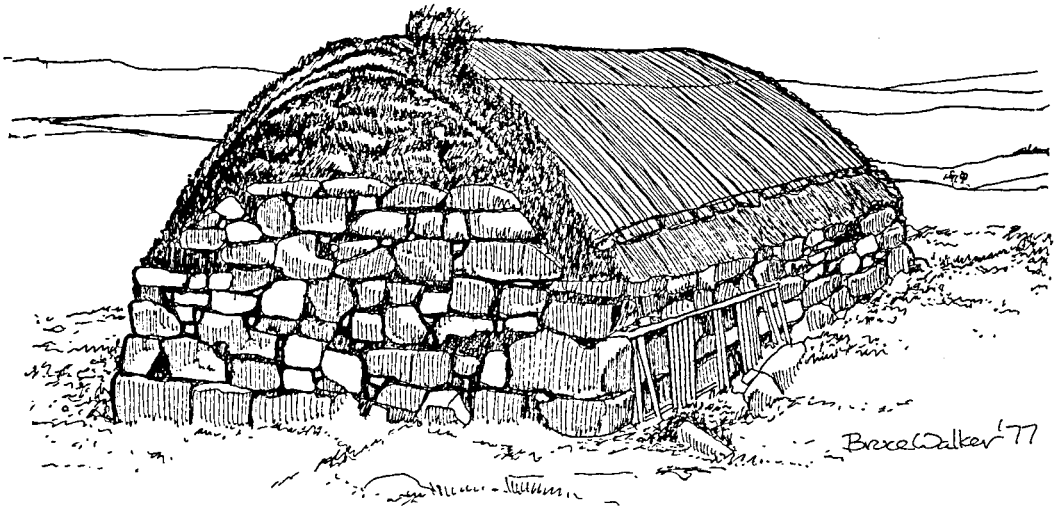
Showing turf gablet and skews.

Byre, Bigton, Shetland.

Showing turf gablet and skews.

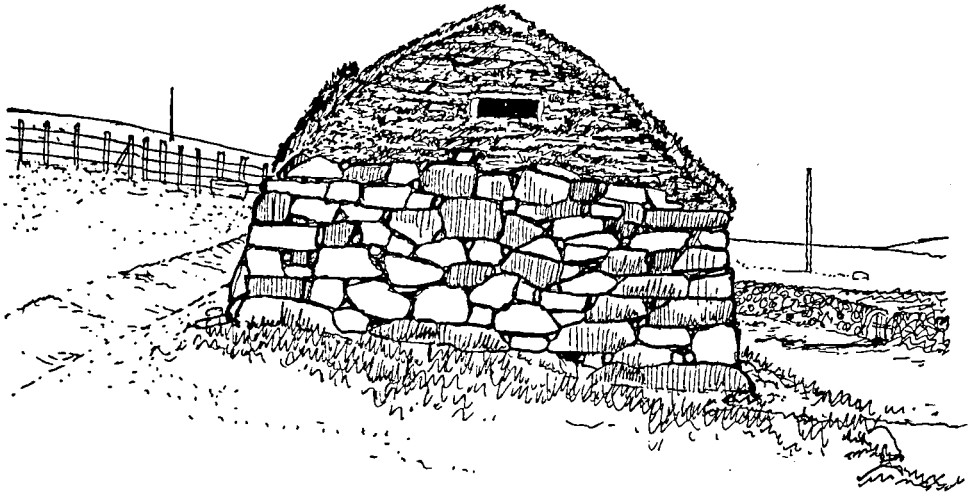
Byre, Sullon, Shetland.

Showing turf gablet and skews.



Byre, Sullon, Shetland.

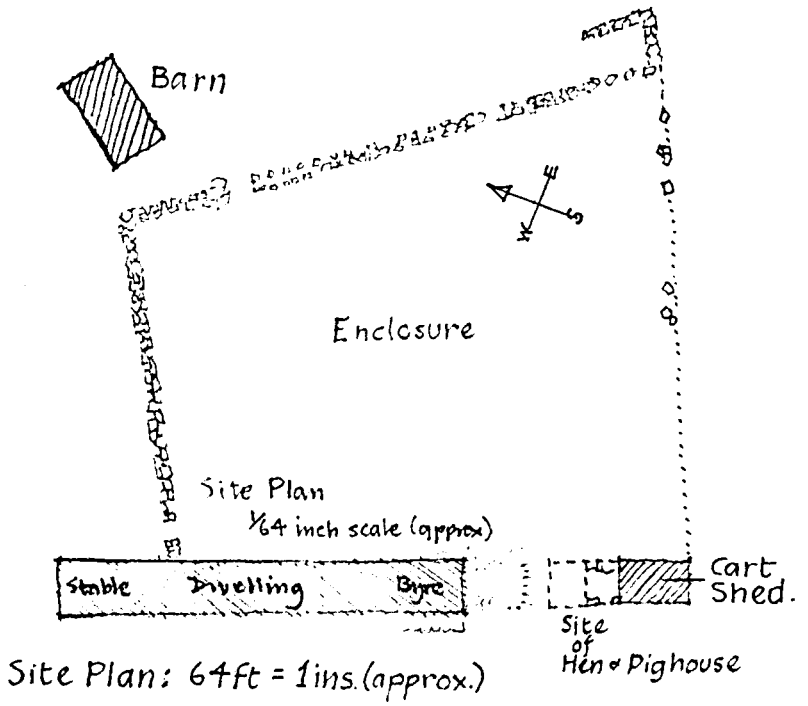
Showing turf gablet and skews.



Laidhay, Dunbeath, Caithness.

Thatched croft house and barn.

(RCAHMS - CAD/29/1)

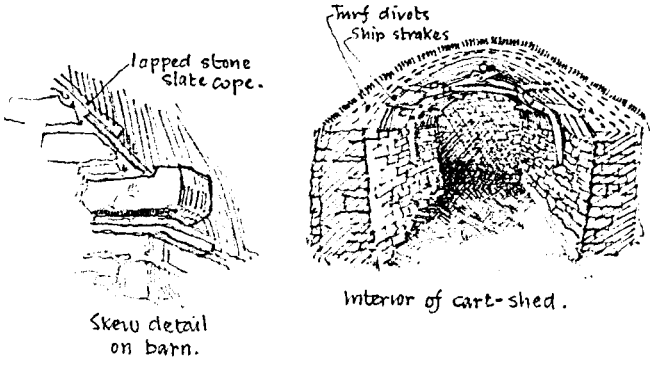


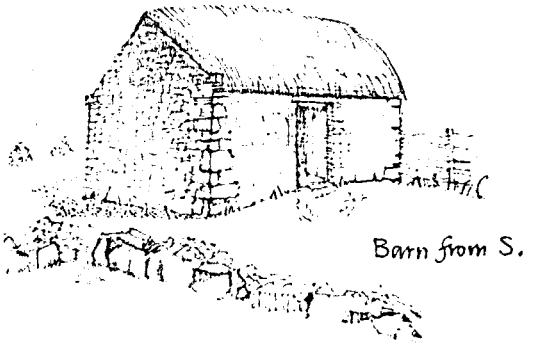
SMALL-HOLDING,
Laidhay, Dunbeath, Caithness

Laidhay, Dunbeath, Caithness.

Thatched croft house and barn.

(RCAHMS - CAD/29/1)



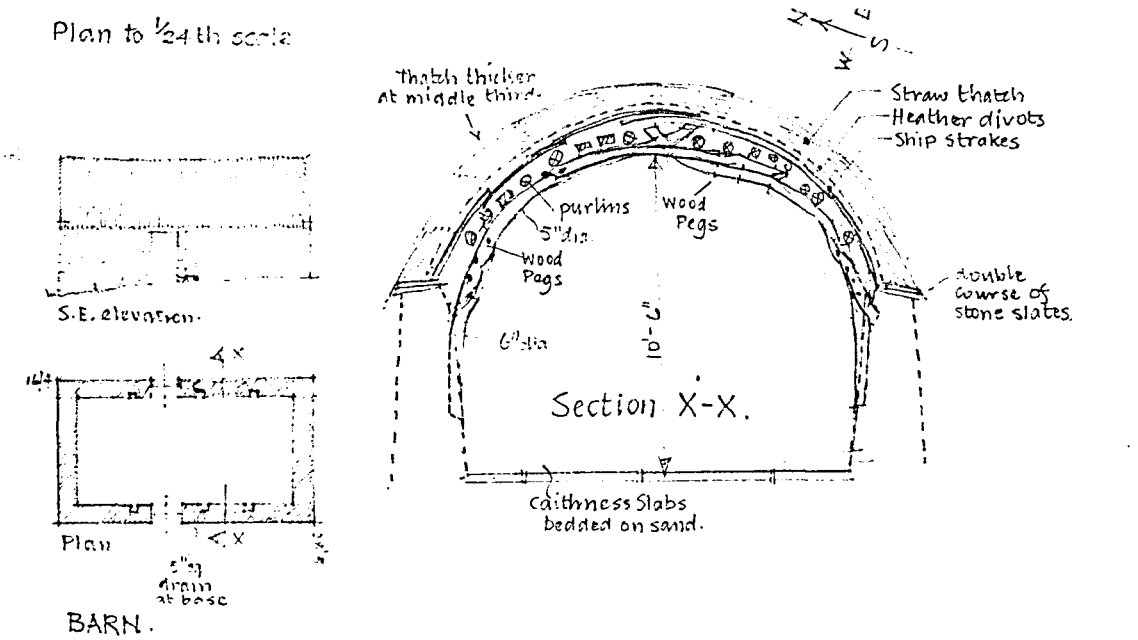


G.D. Hay 18.6.68.

Laidhay, Dunbeath, Caithness.

Thatched croft house and barn.

(RCAHMS - CAD/29/11)



14.02 North-west Highlands and Islands

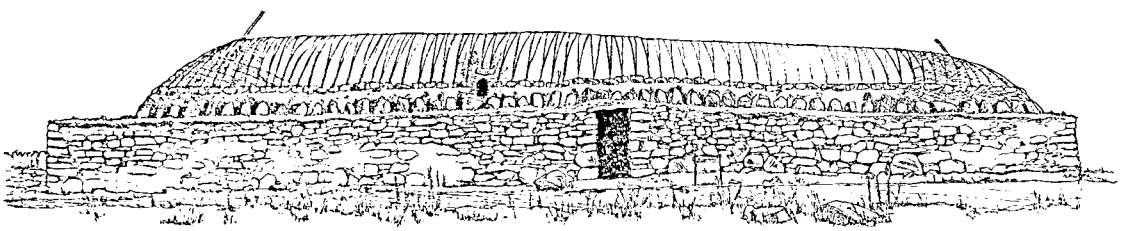
This division includes the Hebrides, Sutherland, Wester Ross and Inverness-shire north of the Glen Mhor, but excluding the coastal strip round the Moray and Beauly Firths.

In the eighteenth century this was an area of hipped-roofed turf-walled rural buildings with occasional better class houses. Clearances followed by the erection of new accommodation for the "improving" farmers and their workforce changed the character of the mainland section to a more lowland character, whilst the Hebrides and some of the coastal areas continued to adhere to older vernacular principles particularly in Lewis where the older building traditions survived albeit with a thin veneer of drystone to make the buildings more acceptable to the lairds.

The classifications adopted by Colin Sinclair in the ***Thatched Houses of the Old Highlands*** is flawed in that it fails to recognise the complete range of types. Similarly Fenton considers straw thatch to be the commonest thatching material in the Western Isles, but this was a late development.

This is an area with a very wide range of thatching materials from the randomly placed eel grass, seaweed and straws to directional materials such as rush, marram grass, heather, bracken, broom, iris and many others. Generally these thatches are rounded in form but normally over an angular roof structure.

Traditional Hebridean roping utilised heavy heather ropes with minimal spacing in much the same way as



14.02 42 Arnol, Lewis, Western Isles.

Completed house showing completed roping pattern.

roping in the North division. To accommodate the hipped ends of the roof an inclined stick was attached to the apex of each hip. These inclined back towards the ridge and provided a secure pivot for the hip ropes. The rope type and spacing was similar to the roofs in the north division but traditionally diagonal ropes were carried round the hip for extra security.

14.03 Central and Western Highlands

This division includes: Inverness-shire south of Glen Mhor but excluding the coastal strip round the Moray Firth: Highland Perthshire: the Trossachs: Argyll: Bute and Arran.

Generally the thatches are similar in external appearance to those of the north-west Highlands but there is a higher proportion of gabled roofs and more variety in the methods used to restrain the thatch. There are also a number of hybrid thatches where thrusting techniques or even stitching is used as a secret fixing yet the thatch has external restraint for additional security.

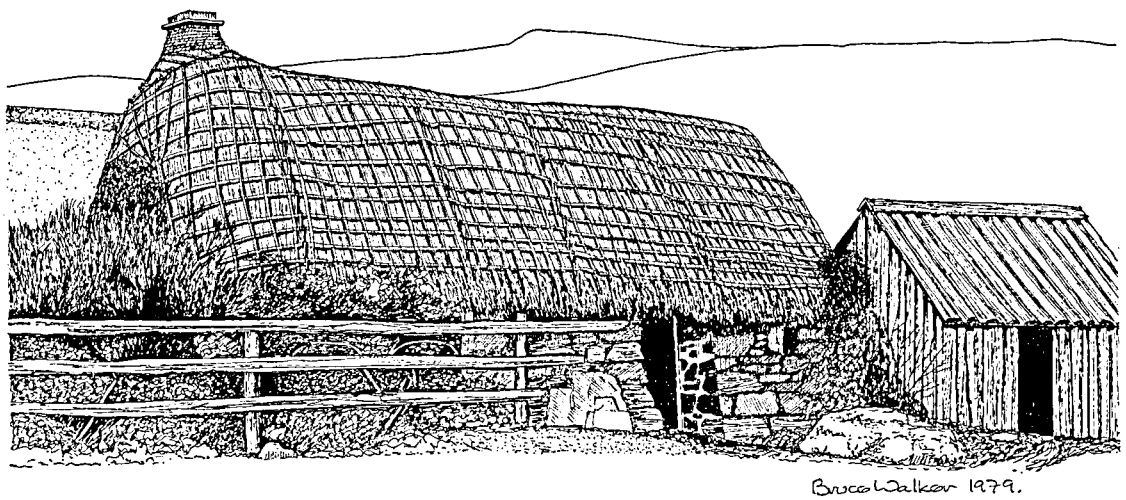
This is the part of Scotland with the richest source of surviving thatches although these are mainly under later sheet metal coverings. It is also the area with the largest number of external influences as it abuts five of the other six divisions.

14.04 North east

This division includes: Banffshire: Buchan: Deeside: Laigh o'Moray: Black Isle and Easter Ross.

There are two distinctive characters to the thatches in this division. The first is a roped form where the ropes form a regular large mesh net over the surface of the thatch and are attached to pegs or pins at the skews and eaves. The second is the top dressing form of clay thatch where liquid clay is used to build up a smooth waterproof surface. Both types can also be secretly fixed with clay or can be stob thatched.

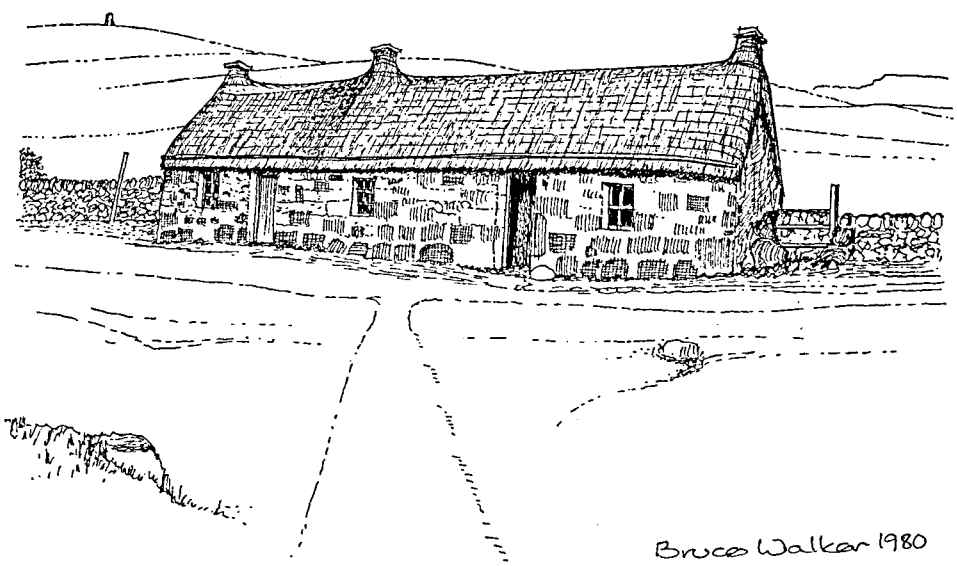
The roped types of thatch appear to be the older types as they are more apparent in early photographs than in recent finds and they also vary in form from the type described above to the raip and scob



Croft House, Braemar, Aberdeenshire.

Roped thatch more typical of Central Highlands than North-east Scotland.

(After GWW photograph E0451)



Buskhead, Glenesk, Angus.

Raip and scob restrained straw thatch roof.

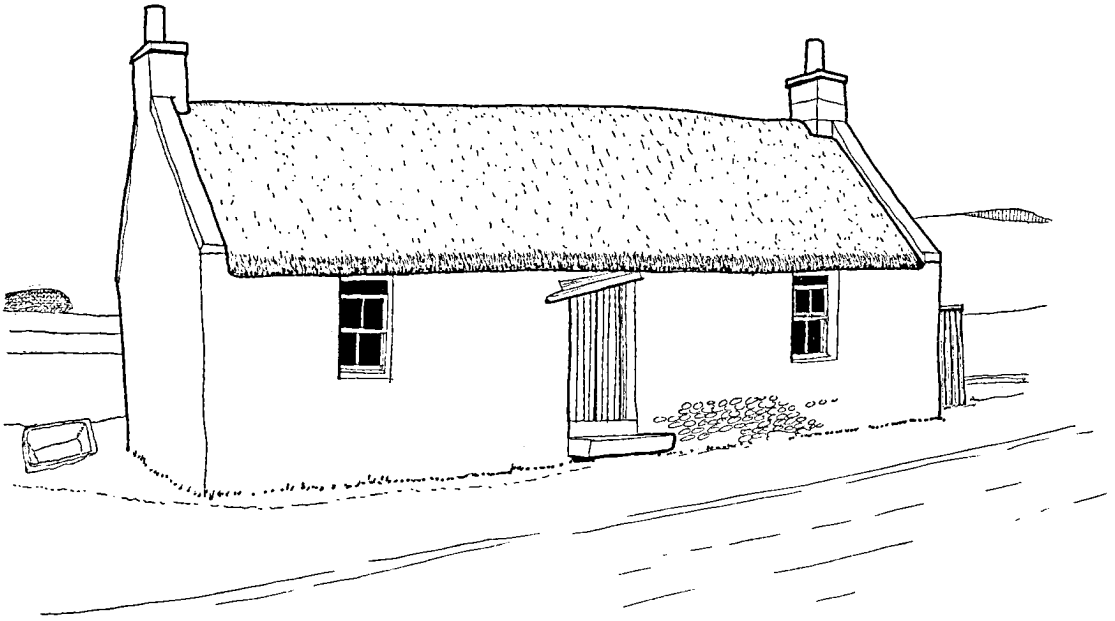
(After photograph in Glenesk Folk Museum)

techniques that survived until recently in the glens of North Angus.

The top dressed clay thatch could be over a range of fixings from thatch weighted with clay within the roof, through a range of stob thatching techniques to thatch that was stitched in place. The number of stobing tools surviving in the north-east suggests that this was the commonest technique, particularly for patching existing thatches.

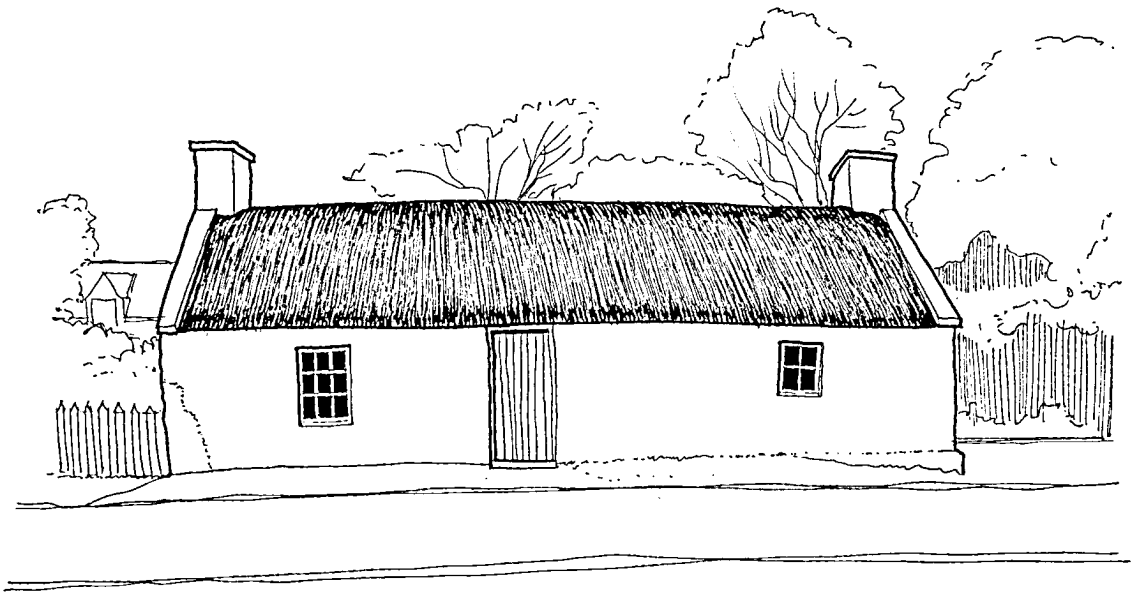
Fernyfield, Urquhart, Moray.

Clay thatched roof.



Rose Cottage, Urquhart, Moray.

Clay thatched roof.

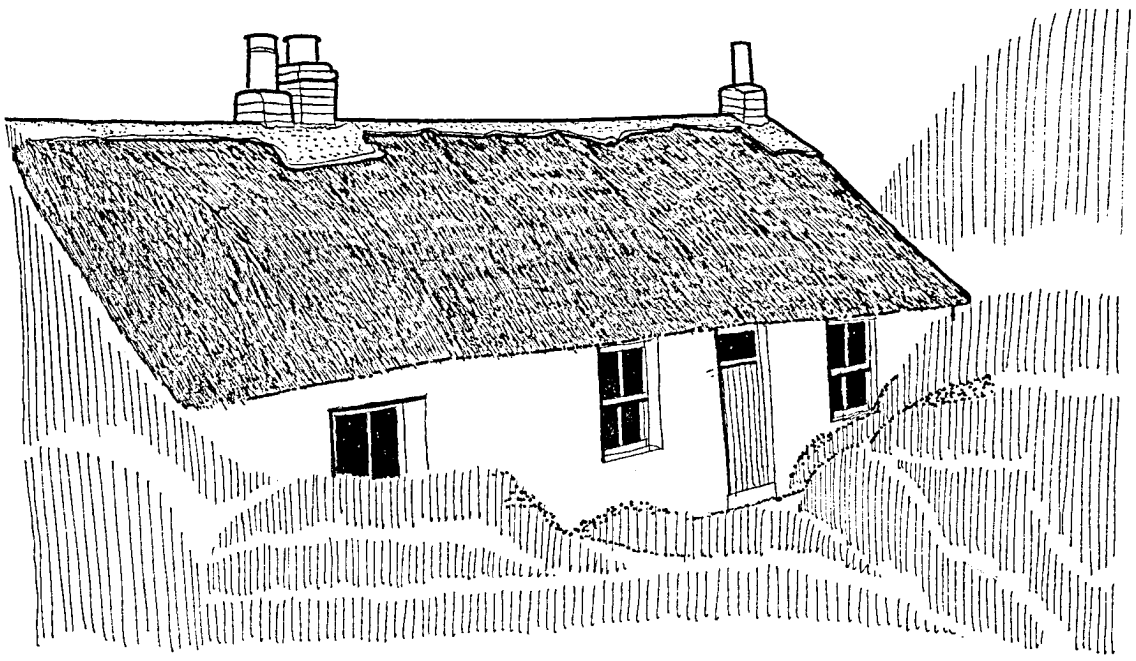


14.05 East Central

This division includes: Strathmore, Strathearn: the Carse of Gowrie: Fife: Kinross: Clackmannan and the Carse of Stirling.

This is known to have been an area of straw thatches until the end of the nineteenth century when the use of reeds from the reed beds on the River Tay quickly superseded the earlier thatches.

The earlier straw thatches appear to have been pegged into position. Bottles of straw thatch bound with a wisp of straw slightly above the half way mark on the bundle were then placed on the roof. The pegs were pushed through the tie, at least two pegs per bottle, into the turf sub strata. The pegs were angled to obtain maximum grip and the ends were covered by the next layer of bottles. In some instances the straw thatch was left insitu when the

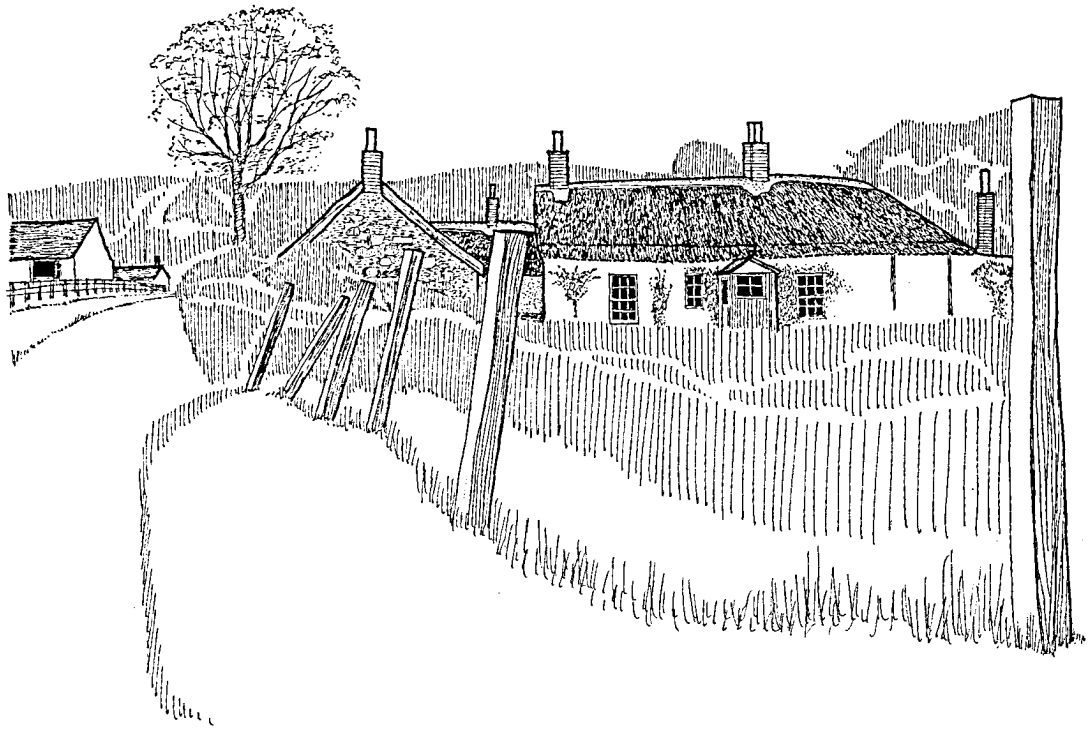


Rait, Kilspindie, Perthshire.

Reed thatched roof with concrete ridge.

Leetown, Errol, Perthshire.

Reed thatched roofs with concrete ridges.



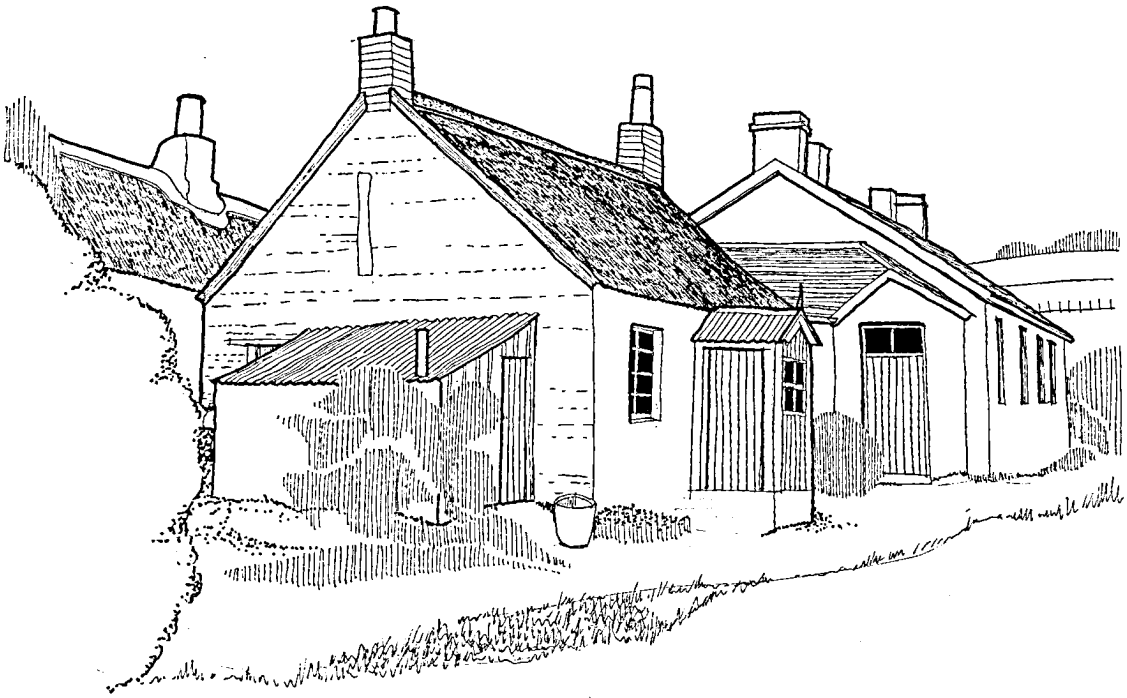
Cottown School and Schoolhouse, St Madoes, Perthshire.

Reed thatched roof with concrete ridge.

weather surface was changed to reed. In these cases the reed was cut to eighteen inch lengths and simply dressed at an angle through the existing thatch into the turf substratum. This was left without additional restraint.

In other instances the move to reed involved the complete removal of the straw thatched roof including the turf substratum. The new reed thatch was then laid using the full length of the reed and working in two bundle lanes running from eaves to ridge, each lane being completed before the next was started. Lanes were formed working across the roof pitch from right to left.

Thatches in this division were ridged, the common ridging materials being turf or mass concrete.



Cottown School and Schoolhouse, St Madoes, Perthshire.

Reed thatched roof with concrete ridge.

Cottown School and Schoolhouse, St Madoes, Perthshire.

Reed thatched roof with concrete ridge.

14.06 South-east

This division includes: the Lothians and the upland Border counties.

In this area clay was used to coat the upper ends of the thatch to provide a secret fixing. This system of thatching is recorded in Yorkshire in the seventeenth century and in south east Scotland in the eighteenth century but the date of introduction to either of these regions is not known.

Since the area is comparatively sheltered from the worst of the prevailing winds external restraint of thatch is less common. Ridges, hips and skews are protected with living grass turf creating a soft frame to three sides of the roof pitch.

Unfortunately no traditional thatches survive except under sheet metal. It must be stressed that these are of exceptional importance and should be given special protection.

Stob thatching techniques are also known particularly for repairs or for lower class roofs.

The surviving thatches in the region are all imported styles such as Jock Brough's re-thatching of Swanston in the 1950s.

14.07 South-west

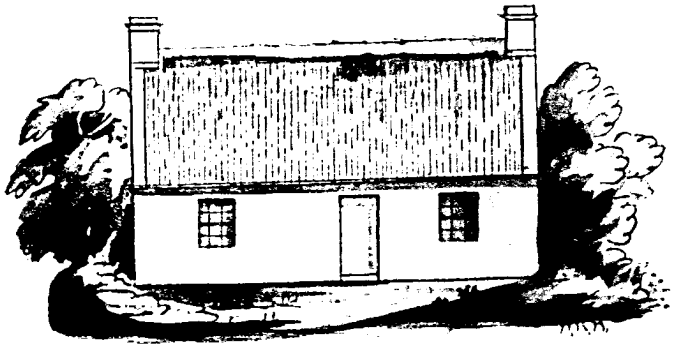
This division includes: Upper Strathclyde: Ayrshire: Dumfriesshire and Galloway.

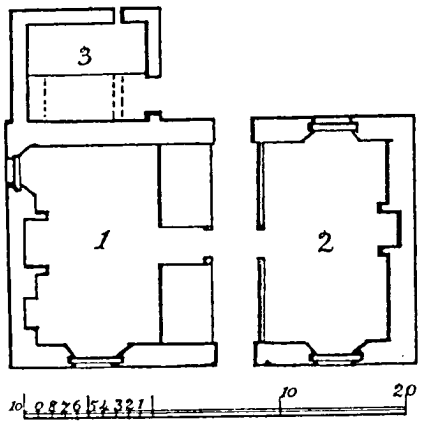
This is an area where the thatching techniques are more closely related to those still practiced in Ireland, Isle of Man and Pembrokeshire than to those in the rest of Scotland. It is a windy region but is not subject to the exceptionally high winds encountered in the North and North west Highlands and Islands divisions. This is reflected in the type of thatching adopted. The thatch is applied using the stob thatching technique common in the East Central and South east divisions but is provided with additional restraint in the form of scob and raip but does not normally require the netting, roping and heavy weighting characteristic of divisions 14.01 and 14.02. This said, additional restraint can be obtained in exposed situation, by attaching the ends of the ropes or twine to pegs, pins or corbelled stones placed below the line of the eaves and/or skew.

Thatches top-dressed with clay are also known in this area, particularly towards central Scotland. These are mainly used in terrace situations and the surviving examples are again under sheet metal.

Pattern Book designs from the early nineteenth century, from South-east Scotland.

No 2. Gabled roof with turf ridge.



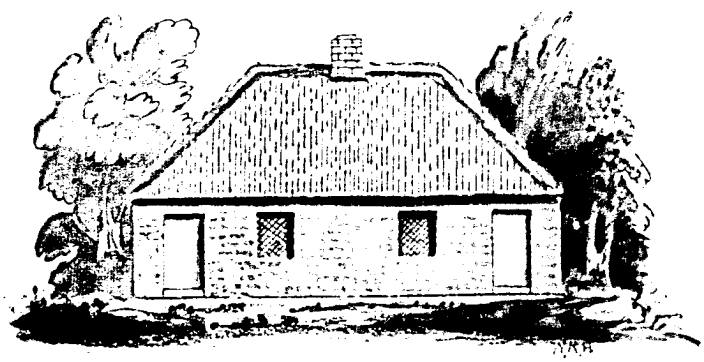


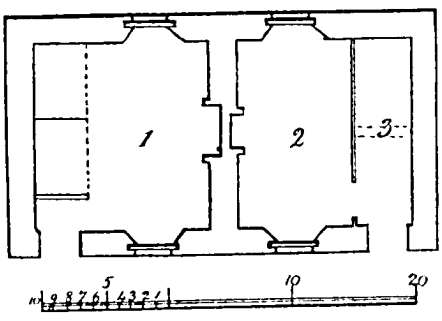
RH.

No. 2

Pattern Book designs from the early nineteenth century.

No 1. Hipped roof with turf ridge and peans.





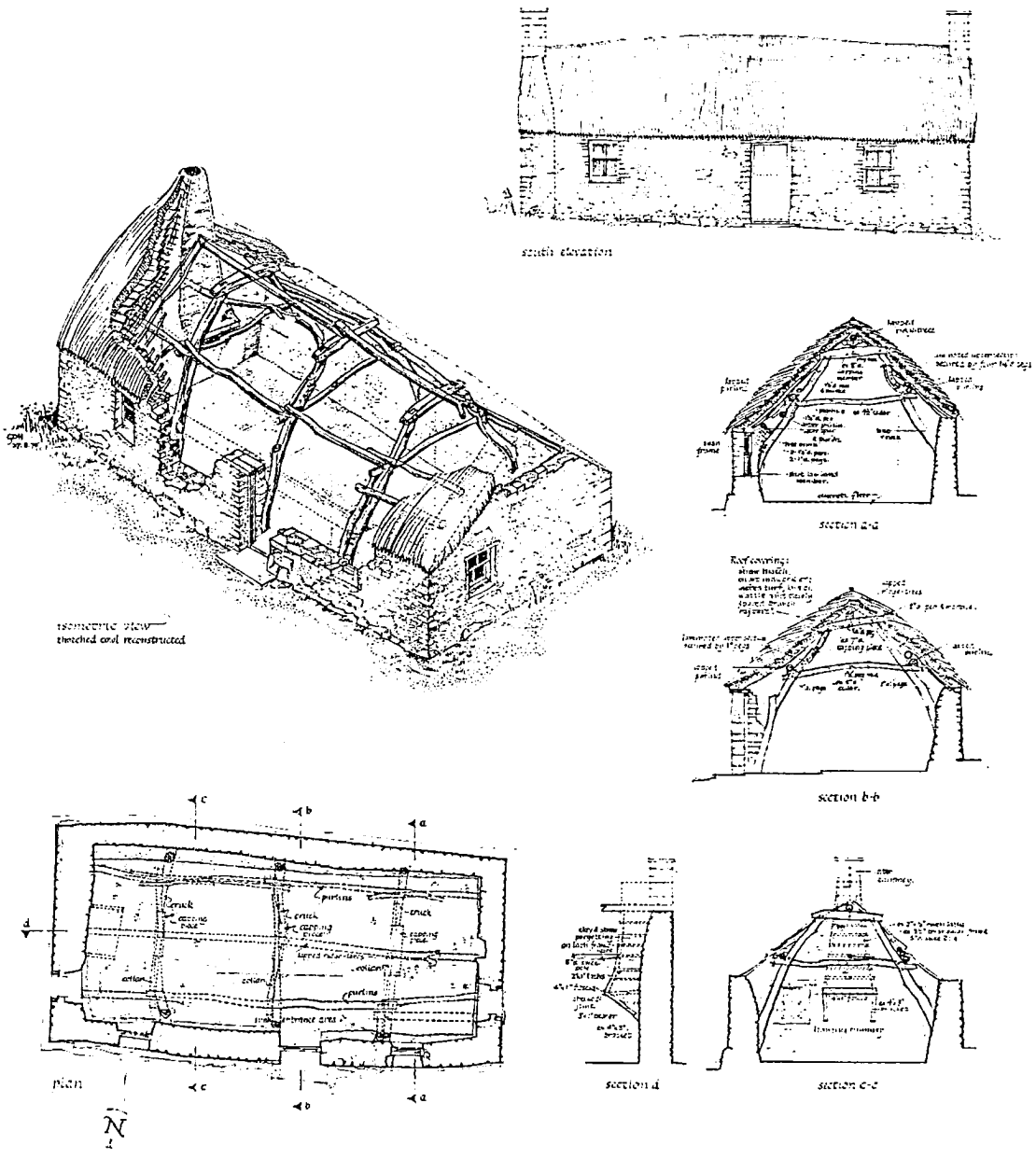
RH

No. 1.

South-west Scotland
Paton Cottage,
Torthorwold,
Dumfriesshire.

Straw thatched roof with skew roll.

RCAHMS - DFD1108/1



CRUCK-FRAMED COTTAGE . TORTHORWALD. DUMFRIESSHIRE

15
MAINTENANCE AND REPAIR

15.01 General Precautions

Thatch should never be subjected to point loads and care should be taken to ensure that children, adults, animals, ladders and other heavy objects are kept away from the roof unless absolutely necessary, and then, only in controlled conditions.

All tradesmen visiting the house, including window cleaners and those in the service industries, should be warned of the vulnerability of thatch to point loads and impact damage.

15.02 Regular Inspection

It is essential that thatch be regularly inspected for physical damage and general deterioration. This is particularly important after any form of roof works including works to chimneyheads, chimney sweeping, painting contracts, window cleaning or after storm conditions.

Any sudden sinking of the weather coat whether at the ridge or on the roof pitch should be investigated by a suitably qualified thatcher. Holes made by nesting birds or by vermin should be filled as soon as possible as they form a weak point in storm conditions or might be colonised by larger birds.

The thatcher might be the house occupant in many Highland and Island situations or could be a qualified thatcher in most lowland situations.

Minor works carried out when a problem first manifests itself may avoid the need for major works a few months, or even weeks, later.

15.03 Natural Deterioration

English thatchers tend to equate the projected life of a thatch to: the steepness of the roof; the dryness of the climate; and the exposure of the roof to both sun and wind. The argument being that: the steep roof sheds water quickly; the dry climate and exposure to sun and wind keeps the thatch dry and prevents the growth of moss.

This is based on the observation that any part of the thatch protected from surface water shows little or no signs of deterioration over a prolonged period.

These principles hold good for lowland thatches in Scotland although generally Scots roof pitches tend to be lower. This may relate to vulnerability to wind damage or it may result from the roof pitches being set at a time when stob thatch was commonplace as the roof pitch tends to steepen during routine maintenance with the application of successive layers.

A thatched roof with a pitch in excess of 45 degrees in a warm dry climate should have a life expectancy of:

Reed	-	40 to 80 years
Wheat Reed	-	25 to 40 years
Long Straw	-	12 to 20 years

These figures would be reduced by 30 to 40 per cent in a mild wet climate, by a further 10 to 20 per cent for pitches from 40 to 45 degrees and by 20 to 50 per cent for pitches between 30 to 40 degrees.

This means that the life expectancy of a slack pitched roof in the south west Highlands, where a mild wet climate prevails, could be up to 90 percent lower than the figures given above. That is:

Reed	-	4 to 8 years
Wheat Reed	-	2.5 to 4 years
Long Straw	-	1.5 to 1.8 years

Add to this the effect of a shaded site where moss growth would be expected and a reed roof can fail after only one year. This makes any of the three major thatching techniques generally used in England totally uneconomic in the Highlands and Islands of Scotland and explains the survival of inexpensive but high maintenance thatches in these wet areas.

15.04 Mosses, Lichens and Fungal Growths

The problems of moss, lichen and fungus on thatched roofs is discussed in item 3.02. Moss can be removed physically or treated with chemical sprays but little is known of the effects of these chemicals on the life expectancy of the thatch. Chemical treatments are affected by the weather and warm damp conditions will result in faster re-establishment of the moss or lichen than a well ventilated dry location.

Do not climb on the thatch to spray or remove moss or fungi. See items 15.01 and 15.

15.05 Pest Damage

Damage by birds should be dealt with as soon as possible but is easy to repair. Rodent damage is more difficult to trace and to repair as they can chew their way in any direction under the weather coat of the thatch. This is particularly damaging in thatches with concealed fixings. Repair work should be carried out by a suitably competent thatcher.

15.06 Fire Protection

Thatch by its very nature is a combustible material therefore it is important to reduce the risk of fire to an absolute minimum. Precautions are a matter of common sense but those in doubt should consult the local Fire Prevention Officer.

Precautions should include:

(a) Keep dry-powder fire extinguisher in kitchen.

(b) CO2 or water fire extinguishers in other areas of house.

(c) Ensure that solid fuel appliance flues are swept regularly: at least twice a year for appliances in regular use.

(d) Fit spark arrestors to chimney cans and check that these are overhauled or replaced each time the flue is swept.

(e) Check the condition of flues particularly within the roof space to ensure that there is no leakage. The most dangerous area is where the flue passes through the thatch and this area should receive special attention during re-thatching or thatch repairs.

(f) Ban all naked flames in roof space. This must include smoking, blow-lamps, and warm air heaters. Make sure that all tradesmen working in the house are aware of these rules.

(g) Ensure that the wind is blowing away from the house before lighting bonfires and if possible burn rubbish in an enclosed chamber with a spark arrestor fitted to the flue outlet.

(h) Take particular care in the siting of barbecues.

(i) Ban the use of fireworks in the vicinity of the house.

(j) Come to agreements with neighbours to observe items 15.06 c, d, g, h and I.

(k) Have electrical wiring checked regularly by a qualified electrician. Perished or damaged wiring is a potential source of fire.

(l) Seek advice on any specialist provision that might be required from local Fire Prevention Officer.

The Fire Prevention Officer may suggest that the thatch is sprayed with a fire retardant solution or that on re-thatching the thatching material be dipped in a fire retardant solution or that a barrier foil or fire retardant board be inserted between the roof timbers and the thatch. Often these can work against the thatch in other ways as discussed below, and this should be discussed with the Fire Prevention Officer.

(m) Fire Retardant Sprays. These comprise water-based solutions of salts sprayed into the thatch using a multi-headed spray lance. This deposits a fire retardant material on the surface of the thatch. Unfortunately the material is subject to weathering-off where exposed to the elements and therefore fails to give protection to the outer weather surface.

(n) Barrier Foil. This comprises a heavy-gauge aluminium foil laid over the top of the roof timbers, lapped to shed water to the eaves. The material helps protect the house during re-thatching or repairs but its main disadvantage is the reduced ventilation of the thatch from the roof space. This may not be a problem when the thatch is reed, wheat reed or long straw but the tighter thatches over turf or random thatches are not naturally self-ventilating from the exterior and need the penetration of air from the interior to prevent the thatch becoming waterlogged or at least damp enough to rot.

(o) Fire-retardent board. The majority of fire retardant boards are rigid and reasonably dense in texture. The boards therefore restrict ventilation in the way described above. Even more worrying is the solutions adopted in some areas where these boards have been used over historical irregular roof structures. In some cases, these historic timbers have been ripped out to replace them with a regular roof. The removed timbers may be the most historical elements of the whole building and this type of change would require full listed building consent.

Manufacturers should be encouraged to develop a flexible fireproof mat that breathes at the same rate as fibrous turf. The method of jointing would also be crucial in achieving the necessary fire protection.

(p) Changing Regulations and Changing Products. The majority of materials developed for thatching have been developed in England where the roofs are generally steeper and the weather generally drier than in Scotland. They may prove reasonably successful on Cottage Orné, Arts and Crafts buildings and later thatches in Central Scotland but they could provide detrimental to traditional thatches elsewhere in Scotland. The situation is being monitored and new regulations are being considered. **It is important to check on changes that may have occurred since the date of publication of this guide.**

15.07 Planned Maintenance

Ensure that the house owner and or occupant is fully aware of the maintenance cycle appropriate to the type of thatch and that this is carried out at appropriate times.

15.08 Replacement of Turf

The traditional sub-stratum of turf often causes Building Control officers to object to the use of thatch as it is a source of dirt and dust in the interior of the house. A breathable geotextile mat may perform in the same way as the turf sub-strata but would prevent dust dropping into the house interior. Similarly a fibrous material like a glass fibre or plastic fibre mat could be developed to replace the turf sub-stratum. These mats would have to be as flexible as turf to accommodate irregularities in the historic structure and ideally should provide a degree of fire protection.

15.09 Access to Roof

It may be necessary to carry out repairs to the completed thatch such as the removal of moss, filling in holes made by birds or vermin, repair of storm damage and so on. Then it is essential that a sufficiently long single-stage ladder be employed that allows the repairer to reach the damaged area without exerting point loads on the thatch. The ladder must be long enough to stretch from the ground to the damaged area, which might be at the ridge, lying parallel to the weather coat of the thatch. This demands considerable skill in determining where the foot of the ladder should be set, to allow it to be lowered gently onto the roof pitch without undue pressure on the eaves or the upper pitch of the roof.

Work of this type is more safely carried out from a scaffold or staging, erected to eaves level and using the ladder from there. This allows the use of shorter, lighter ladders and reduces the risk of damage to the thatch.

Repairs of this type should be carried out when the thatch is slightly damp rather than at the end of prolonged periods of wet or dry weather. Thatch that is sodden is easily damaged as is thatch that is too dry.

16
CONSERVATION ISSUES

16.01 General Principles

Historic Scotland's preferred conservation policy is to "treat as found" and to respect the individual idiosyncrasies of the design, detail and character of each individual building.

Similarly all replacement materials should be on a "like for like" basis.

16.02 Replacement Thatching Materials

Thatch is by its nature a semi-permanent material subject to natural degradation and therefore to eventual renewal.

In the past, changing economic circumstances often resulted in a change of material. One comparatively recent example is the increasing crop of reeds from the Tay reedbeds at a time when mechanised harvesting techniques were making the traditional straw for thatching more and more difficult to obtain. The result was a change from straw to reed thatch.

This is a natural progression and can be paralleled in many parts of Scotland with different materials and different driving forces. Some thatchers and owners argue that these progressions should be allowed to continue. This was occasionally accepted in the past mainly through ignorance of local thatching techniques or through pressure applied by incoming master thatches.

Historic Scotland accepts that a decision of this type should remain with the local Planning Authority for "new-build" roofs but on old roofs, particularly those on listed buildings, every effort should be made to conserve local techniques, materials and traditions.

This policy is based on the premise that when a thatched building is "listed" the natural progression should cease and the surviving thatching material and details should be taken as a model and replicated when the roof requires top dressing or renewal.

Unfortunately the quality of traditional materials is being affected by a number of external forces, particularly the use of concentrated nitrate fertilisers and changes in the husbandry of the thatch-producing areas.

More attention needs to be given to counteracting the effects of nitrate pollution of thatching materials and changes in the husbandry of thatch producing areas. Local Authorities with significant numbers of thatched buildings should make arrangements to protect and expand sources of the materials used in their area.

To date, the only successful man-made replacement thatching material is natural plastic extruded "reed". This can be applied using traditional methods but eliminates the problems of rot and damage by vermin. Whether this should be allowed as a replacement for reed thatch on a listed building is problematical but there are extreme situations where this might be considered. Listed building consent would be essential.

It is generally recognised that when a reed thatch fails, the entire thatch requires to be stripped and renewed. This is not the case when the reeds are cut reeds, driven through an earlier thatch into a substratum of turf. This and all other thatches are capable of being partly stripped to retain the substrata and undercoats of sound thatch under the replacement weather coat.

16.03 Replacement Ropes and Nets

Ropes and nets are often subject to even faster degradation than thatch and the conservation issues are even more complex.

Traditional roping systems normally employed handmade ropes such as sugan and simmons. The life expectancy was short, usually less than five years on a roof surface although they may survive for a great many years under later top dressings of thatch.

A change of circumstances began in the late nineteenth century, continuing until the Second World War. This involved a move from hand-made ropes to either coir or to discarded fishing gear, including both nets and ropes. This gear, although not strong enough to serve its original purpose, lasted longer than the handmade ropes in holding down the thatch. The nets were fine-meshed herring drift-nets or inshore fishing seine-nets.

These materials are now difficult to obtain. Coir is no longer imported in vast quantities as stronger cheaper fibres have reduced the demand. Now as the quantity imported decreases, the cost increases. Shipments to individual suppliers are often difficult to track down and often there is none available on the open market. In areas where this is used for thatching a regular supply should be established if the current style of thatching is to be maintained.

The second-hand drift net is much more problematical. These were traditionally expensive to manufacture but the cost was amortized by the fish caught. The discarded net had no market value and deteriorated quite quickly lying on the roof of the house but was easy to replace. Now, drift netting by large numbers of small to medium sized sail boats has been replaced by purse seine-netting from an ever

decreasing fleet of medium to large motor boats and the nets are now made from long-lasting man-made fibres. This affects the value, the mesh size, the strand thickness and most importantly, the colour, bright blue or orange being the most common. Where the sea provides the second-hand net in the form of flotsam, there appears to be little harm in allowing the tradition of using this material on the roof of the house to continue, as the quantity available is small in relation to the total number of thatches.

Black nylon strawberry nets are similar in mesh size to drift-net but have a much finer strand. They are easy to handle but are almost invisible on a random thatched roof. These have been used with coir rope on the Blackhouse at 42 Arnol, Lewis, but change the character of the roof.

Perhaps the way forward is to return to the use of handmade ropes that would have been used without a net but use the black nylon strawberry net as an almost invisible back-up, to reduce the risk of storm damage.

Galvanised metal nets and meshes are used to weight many thatches in the Highlands and Islands. Here it is important to replace on a like-for-like basis for as long as the individual pattern of mesh remains in production.

16.04 Replacement of Anchor Weights

The weights used to anchor the ropes or wire net over the thatch add much to the individual character of the house. The character changes from area to area. Some use thin flat stones, of regular size, others rounded boulders, slivers of slate or flagstone, straightened metal cart tyres, rubbing strakes from ships, bands and rods from broken agricultural machinery or in some cases bricks.

All replacements should be in character with the rest of that roof no matter now bizarre. Suitable flotsam such as the heavy nylon hawser used as a continuous weight round the wire netting of a house in South Uist should also be accepted.

16.05 Protection of Traditional Timbers

The traditional timbers forming the roof should always be considered as being more important than the semi-permanent thatch.

In the past, when thatch has been renewed, the traditional timbers have sometimes been replaced or cut to provide a regular surface on which to lay thatching bats. Work of this type requires Listed Building Consent and if timbers are deemed to be inadequate they should be repaired or reinforced or the structure doubled-up to retain as much of the original structure as is possible.

16.06 Restoration Thatches

Restoration thatches should only be undertaken when complete details of the original thatch are known and are to be replicated in every respect.

16.07 Experimental Thatches

Experimental thatches are sometimes constructed to test descriptions of earlier thatches. Experiments of this type, if properly set up and carefully monitored can provide a great deal of information. Experiments also allow thatches, only known by description, to be experienced and assessed. They might also highlight possible deficiencies in the description or allow ambiguities to be clarified.

Experimental thatches are particularly useful as parts of archaeological reconstructions, particularly if linked to elements or other clues surviving from excavations.

Reconstructions are unlikely to proceed as a result of a single excavation and would normally be erected in the vicinity of the excavation but not on the original archaeological site.

17
SPECIFICATION AND MEASUREMENT

17.01 Purchase of Materials - Historical

Establishing the amount of material originally purchased for a thatched roof is extremely difficult as the meaning of the terminology varies from area to area as does local practice and agreements.

The length of the material, diameter of the bundle or size of the cart, and the method of charging for a set number of bundles are all subject to variation. Even at a later date, when other weights and measures were standardised under the Imperial system thatching materials remained outwith standard control.

The problem was addressed in a chapter on roofing materials for farm buildings in 1908. The reporter stated that, in Somerset, halumn (stalks of wheat or bean) was sold in bundles 3 feet high by 5 feet 6 inches circumference and sold by the dozen bundles. He went on to say:

> "To thatch a new roof, twelve bundles per square of 100 feet would be required - these would weigh about 5 cwt, and should give a coating of 6 inches thickness".

Another writer in the same journal says:-

> "My experience is that a ton of straw will cover five squares."

Assuming that one square equals 100 square feet the first reporter suggests that a ton of thatch will cover 400 square feet whilst the second thinks that it will cover 500 square feet.

Turning to reeds the same reporter states that reeds are available in bundles 4-6 feet or 6-9 feet long and that all bundles are tied 18 inches from the stub end. The girth of the bundles vary according to the custom of the grower or to the locality. He goes on:

> "Reeds are usually sold at per hundred fathom of 600 bunches, sometimes 720 bunches are called a hundred, others sell at per hundred (60 bunches)."

Assuming that they are still referring to the amount that would cover 100 square feet: the first two statistics refer to the number of bunches required to cover the square to a fathom (6 feet) depth: the last statistic to a one foot depth.

17.02 Specification

Traditionally each thatcher had all the information required to do his job successfully, the skills being handed down from one generation to the next. He could obtain the correct materials; prepared in the right way, cut at the right time, and stored correctly. He knew how to apply these materials to the job, appropriate methods of detailing, methods of finishing and completing the work. He could also advise on maintenance and would be able to forecast when particular maintenance work might be necessary. Materials were predictable, the thatcher used tried-and-tested procedures and the only problems were those posed by poor harvests or natural disasters. This accepted there was little need for formal specifications.

Unfortunately in many parts of the country this has already changed and even in those areas where traditional thatching still occurs, change seems inevitable.

Conservation and restoration work is controlled by architects or conservation officers who may practise in, or administer, a wide geographical area where there is a range of thatching materials, styles, techniques and finishes. Suppliers of thatching materials are seldom specialists and those who are may be hundreds, if not thousands of miles from the site. Similarly today's thatchers come from a wide range of backgrounds, have learned their craft in many different ways and are increasingly being expected to price for and produce different styles of thatch in areas where they have little knowledge of local conditions. This makes a full specification an essential element of the contract.

This raises the next problem, the fact that very few young architects are taught the skills of traditional specification writing. "Traditional" specification is one that does not constantly refer to materials being in accordance with British Standards and to handling, storage and practices being in accordance with various Codes of Practice neither of which exists for the wide range of materials and the variety of techniques used in Scottish thatches. This, combined with the known decline in the quality of many thatching materials, the poor husbandry applied to them and the lack of basic knowledge and skills, leaves the specification writer with a difficult task. Realistically this will have to be addressed over a long period of time as knowledge and experience is gained for each of the wide range of thatching materials, skills and techniques being considered in a given region. Like many other conservation issues, national solutions have been used in the recent past to the chagrin of locals and a few knowledgeable museum curators who are more aware of regional diversity.

Other countries are facing the same problems. Unfortunately there is no easy option, other than to give up. Regional diversity requires meticulous observation, recording and research followed by an

accurate unambiguous specification, and good site control.

In the longer term an improved system for instructing trainee thatchers and locally accredited certification is required to back up the specification, but this is of secondary importance at this stage.

The ability to write adequate specifications presupposes a complete knowledge of thatching from the growing, harvesting, preparation and storage of the materials to the application of the materials and completion of the roofs.

It is not feasible to expect busy conservation officers to be able to devote the amount of time necessary to carry out the research work required to allow full specifications to be prepared for the thatches in their area; but each specification would make an excellent research project for a trainee conservation officer or architect or could be a worthy topic for a local history group, young farmers club, or other group with historical, social, agricultural or architectural interests.

The specification should cover every aspect of the work and should include the following where appropriate.

1. Type or types of material required.
2. Quantities required or acreage to be sown. (See item 17.03)
3. Family, genus species of plant, and also its common name.
4. Ideal soil conditions - that is - as close as possible to conditions when thatching was widespread in the particular area.
5. Time and method of sowing.
6. Method of husbandry.
7. Location.
8. Best time for harvesting.
9. Position in original agricultural calendar.
10. Preferred condition of crop at time of harvest.
11. Method of harvesting.
12. Method of handling.
13. Drying (if necessary).
14. Method of storage of raw materials.
15. Maximum/minimum/preferred time in storage.
16. Special treatments before application to roof.
17. Method and sequence of application for each material including external restraint, weighting and fixed anchorages.
18. Finishing off works.
19. Tidying site.
20. Maintenance programme for owners.

The above list is not intended to be exhaustive but to give guidance as to the range of topics that may have to be addressed for each of the materials used in the thatching, the sub-strata, the surface finishing, types of restraint, weighting, anchorages and so on. Once prepared and used it will possibly require revision to eliminate problems.

A separate specification is required for each thatch type but only where contractors are being employed. Community group thatches and individuals thatching their own property using traditional materials from traditional sources and applied using traditional techniques can usually be allowed to continue their normal practice. Problems are likely to occur only if one aspect of the traditional procedure is changed. Then careful consideration of the available options will be necessary to ensure that the thatch continues to utilise the same constructional principles as are incorporated in the existing thatch. **However, it is worth considering the preparation of a specification whilst the thatching is still a community or individual occupant type of operation as it will then be available should contractors be required to take over the thatching in the future.**

17.03 Measurement

The last Standard Method of Measurement of Building Works to include thatching materials is the fifth edition: metric published July 1968. Surveyors may wish to use this as a guide in preparing quantities or final measurements for reed, wheat reed and long straw thatches but this document will be of little help in preparing measurements for the more rounded forms of thatch described in this volume.

Similarly, traditional methods of measurement such as "cartfulls" are no longer relevant since the traditional standardised carts of each area have given way to tractor bogies, floats, trailers, various sizes of vans, lorries and so on.

A volume of material can be calculated from a drawing of the roof making allowance for compression and settlement of the material prior to the final roof profile being achieved but with the wide range of materials being used and the various forms of thatching adopted it is impossible to link the volume of completed thatch to the volume of material harvested and the acreage required to produce that material at present. This type of information must be built up through experience of individual thatches in individual situations and be gradually added to the specification. See 17.02.

17.04 Storage

Many thatching materials are cut well in advance of their application to the roof and the materials must be stored until required. The method of storage must be appropriate to the material. Each material has individual characteristics and methods of storage have been developed to keep the materials in the best possible condition.

Storage spaces may be outdoors or indoors, from stackyards for cereal crops, through a range of open-sided but roofed structures to completely enclosed storage sheds. In each case, care must be taken to ensure that the thatching material does not deteriorate and that it is in the best possible condition when applied to the roof.

Materials such as turf should not be stored but should be applied to the roof on the same day as they are cut from the sward. Other materials that were traditionally applied to the roof immediately after harvesting should be treated in the same way when they are used today, otherwise they may become subject to mildew or other rot. Some materials are stored for minimal periods but in specific conditions; for example, rushes may be stored under a weighted board to flatten the stems and make them easier to apply to the roof.

The most important thing to recognise is the quality of the material and to try to follow the programme set by traditional thatches in the locality under consideration.

17.05 Delivery

Ideally thatching materials should be the responsibility of the thatcher but, if these are coming from a distance and are to be delivered by a carrier or other contractor, it is essential to specify exactly how they are to be handled, stacked, covered and protected whilst in transit.

The thatcher should be on site during the delivery to check the quality and condition of the materials before signing the delivery slip.

18
TOOLS

GENERAL

Thatching tools come in a wide variety of forms, sizes and materials each tailored to the needs of the individual thatcher to suit his way of working and the type of thatch being formed.

Most can be made from readily available natural materials or are standard agricultural tools.

The following is a list of basic tools. It should be noted that not all of these will be required on any single roof.

PREPARATORY WORK

18.01 Scaffolding or staging

Scaffolding or staging will be required in every instance where the unsupported length of ladder would exceed current regulations.

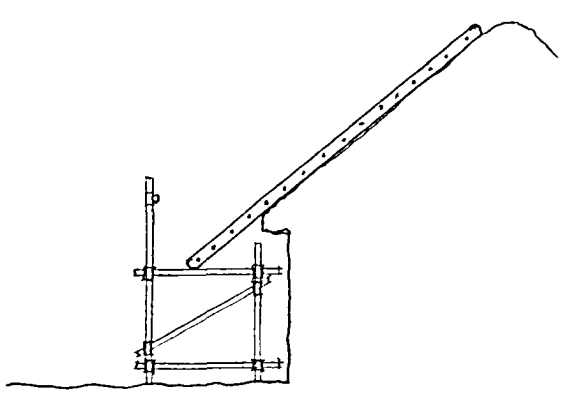
The height of the work platform should be set to allow the eaves to be formed and the platform should be wide enough to allow single stage ladders to be used as set out in item 15.08.

All work platforms of this type must comply with the current Health and Safety at Work legislation.

18.02 Ladders

The thatcher should have single stage ladders capable of stretching from ground or work platform

Diagram showing correct ladder position in relation to scaffolding or staging.



to the ridge of the roof for most thatch types. Shorter ladders may be used on random thatches to gain access to the ridge for forming the upper portion of the thatch and for netting and roping.

18.03 Buckets

A water bucket is essential on sites where the thatch requires to be dampened before application.

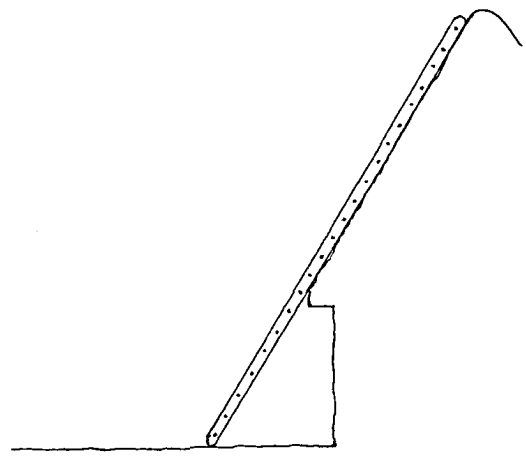
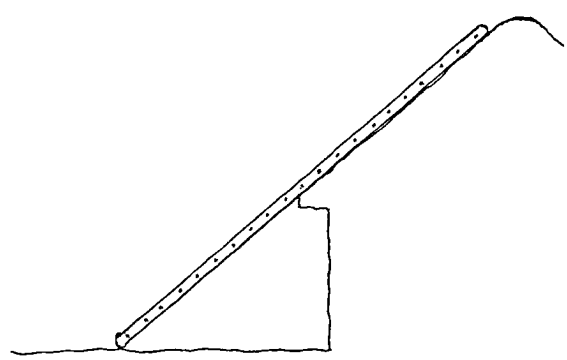


Diagram showing correct ladder positions for steep and slack pitched roofs.



18.04 Scaffold cords

Required for securing ladders in accordance with Health and Safety Regulations.

18.05 Knee Pads

Many thatchers use knee pads for protection.

18.06 Warning Signs and Flags

Required when the scaffold, staging or ladders impinge on the public highway or into public areas. These should comply with all relevant safety standards and should include warning lamps if left in place overnight.

18.07 Spot Board

A wooden board placed on the ground and used for butting thatching materials that are required in bunches or bottles by the thatcher.

18.08 Garden Rake

A garden rake is useful for tidying the site after the removal of the old thatch or after re-thatching.

TURF PARING

18.09 Flaughter Spade

The flaughter spade or breast plough used to be a standard piece of agricultural equipment. Many examples exist in folk museums or on old farms and these can be used to obtain a pattern for a blacksmith made replacement.

The flaughter spade is used for paring turf for use as a sub-stratum, or for beam filling, wallheads, skews and ridges as appropriate.

The cutting blade is normally curved and slightly dished giving the turf a distinctive cross-section. One end of the cutting blade is turned up at right angles to cut the inner edge of the pared turf.

Sizes vary considerably depending on the region as does the angle of shaft to blade. Some take out wide even-shaped turves whilst others remove tapered, almost heart or leaf, shaped turves. Each has its own sphere of influence. Thatchers on the machair of the Western Isles often remove turves that are no more than 25mm thick. Others cut turves of 100mm and over. It is important to recognise local tradition, obtain the appropriate type flaughter spade and use the tool to obtain the correct shape of turf.

18.10 Garden Spade

Common garden spades can sometimes be used to obtain smaller quantities of turf. The turves should be cut to the correct width then using garden spades in tandem and on opposite sides of the turf to be removed, cut towards the centre keeping the spades at the same angles (as far as possible) to obtain a dished base to the turf. These should be as close as possible to the dishing that would be produced using a local flaughter spade.

HANDLING EQUIPMENT

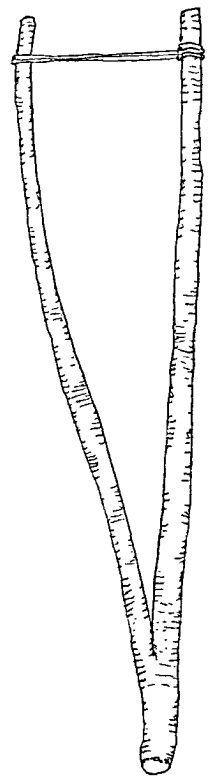
18.11 Hay Fork

Two-pronged hay forks are useful for lifting materials for both random and laid on thatches as the roofs are normally at a low level and easy to reach from the ground. They can also be used to move material taken from he roof for disposal.

Forks make a useful extension to the reach of thatchers applying nylon netting by preventing it from dragging over the surface of the loose thatch.

18.12 Yoke

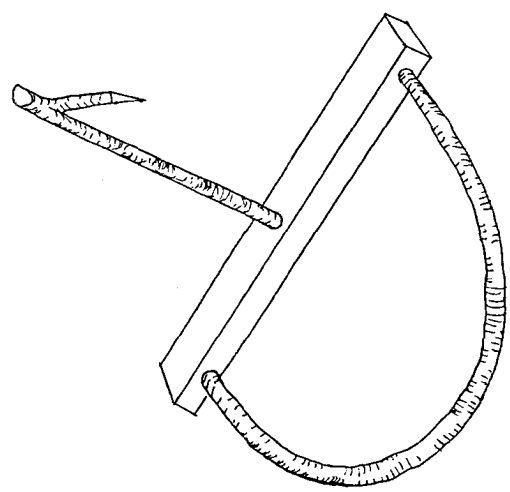
A yoke is a naturally forked branch flexible enough to grip a number of yealms or bottles of straw which are then carried to the roof and laid there until required by the thatcher. A twine loop at the open end of the fork is used to keep the yealms in place.



Thatches Yoke

18.13 Reed Bracket

An L-shaped bracket with a hook to grip a thatching batten. The bundles of reeds are then set over this at right angles for storage on the roof pitch until required by the thatcher.



Reed Bracket

18.14 Thraw Crook

The thraw crook or rope twister is used in the making of straw ropes. Basically it takes the form of a hook round which the first straws of the rope are twisted and a crank or asymmetrical shaft that allows the hook to be turned thereby maintaining the twisting action as more straw is fed into the rope.

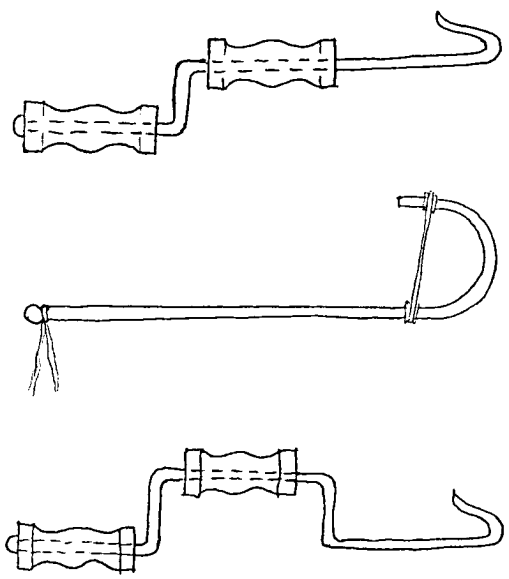
The crank can take the form of a single or doubt offset or can be obtained by bending a pliable ozier into a "walking-stick" shape and tying a string across the bent end. The short projection beyond the string acts as a hook and the other end is attached to the belt of the user. In this way it can be operated with a single hand whereas the other forms of crank require the use of both hands simultaneously.

Three typical thraw-crooks.

a. single crank

b. "walking stick" type

c. double crank.



DRIVING EQUIPMENT

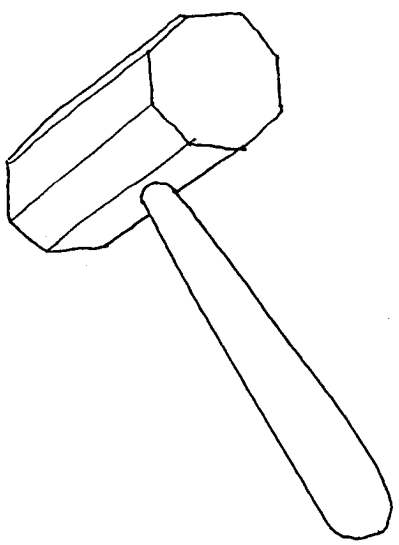
18.16 Claw Hammer

Used for many jobs such as refixing thatching battens or for driving home thatching hooks.

18.17 Mallet

Used for driving home scobs or other forms of rigid fixings.

Mallet



18.18 Leather Palm

Used to protect the palm of the hand when pushing home scobs or for hand dressing of reed.

18.19 Legget

A flat board or angled bat used for dressing reed or combed wheat reed.

These take many shapes and are individual to the type of thatching being undertaken.

They also include a range of smaller "dressers" for working in awkward corners.

The most common type used in Scotland is the angled legget, similar in shape to the blade of an ice-hockey stick but thicker and heavier. These are sometimes faced with a zinc sheet tacked round the edges of the driving face. Other versions are straight, like an elongated butter-pat.

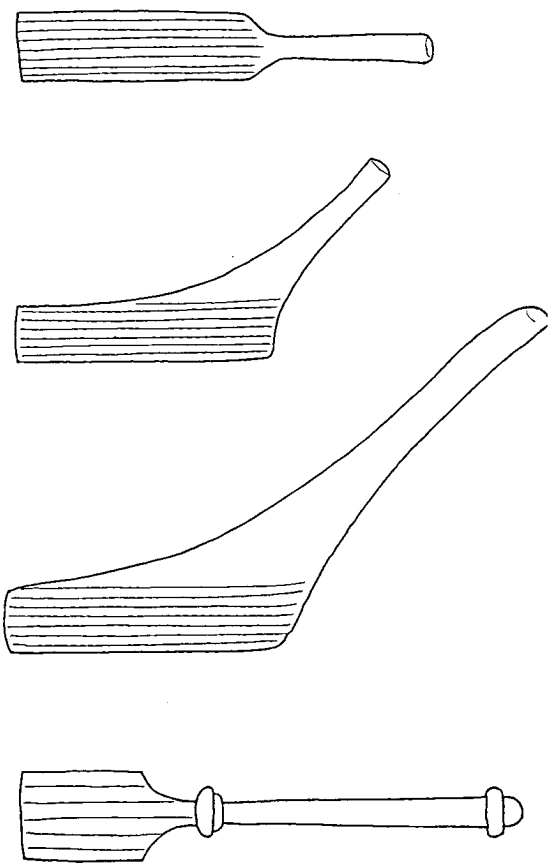
English thatchers have more recently introduced a legget, square on plan and with the handle rising from the back at an angle. Leggets of this type often have short pieces of copper pipe attached to the driving face to increase the grip, others are ribbed or studded.

Three types of Scottish leggets

a. Straight legget

b. Short angled legget

c. Long handled angled lettet.



Straight legget taken from marginal sketch in Court Roll of Manor of Crowle, Lincolnshire - 1364.

(After Saltzman)

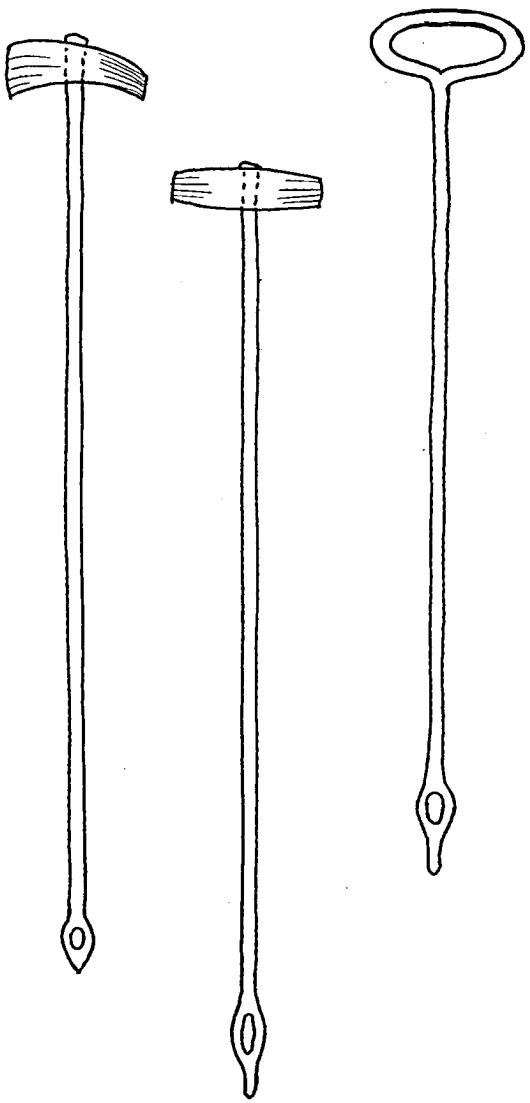
FIXINGS

18.20 Stitching needles

A long metal, or wooden, tool with an eye at one end and usually a handle at the other. Used to carry the twine from the thatcher to his assistant in the roof space and vice versa.

There are a number of variations on the style of needle with: eyes at either end: the eye in the centre: and one curved to form a semi circle or even two-thirds of a circle.

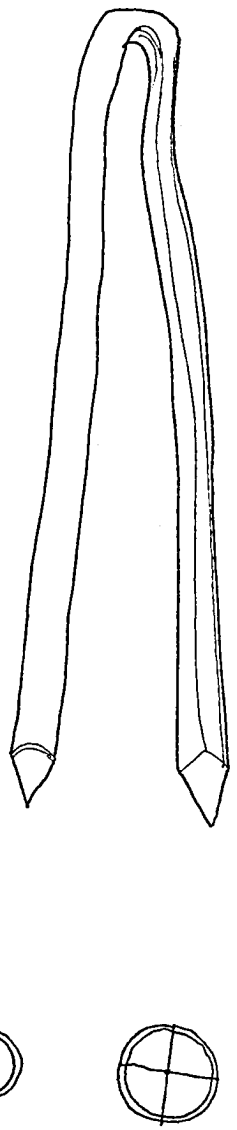
Types of stitching needle.



18.21 Scobs

A split hazel ozier sharpened at each end and twisted in the centre. Used to secure surface rope or stays or as part of a secret fixing system.

Typical scob (hairpin type) with cross sections of hazel wands showing positions for splitting.



18.22 Tarred Twine

Used in conjunction with the stitching needle as a secret fixing for reed, wheat need, long straw and occasionally for other thatches. Made from a mixture of sisal and jute and finished with tar.

18.23 Side Needles

Used as temporary fixings to keep the lanes in place. Can be made of metal or timber. They are usually made with handles to allow easy withdrawal and are similar to stitching needles but without the eye.

18.24 Sways

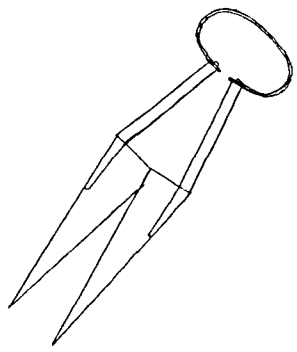
Hazel or willow saplings about 1.5 metres long, held in place by scobs and used for securing thatch. Can be secret or exposed fixing. Also known as liggers, ledgers, rods and runners.

CUTTING AND TRIMMING

18.25 Sheep Shears

Most thatchers in Scotland use standard sheep-shears for general purpose cutting and trimming of material.

Sheep Shears



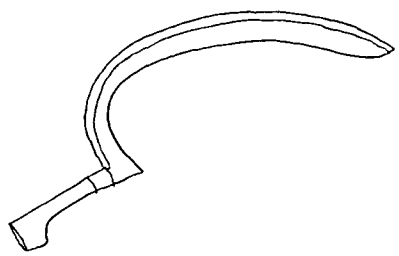
18.26 Wire Cutters or Snips

Used for cutting wire netting or fence wire used to form hooks for weights.

18.27 Heuks (Hooks)

The common heuk or sickle is used for cutting thatching materials and can be used for cleaning down the face of finished work.

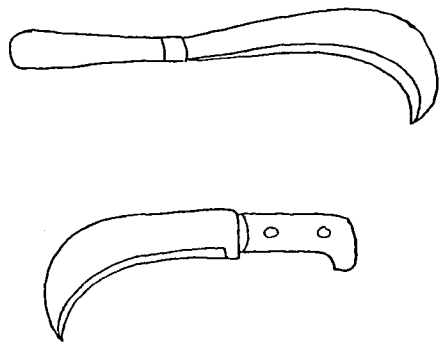
Heuk



18.28 Scob-heuk (Spar-hook)

Used for splitting and sharpening stobs.

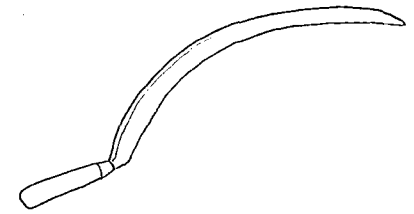
Scob-heuk



18.29 Easing-heuk (Eaves-hook)

Chiefly used for wheat-reed thatching.

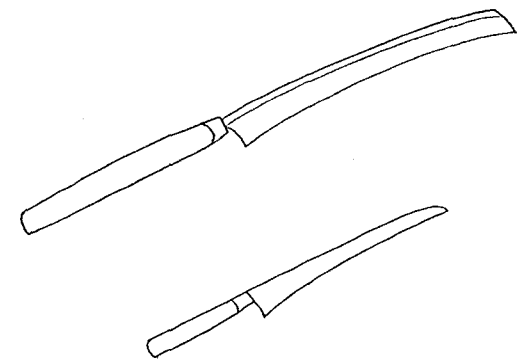
Easing heuk



18.30 Short-handled Knife

Used for cutting the tops of reed when they protrude over the apex of the roof. Often takes the form of a scythe blade with a short handle running as a continuation of the blade.

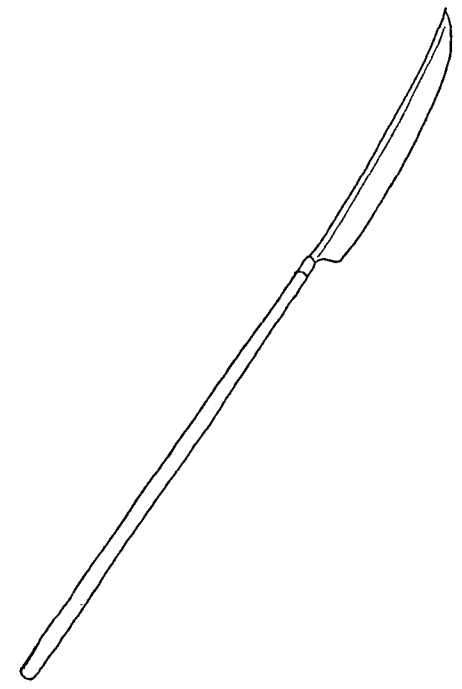
Short-handled knife



18.31 Long-handled Knife

Mainly used for the eaves of long-straw thatch.

Long-handled knife



18.32 Whetstones

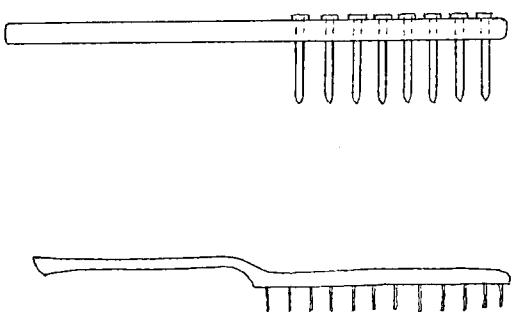
In a range of textures and used for sharpening edged tools.

FINISHING

18.33 Side Rake

A long straight or cranked spar with wire nails driven through one half to form a rake for dressing long-straw work.

Typical side Rakes



19
SELECT BIBLIOGRAPHY

ARGYLL AND BUTE DISTRICT COUNCIL: 1985: Tiree, Coll and Mull: Thatched Buildings Survey (MSS) LOCHGILPHEAD

BALLARD, Linda May: 1982: "The Luck of the Thatch" Ulster Folklife 28 BELFAST 65-66.

BARTHOLOMEW, G: 1951: "The Paton Cottage, Torthorwald "Transactions of the Dumfries and Galloway Natural History and Antiquarian Society 29 (1950-51) 173-176.

BEST, Henry: 1857: Rural Economy in Yorkshire in 1641 being the Farming and Account Books of Henry Best of Elmswell, in the East Riding of the County of York DURHAM.
"For Thatching of a Stacke" 59-60.
"Shorte Remembrances for Thatchinge" 137-140.
"Of Thatchinge" 144-146.

BILLETT, Michael: 1979: Thatching and Thatched Buildings. Hale, LONDON

BOARD of AGRICULTURE and FISHERIES: 1910: Leaflet No 236: Thatching LONDON.

BOYD Ailean: 1986: Seann Taighean Tirisdeach.

BROCKETT, Peter and WRIGHT, Adela: 1986: The Care and Repair of Thatched Roofs. Society for the Protection of Ancient Buildings and Council for Small Industries in Rural Areas: Technical pamphlet 10.

BUCHANAN, Ronald H: 1957: Thatch and Thatching in North East Ireland. Gwerin 2 123-142.

BUCHANAN, Ronald H: 1957 "Stapple Thatch" Ulster-Folklife 3, BELFAST, 19-28.

BURSTOW, Frank: 1988: Thatched Buildings Survey in the Highland Region of Scotland (MSS) Hurd Rolland Partnership, KYLE OF LOCHALSH

COLLIER, S: 1831: "On Thatching with Heath" Prize Essays and Transactions of the Highland Society of Scotland new series 2, 190-195.

DANAHER, Kevin: 1975: Irelands Vernacular Architecture Mercier Press, CORK.

DANAHER, Kevin: n.d.: Irelands Traditional Houses Bord Fáilte, DUBLIN.

DAVEY, Norman: 1961: A History of Building Materials Chapter 7 "Thatch" 55-63 LONDON.

DENNISON, Gabriel and O'FLOINN, Bairbre: 1990: A Lost Cause?: A Review of the Present State of Thatch and Thatching in Ireland with Proposals for the 1990s Ceann Tui: National Heritage Council DUBLIN.

ERSKINE J F: 1795: General View of the Agriculture of the County of Clackmannan EDINBURGH.

EVANS, E Estyn: 1957: Irish Folkways LONDON and BOSTON.

EVANS, E Estyn: 1974: "Folk Housing in the British Isles in materials other than timber" Geoscience and Man V. (June) 53-64.

FEARN, Jacqueline: 1978: Thatch and Thatching Shire Album 16, AYLESBURY.

FENTON, Alexander: 1970: "Clay Building and Clay Thatch in Scotland" Ulster Folklife 15/16 Ulster Folk Museum, BELFAST 28-51.

FENTON, Alexander 1976: "Thatch and Thatching" in Fenton, Walker and Stell (eds) Building Construction in Scotland: Some Historical and Regional Aspects DUNDEE and EDINBURGH 39-51.

GAILEY, Alan: 1960: "The Use of Mud in Thatching: Scotland "Ulster Folklife 6 BELFAST, 68-70.

GAILEY, Alan: 1961: The Thatched Houses of Ulster: The First Ulster Folk Museum Questionnaire" Ulster Folklife 7. BELFAST 9-18.

GAILEY, Alan: 1962: "Ropes and Rope Twisters" Ulster Folklife 8 BELFAST 72-82

GRÜTZMACHER, Bernd: 1981: Reet-und Strohdächer Alte Techniken Wiederbelebt Callwey MUNCHEN.

HADLINGTON, Martin: 1993: Uist - Thatched House Survey (MSS). EDINBURGH.

HALL, Nicolas: 1988: Thatching: A Handbook Intermediate Technology Publications LONDON.

HAWKE, CJ and JOSÉ, PV: 1996: Reedbed Management for Commercial and Wildlife Interests. RSPB, Sandy, Bedfordshire.

HAWKES, Nigel: 1995: "Secrets of Medieval Life Entwined in Country Thatches" The Sunday Times August 12. Home News 3.

HUTCHINSON, Roger: 1991: "New Life in the Old Thatch" ? (Monday April 29).

INNOCENT, C F: 1916: Chapter XIII Thatching The Development of English Building Construction 188-222.

KNIGHT, John (editor): 1995: "Recovering of Roofs: 4.2.3 Thatch" The Repair of Historic Buildings in Scotland: Advice on Principles and Methods. Historic Scotland, EDINBURGH 20-21.

LOUDON, John Claudius: 1842: An Encyclopaedia of Cottage, Farm and Villa Architecture and Furniture LONDON 2239 and 2455.

LOUDON, John Claudius: 1883: An Encyclopedia of Agriculture LONDON items 2469, 2487, 3184-3190.

MICHELSEN, Peter: 1973: "The Laeso Farmstead" Frilandsmuseet: The Danish Museum Village at Sorgenfri" COPENHAGEN 222-228.

MURRAY, John: 1968: "Outdoor Scot: Jock Brough, Thatcher" Scottish Field 115. 790 (October) 51.

NASH, Judy: 1991: Thatchers and Thatching Batsford, LONDON.

NEWMAN, Paul and Alison: 1991: "Simmens and Strae: Thatched Roofs in Orkney" Vernacular Building 15 27-40.

NEWMAN, Paul and Alison: 1992: "Roof Types in the Traditional Rural Buildings of Orkney" Vernacular Building 16 39-55.

Ni FHLOINN, Bairbré and DENNISON Gabriel: 1994: Traditional Architecture in Ireland and its Role in Rural Development and Tourism University College, DUBLIN.

O'DANACHAIR, Caoimhin: 1945: "The Questionnaire System" Beáloideas15. 203-217.

O'DANACHAIR, Caoimhin: 1975: Foirgneam Na nDaoine Mercier, CORCAIGH.

O'REILLY, Barry: 1990: "Stapple Thatch in Co Dublin" Sinsear 6.

O'REILLY, Barry: 1990: "The Demise of the Thatch" Living Heritage 7.1 (May) 4-5.

PARRISH, Sue: 1994: "The Last of the Thatchers"? 46-47.

PETERS, J E C: 1977: "The Solid Thatch Roof" Vernacular Architecture 8 825.

RICS and NFBTE: 1968: "Section M, Roofing M1: Thatch Roofing M27-34" Standard Method of Measurement of Building Works LONDON 44, 46-47.

RURAL INDUSTRIES BUREAU: 1960: The Thatcher's Craft, WIMBLEDON

ROBINSON, Philip: 1985: "From Thatch to Slate". Innovation in Roof Covering Materials of Traditional Houses in Ulster" Ulster Folklife 31 BELFAST 21-35.

SINCLAIR, Colin: 1953: Thatched Houses of the Old Highlands, Oliver and Boyd, EDINBURGH and LONDON.

SMITH, David: 1978: "Some Flat-roof Thatch Survivals" Folklife 16 LEEDS 74-77.

SOUNESS, James R: 1991: "The Thatched Houses of Tiree" Materials and Traditions in Scottish Building SVBWG Regional and Thematic Studies No 2 EDINBURGH 81-94.

SOUNESS, James R: 1987: "Re-thatching at 12 Lower Ardelne, Lochalsh" Vernacular Building 10 17-24.

SOUNESS, James: 1991: "Heather Thatching in Scotland - Further Observations "Vernacular Building 15 3-26.

STELL, Geoffrey: 1982: "Over Croy Farmhouse, Croy, Dunbartonshire" Vernacular Building 7 1-9.

STOKLUND, Bjarne: 1962: Laesøgården på Frilandsmuseet. København.

STOWE, E J: 1954: Thatching of Rick and Barn Landsman's Library. HARTFORD.

WALKER, Bruce: 1977: Clay Buildings in North-East Scotland SVBWG, DUNDEE and EDINBURGH.

WALKER, Bruce: 1979: "The Vernacular Buildings of North-East Scotland: An Exploration" Scottish Geographical Magazine 95 (April) 45-60.

WALKER, Bruce: 1979: Scottish Vernacular Architecture in Nineteenth Century Photographs DJCA DUNDEE.

WALKER, Bruce: 1981: "Rait, Perthshire, Scotland: An Exploration in Architectural Archaeology" Permanent European Conference for the Study of the Rural Landscape: Collected Papers, Denmark, Session 1979 COPENHAGEN 201-211.

WALKER, Bruce: 1989 "Traditional Dwellings of the Uists" Highland Vernacular Building SVBWG EDINBURGH, 50-70.

WALKER, Bruce: 1989: "Edited Notes on Hebridean Buildings from Ake Campbell's Field Notebooks of July 1948: I - Sheiling Huts and II - Blackhouses, Crucks and Outbuildings" Vernacular Building 13 47-61.

WALKER, Bruce: 1990: "The Lewis Blackhouse: Green House of the Future" Welcome: News for Friends of the Scottish Monuments September.

WALKER, Bruce, McGREGOR, Christopher: 1992: The Hebridean Blackhouse: Possible Green House of the Future The Ancient Home and the Modernised Internationalised Home: Dwelling in Scandinavia. TRONDHEIM.

WALKER, Bruce: 1994: "Traditional Buildings after the '45" in FOJUT, Noel: PRINGLE, Denys and WALKER, Bruce The Ancient Monuments of the Western Isles Historic Scotland: HMSO EDINBURGH. 55-71.

WALKER, Bruce and McGREGOR, Christopher: 1994: "Thatched Roofs and Thatching Methods on the Isle of Jura, Argyllshire" (MSS report) Argyll and Bute DC LOCHGILPHEAD.

WALKER, Bruce, McGREGOR, Christopher and STARK, Gregor: 1994 "Thatched Buildings: The Scottish Experience" in Ni FHLIONN and DENNISON (eds) op. cit. 70-76.

WALKER, Bruce, McGREGOR, Christopher and STARK, Gregor: 1994: "Thatching: Keeping the Tradition Alive "WELCOME: Friends of Historic Scotland Autumn, 8-9.

WATSON, Mervyn: 1979: "Flachters: Their Construction and Use in an Ulster Peat Bog" Ulster Folklife 25 BELFAST 61-66.

WEST, Robert: 1987: THATCH: A Manual for Owners, Surveyors, Architects and Builders David and Charles, NEWTON ABBOT.

WILIAM, Eurwyn: 1975: Straw Rope Underthatch in South-West Wales" Folklife 13 LEEDS 84-89.

WILIAM, Eurwyn: 1976: "Scollop Thatch in Co Mayo" Folklife 14 LEEDS 99-100.

WILIAM, Eurwyn: 1982: "Straw-rope Underthatch in South West Wales" Vernacular Architecture 13. 35-38.

WILIAM, Eurwyn: 1988: Home Made Homes: Dwellings of the Rural Poor in Wales National Museum of Wales CARDIFF.

WINDER, Thomas: 1908: Handbook of Farm Buildings, Ponds, Etc, and their Appurtenances SHEFFIELD, LONDON and GLASGOW 29-34.

20
USEFUL ADDRESSES

Thatched Houses Grants Scheme
HISTORIC SCOTLAND
Longmore House
Salisbury Place
EDINBURGH
EH9 1SH 0131 668 8600 Advice, Grants

SCOTTISH NATURAL HERITAGE
Battleby
Redgorton
PERTH
PH1 3EW 01 738 627921 Materials

HIGHLAND FOLK MUSEUM
Duke Street
KINGUSSIE
PH21 1JG 01 540 661307 Archive

Scottish Country Life Archive
NATIONAL MUSEUMS OF SCOTLAND
York Buildings
Queen Street
EDINBURGH
EH2 1SD 0131 225 7534 Archive

Country Life Archive
GLASGOW MUSEUMS and ART GALLERIES
Kelvingrove
GLASGOW
G3 8AG 0141 221 9600 Archive

SOUTHERN ISLES AMENITY TRUST
Sgoil Lionacliet
BENBECULA
Western Isles
HS7 5PJ 01 870 602039 Advice, Archive, Grants

21
GLOSSARY OF TERMS

BARGEBOARD - Verge board,

An inclined board, at the junction of the gable and the roof slope, covering the ends of the roof timbers and/or the thatch.

BERE - Bear

A kind of barley hardier than the normal type but of inferior quality. Ordinary barley has two rows of grain on the ear, bere has four.

BOG OAK

Any form of wood preserved in a peat bog.

BOTTLE

A bundle or roll of thatching material.

BRUSHWOOD

Cut or broken off branches that are flexible enough to weave between parallel rails.

CABERS - Cabar, Kebber

Generally used to describe the long straight poles used to span from eaves to ridge over the purlins. The thinnings from young plantations. Thin versions of these are known as UPSTARTS in south-west Scotland.

CANOPY CHIMNEY

A large projecting chimney hood used to convey smoke slowly towards the exterior of the house. May also be used for "hanging" meat or fish as part of a curing process hence the alternative name HANGING CHIMNEY or more recently HINGIN' LUM.

CLAMP - Klamp

A stack of peat or turf. Root crops or other material stored in a stack and covered over with earth, peat or turf, sometimes as a form of thatch.

COIR

Rope made from the fibre from the husk of a coconut.

COTTAGE ORNÉ

An artfully rustic building. A product of the picturesque cult of the late eighteenth and early nineteenth century.

COUPLES - Cupples

The early use of this expression in Scotland refers to any pair of inclined rafters or crucks supporting a roof of a house. More recent usage limits the term to the common rafters.

CROOK

A hook shaped fixing.

CRUCK

Pairs of large curved timbers used as the principal framing of a house. They combine the functions of rafters and wall posts. In many parts of Scotland the crucks are made up of smaller timbers jointed and pegged to provide a continuous support, as described above.

DRIFTWOOD

Any form of wood washed in by the tide. On the west coast of Scotland this included whole trees brought over from the Caribbean by the Gulf Stream.

EAVES - Easing

The base of the roof slope that sits on, or overhangs, the wall.

FLAG (STONE)

Hard fine grained sedimentary rock easily split into layers or large slabs.

FLASHINGS

A strip of impervious material used to deflect water from the junction between a roof covering and another surface (usually vertical).

LANES

The working width left between the completed roof and the ladder when applying the thatch in two to three bundle widths from eaves to ridge.

LUMS

A Scottish name for a smoke vent, chimney or flue.

NEEDLING.v.

To interlace ropes on a roof or corn stack to form a restraint for the thatch.
In Orkney, the needling also produced a substratum to support the thatch.

OSIERS

Long rod-like twigs (usually willow) used in basketry, wicker- or wattle-work.

PONE

A thin oval strip of green turf measuring about 15 x 5½ x 1¼ inches. Used in Shetland in the roofing of houses or peat stacks.

Swards of earth, cut very fine, upon the surface of which grows a short grass. Used for the sole purpose of roofing.

RICKS

A stack of hay, straw or similar material, especially when covered or thatched for protection from the weather.

RIGGIN

The ridge of a roof and in an extended form, the roof itself or the materials of which it is constructed.

SCRAWS

A thin turf or sod generally used for roofing.

SEAMED JOINT

A butt joint with a cover strap of the same material.

SEAMER (STONE)

The cover stone of a butt joint on a flagstone roof.

SHEAVES

A bundle of straw, usually laid lengthwise and bound with straw or twine.

SHINGLES

A thin oblong piece of wood, laid in overlapping rows to cover the roofs and sides of houses.

SIMMONS - Simmens

A Cope made of heather, grass, rushes or straw used to hold down thatch on houses and stacks by being weighted with stones at the eaves. This is not a normal twisted rope, nor is it a normal plait, but a combination of the two. Fashioned by hand-twisting but using a proportion of the available straw to lock the twisted section resulting in a stronger rope.

SKEWS

The edge of a sloping roof at its junction with the gable wall. The Scottish expression for verge.

SMOKE HOLE

The smoke vent in a roof where there is a chimneyless hearth.

SOLDIER COURSE

A row of upright stones, sticks or bricks where the material forms a repetitive pattern.

SOLID ROOFED

A roof formed of heaped material often in the form of a clamp. In solid roofed buildings the heaped materials are placed on horizontal joists at ceiling level.

STACKS

A large usually conical pile of straw or fodder arranged for outdoor storage.

STOOKS

An arrangement of sheaves of corn usually to facilitate the initial drying in the field immediately after harvesting.

SUGAN

A straw or heather rope made using a rope-twister or thraw-crook.

THATCHING BATTENS

Timber battens laid parallel to the eaves to support the thatch and provide a base onto which the thatch can be stitched or spiked.

TREVIS - Trevace

The divisions forming stalls in a byre or stable.

WATTLE

Poles intertwined with twigs, reeds or branches used in the construction of walls and fences.

WEATHERCOAT

That part of the thatch that withstands the impact of the weather particularly the vibrations set up by the wind.

WEATHER FACE

The surface formed by the ends of thatching material exposed to the weather.

Printed by HMSO Scotland Dd 8403480 4/96 (116695)

Thatch and Thatching Techniques

A guide to conserving Scottish thatching traditions

Historic Scotland Technical Advice Note 4

Bruce Walker
Christopher McGregor
Gregor Stark

Thatch is often perceived as a standardised material. This perception spreads far beyond the general public being found amongst architects, builders, conservation officers, surveyors and others connected with the building industry as well as archaeologists, historians and others concerned with the interpretation of the past. It is hoped that this document will change this perception.

This Advice Note is addressed to four distinct groups of readers: those who own or occupy thatched properties; those involved in the maintenance, repair and renewal of thatch; those who grow, prepare or supply thatching materials; and those concerned with historical accuracy, regional distribution patterns, archaeological, historical and conservation issues.